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| | | | | IC ID 2503A-RDU70CW |

SAR Compliance Test Report

| | | | |
|---------------------|---|-------------------|--|
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Statement of Compliance: RIM Testing Services 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 OET Bulletin 65 Supplement C (Edition 01-01), FCC 96-326, IEEE Std. C95.1-2005, 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 FCC OET Procedures, OET Bulletin 65 Supplement C (Edition 01-01), ANSI/IEEE Std. C95.3-2002, IEEE 1528-2003, IEC 62209-1-2005, IEC 62209 - 2-2010 and Health Canada's Safety Code 6.

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| Tested and documented by: | Signatures | Date |
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APPENDIX A: SAR DISTRIBUTION COMPARISON FOR ACCURACY VERIFICATION

APPENDIX B: SAR DISTRIBUTION PLOTS - HEAD CONFIGURATION

APPENDIX C: SAR DISTRIBUTION PLOTS - BODY-WORN CONFIGURATION

APPENDIX D: PROBE & DIPOLE CALIBRATION DATA

APPENDIX E: PHOTOGRAPHS

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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

| | |
|----------------------|---|
| Type | Internal fixed antenna |
| Location | Back bottom centre (main licensed transmitters) |
| Configuration | Internal fixed antenna |

Table 1.2.1. Antenna description

1.3 Device description


| | | | | | |
|--|--|----------------------------------|----------------------------------|----------------------------------|----------------------|
| Device Model | RDU71CW | | | | |
| FCC ID | L6ARDU70CW | | | | |
| PIN | 32D4BD0D (Radiated Rev2), 32D4BD3C, 32E46EDD (Radiated Rev3), 32E895E6 (Radiated Rev4) | | | | |
| Hardware Rev | Rev 2, Rev 3, Rev 4 | | | | |
| Software Version | 6.1.0.260/420/677/825 | | | | |
| Prototype or Production Unit | Production | | | | |
| Mode(s) of Operation in North America | 1-slot GSM 850 GSM 1900 | 2-slots EDGE/GPRS 850/1900 | 3-slots EDGE/GPRS 850/1900 | 4-slots EDGE/GPRS 850/1900 | CDMA2000 Cell 850 |
| Nominal Maximum conducted RF Output Power (dBm) | 32.5 29.5 | 30.0 29.0 | 29.0 26.0 | 27.0 25.5 | 24.0 |
| Tolerance in Power Setting on centre channel (dB) | ± 0.50 | ± 0.50 | ± 0.50 | ± 0.50 | ± 0.50 |
| Duty Cycle | 1:8 | 2:8 | 3:8 | 4:8 | 1:1 |
| Transmitting Frequency Range (MHz) | 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 | 824.70 – 848.52 |
| Mode(s) of Operation | 802.11b | 802.11g | 802.11n | Bluetooth | CDMA2000 PCS 1900 |
| Nominal Maximum conducted RF Output Power (dBm) | 18.5 | 17.0 | 17.0 | 10.5 | 23.5 |
| Tolerance in Power Setting on centre channel (dB) | ± 0.50 | ± 0.50 | ± 0.50 | N/A | ± 0.50 |
| Duty Cycle | 1:1 | 1:1 | 1:1 | N/A | 1:1 |

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| | | | | | |
|--|-------------------------|----------------------------|------------------------------|-------------------------------|-----------------|
| Transmitting Frequency Range (MHz) | 2412-2462 | 2412-2462 | 2412-2462 | 2402-2483 | 1851.25-1908.50 |
| Mode(s) of Operation | 802.11a/n (low band) | 802.11a/n (middle band) | 802.11a/n (upper band I) | 802.11a/n (upper band II) | |
| Nominal Maximum conducted RF Output Power (dBm) | 11.0 | 12.0 | 14.0 | 13.5 | |
| Tolerance in Power Setting on centre channel (dB) | ± 0.50 | ± 0.50 | ± 0.50 | ± 0.50 | |
| Duty Cycle | 1:1 | 1:1 | 1:1 | 1:1 | |
| Transmitting Frequency Range (MHz) | 5180-5240 | 5260-5320 | 5500-5700 | 5749-5805 | |

Table 1.3.1. Test device description

The device supports GSM/GPRS/EDGE 900/1800 MHz bands and UMTS band I & VIII that are not operational in North America, therefore no data is presented in this report for those bands.

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1.4 Body worn accessories (holsters)

The device has been tested with the holster below. The holster is designed with the intended device orientation being with the LCD facing the belt clip. 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 | HDW-38843-001 | 20 |

Table 1.4.1. Body worn holster

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-14322-003
- 2) HDW-15766-005
- 3) HDW-24529-001

1.6 Battery

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

- 1) BAT-30615-006

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1.7 Procedure used to establish test signal

The device was put into test mode for SAR measurements by placing a voice call from a Rohde & Schwarz CMU 200 Communications Test Instrument. The power control level was set to command the device to transmit at full power at the specified frequency. Other parameters include: Channel type = full rate, discontinuous transmission off, frequency hopping off.

1.8 Highlights of the FCC OET SAR Measurement Requirements

1.8.1 SAR Measurement Requirements for 3-6 GHz and Measurement Procedures for 802.11 a/b/g/n Transmitter

- Maintained dielectric parameter uncertainty as close to $\pm 5.0\%$ of the target value as possible.
- Liquid depth from SAM ERP or flat phantom was kept at 15 cm.
- Probe Requirement: Used SPEAG probe model EX3DV4 for 2.4 – 6 GHz SAR testing specs are outlined below:

| | |
|-------------------------------|------------------------------------|
| 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 1.8.1. Probe requirement

- Area scan resolution was maintained at 10mm
- System accuracy validation was conducted within ± 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.

| | |
|-------------------------------------|-----------------|
| Closet Measurement Point to Phantom | 2.0 mm |
| Zoom Scan (x,y) Resolution | 4.0 mm |
| Zoom Scan (z) Resolution | 2.5 mm |
| Zoom Scan Volume | 24 x 24 x 20 mm |
| Zoom Scan Grid Points | 7 x 7 x 9 |

Table 1.8.2. Zoom Scan requirement

- 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 channels 36 and 48 in the lower band 5.15 – 5.25 GHz band; channels 52 and 64 in the 5.25 – 5.35 GHz band; channels 149 and 161 in the 5.8 GHz band.
- 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 $\frac{1}{4}$ dB higher than those measured at the lowest data rate.
- SAR is not required for 802.11g channels when the maximum average output power is less than $\frac{1}{4}$ dB higher than that measured on the corresponding 802.11b channels. The average output power for 802.11a should be measured on all channels in each frequency band.
- SAR test are conducted on each “default test channel” and each band with the worst case modulation that resulted in maximum duty cycle of 99.5 %.

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- Conducted power measurements:

| 802.11a (low band) 6Mbps | | 802.11a (mid band) 6Mbps | | 802.11a (upper band I) 6Mbps | | 802.11a (upper band II) 6Mbps | |
|--------------------------|-------------------|--------------------------|-------------------|------------------------------|-------------------|-------------------------------|-------------------|
| Chan | Cond. Power (dBm) | Chan | Cond. Power (dBm) | Chan | Cond. Power (dBm) | Chan | Cond. Power (dBm) |
| 36 | 11.05 | 52 | 12.00 | 104 | 14.12 | 149 | 13.35 |
| 40 | 11.03 | 56 | 11.97 | 116 | 14.03 | 153 | 13.28 |
| 44 | 10.98 | 60 | 11.95 | 124 | 13.98 | 157 | 13.30 |
| 48 | 10.95 | 64 | 11.98 | 140 | 13.85 | 161 | 13.30 |

Table 1.8.3. 802.11a channel vs. conducted power

| | | 802.11a (lower band) | 802.11a (middle band) | 802.11a (upper band I) |
|-------------------|--------|----------------------|-----------------------|------------------------|
| Data Rate (Mbits) | Mod. | Channel 36 | Channel 52 | Channel 149 |
| | | Cond. Power (dBm) | Cond. Power (dBm) | Cond. Power (dBm) |
| 6 | BPSK | 11.05 | 12.00 | 13.35 |
| 9 | BPSK | 10.61 | 11.53 | 12.93 |
| 12 | QPSK | 9.40 | 10.71 | 12.33 |
| 18 | QPSK | 9.45 | 10.16 | 11.53 |
| 24 | 16-QAM | 8.13 | 9.26 | 10.48 |
| 36 | 16-QAM | 8.00 | 8.47 | 9.68 |
| 48 | 64-QAM | 6.70 | 7.68 | 7.61 |
| 54 | 64-QAM | 6.61 | 7.62 | 7.51 |
| | | 802.11 n | | |
| | | Channel 149 | | |
| | | Cond. Power (dBm) | | |
| 6.5 | | MCS0 | | |
| 13 | | MCS1 | | |
| 19.5 | | MCS2 | | |
| 26 | | MCS3 | | |
| 39 | | MCS4 | | |
| 52 | | MCS5 | | |
| 58.5 | | MCS6 | | |
| 65 | | MCS7 | | |

Table 1.8.4. 802.11a modulation type/data rate vs. conducted power


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| 802.11b @ 1Mbps | | 802.11g @ 6Mbps | | 802.11n @ 6.5 Mbps | |
|-----------------|-------------------|-----------------|-------------------|--------------------|-------------------|
| Chan | Cond. Power (dBm) | Chan | Cond. Power (dBm) | Chan | Cond. Power (dBm) |
| 1 | 18.86 | 1 | 13.02 | 1 | 12.82 |
| 6 | 19.00 | 6 | 17.18 | 6 | 16.93 |
| 11 | 18.30 | 11 | 12.63 | 11 | 12.45 |

Table 1.8.5. 802.11 b/g/n channel vs. conducted power

| Data Rate (Mbps) | Mod. | 802.11g | Data Rate (Mbps) | Mod. | 802.11b |
|------------------|--------|--------------------------------|--------------------------------|-------|--------------------------------|
| | | Channel 6 Cond. Power (dBm) | | | Channel 6 Cond. Power (dBm) |
| 6 | BPSK | 17.18 | 1 | BPSK | 19.00 |
| 9 | BPSK | 16.53 | 2 | DQPSK | 18.89 |
| 12 | QPSK | 15.62 | 5.5 | CCK | 17.97 |
| 18 | QPSK | 14.83 | 11 | CCK | 17.56 |
| 24 | 16-QAM | 12.33 | 22 | CCK | 18.90 |
| 36 | 16-QAM | 11.50 | | | |
| 48 | 64-QAM | 9.37 | | | |
| 54 | 64-QAM | 9.24 | | | |
| | | | 802.11 n | | |
| Data Rate (Mbps) | | Mod. | Channel 6 Cond. Power (dBm) | | |
| 6.5 | | MCS0 | 16.93 | | |
| 13 | | MCS1 | 15.52 | | |
| 19.5 | | MCS2 | 14.81 | | |
| 26 | | MCS3 | 12.43 | | |
| 39 | | MCS4 | 11.68 | | |
| 52 | | MCS5 | 9.68 | | |
| 58.5 | | MCS6 | 9.52 | | |
| 65 | | MCS7 | 8.51 | | |

Table 1.8.6. 802.11 b/g/n modulation type/data rate vs. conducted power

| | | | | |
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1.8.2 FCC SAR Measurement Procedures for 3G Devices CDMA 2000

The followings are the **FCC SAR Measurement Procedures for 3G Devices issued in Oct. 2006**, applicable to handsets operating under CDMA 2000, Release 0, with MS Protocol Revision 6 (**P_REV 6**). The default test configuration is to measure SAR in RC3 with an established radio link between the DUT and a communication test set. SAR in RC1 is selectively confirmed according to output power and exposure conditions.

1.8.2.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. Results for at least steps 3, 4 and 10 of the power measurement procedures should be tabulated in the SAR report as shown on Table 1.9.2. Steps 3 and 4 should be measured using SO55 with power control bits in “All Up” condition. TDSO / SO32 may be used instead of SO55 for step 4. Step 10 should be measured using TDSO / SO32 with power control bits in the “Bits Hold” condition (i.e. alternative Up/Down Bits).

1.8.2.2 3GPP2 C.S0011/ TIA-98-E, section 4.4.5.2 Method of Measurement

1. If the mobile station supports Reverse Traffic Channel Radio Configuration 1 and 7 Forward Traffic Channel Radio Configuration 1, set up a call using Fundamental 8 Channel Test Mode 1 with 9600 bps data rate only and perform steps 6 through 8.
2. If the mobile station supports the Radio Configuration 3 Reverse Fundamental 11 Channel and demodulation of Radio Configuration 3, 4, or 5, set up a call using 12 Fundamental Channel Test Mode 3 with 9600 bps data rate only and 13 perform steps 6 through 8.
3. Set the test parameters as specified in Table 1.8.7.
4. Send continuously ‘0’ power control bits to the mobile station.
5. Measure the mobile station output power at the mobile station antenna connector.
6. If the mobile station supports the Radio Configuration 3 Reverse Fundamental Channel, Radio Configuration 3 Reverse Supplemental Channel 0 and demodulation of Radio Configuration 3, 4, or 5, set up a call using Supplemental Channel Test Mode 3 with 9600 bps Fundamental Channel and 9600 bps Supplemental Channel 0 data rate, and perform the following:
 - a) Set the test parameters as specified in Table 1.8.8.
 - b) Send alternating ‘0’ and ‘1’ power control bits to the mobile station using the smallest supported closed loop power control step size supported by the mobile station.
 - c) Determine the active channel configuration. If the desired channel configuration is not active, increase by 1 dB and repeat the verification. Repeat this step until the desired channel configuration becomes active.
 - d) Measure the mobile station output power at the mobile station antenna connector and record reading.


| Parameter | Units | Value |
|------------------------------|--------------|-------|
| \bar{I}_{or} | dBm/1.23 MHz | -104 |
| $\frac{Pilot E_c}{I_{or}}$ | dB | -7 |
| $\frac{Traffic E_c}{I_{or}}$ | dB | -7.4 |

Table 1.8.7.

Test Parameters for Maximum RF Output Power for Spreading Rate 1

| Parameter | Units | Value |
|------------------------------|--------------|-------|
| \bar{I}_{or} | dBm/1.23 MHz | -86 |
| $\frac{Pilot E_c}{I_{or}}$ | dB | -7 |
| $\frac{Traffic E_c}{I_{or}}$ | dB | -7.4 |

Table 1.8.8.

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1.8.2.3 Head SAR Measurements

SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.


1.8.2.4 Body SAR Measurements

SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + SCH_n) is not required when the maximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + SCH_n) with FCH at full rate and SCH₀ enabled at 9600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only. When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts.

Body SAR in RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.


1.8.2.5 1x Ev-DO

For handsets with Ev-Do capabilities, when the maximum average output of each channel in Rev. 0 is less than ¼ dB higher than that measured in RC3 (1x RTT), body SAR for Ev-Do is not required. Otherwise, SAR for Rev. 0 is measured on the maximum output channel at 153.6 kbps using the body exposure configuration that results in the highest SAR for that channel in RC3. SAR for Rev. A is not required when the maximum average output of each channel is less than that measured in Rev. 0 or less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel for Rev. A using a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots should be configured in the downlink for both Rev. 0 and Rev. A.

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| Band | Channel | 1x EvDO (153.6kbps) | CDMA2000 RC | SO2 Loopback | SO55 Loopback | TDSO SO32 Test Data Service |
|---------------------|---------|------------------------|----------------|-----------------|------------------|---|
| CDMA Cell 850 | 1013 | 24.6 | RC1 | 24.7 | 24.7 | N/A |
| | | | RC3 | 24.6 | 24.7 | 24.6 |
| | 384 | 24.7 | RC1 | 24.7 | 24.7 | N/A |
| | | | RC3 | 24.7 | 24.7 | 24.7 |
| | 777 | 24.6 | RC1 | 24.6 | 24.5 | N/A |
| | | | RC3 | 24.5 | 24.6 | 24.6 |
| | | | | | | |
| Band | Channel | 1x EvDO (153.6kbps) | CDMA2000 RC | SO2 Loopback | SO55 Loopback | TDSO SO32 Test Data Service |
| CDMA 1900 | 25 | 23.7 | RC1 | 23.7 | 23.8 | N/A |
| | | | RC3 | 23.6 | 23.8 | 23.7 |
| | 600 | 23.8 | RC1 | 23.9 | 23.9 | N/A |
| | | | RC3 | 23.9 | 23.9 | 23.8 |
| | 1175 | 23.8 | RC1 | 23.8 | 23.9 | N/A |
| | | | RC3 | 23.9 | 23.9 | 23.8 |


Table 1.8.9. Conducted RF output power (dBm) measured for various settings

| | | | | |
|---|--|---|------------------------------|-------------------------------|
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1.8.3 SAR Measurement Requirements for Bluetooth

| Channel | Freq (MHz) | Mode | Conducted Transmit Power (dBm) |
|---------|------------|------|--------------------------------|
| 0 | 2402 | DH5 | 9.00 |
| 39 | 2441 | DH5 | 10.67 |
| 78 | 2480 | DH5 | 10.33 |

Table 1.8.10. Bluetooth peak conducted power measurements

| | | | | |
|---|--|---|------------------------------|-------------------------------|
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1.9 Highlights of the FCC OET SAR Evaluation Considerations for Handsets with Multiple Transmitters/ Antennas & GSM/GPRS/EDGE Procedure

Unlicensed Transmitters

When there is simultaneous transmission –
Stand-alone SAR not required when

- output $\leq 2 \cdot P_{Ref}$ and antenna is > 5.0 cm from other antennas
- output $\leq P_{Ref}$ and antenna is > 2.5 cm from other antennas
- the other antenna(s), which are < 2.5 cm away, has an output $\leq P_{Ref}$ OR max 1g SAR < 1.2 W/kg

Otherwise stand-alone SAR is required

- test SAR on highest output channel for each wireless mode and exposure condition
- if SAR for highest output channel is $> 50\%$ of SAR limit, evaluate all channels according to normal procedure

Simultaneous Transmission SAR not required:

Unlicensed only

- when stand-alone 1-g SAR is not required and antenna is > 5 cm from other antennas
- when the other antenna(s), which are < 2.5 cm away, has an output $\leq P_{Ref}$ OR max 1g SAR < 1.2 W/kg

Licensed & Unlicensed

- when the sum of the 1-g SAR is < 1.6 W/kg for each pair of simultaneous transmitting antennas.
- or
- when the ratio of SAR to peak SAR separation distance of simultaneous transmitting antenna pair is < 0.3

Simultaneous Transmission SAR required:

Licensed & Unlicensed

- antenna pairs with SAR to antenna separation ratio ≥ 0.3 ; test is only required for the configuration that results in the highest SAR in standalone configuration for each wireless mode and exposure condition.

| | 2.45 | 5.15 - 5.35 | 5.47 - 5.85 | GHz |
|---|------|-------------|-------------|-----|
| P_{Ref} | 12 | 6 | 5 | mW |
| Device output power should be rounded to the nearest mW to compare with values specified in this table. | | | | |

Table 1.9.1. Output Power Thresholds for Unlicensed Transmitters

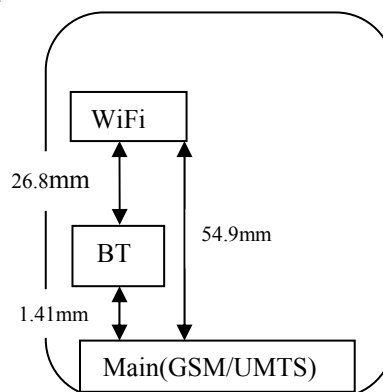



Figure 1.9.2. Back view of device showing closet distance between antenna pairs

| | | | | |
|---|--|--|---|------------------------------|
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| Mode | Configuration | Highest 1 g SAR (W/kg) |
|--------------------|-------------------|------------------------|
| GSM/GPRS/EDGE/CDMA | Head-Left-Touch | 1.38 |
| | 15mm Spacer, Back | 0.78 |
| 802.11a/b/g/n | Head-Left-Touch | 0.52 |
| | 15mm Spacer, Back | 0.49 |
| BT | Head-Left-Touch | 0.01 |
| | 15mm Spacer, Back | 0.00 |

Table 1.9.3. Highest SAR values for the same setup

| Antenna | Position | SAR Zoom 1gr | X [mm] | Y [mm] | Z [mm] | |
|-------------------------|-----------------------|--------------|--------|--------|--------|------|
| Antenna 3 (802.11 b) | LHS, Touch | 0.52 | 55.9 | 328.0 | -170.0 | |
| Antenna 2 CDMA1900 | LHS, Touch | 1.38 | 66.0 | 252.4 | -169.5 | |
| | | | | | | |
| | SAR Sum | 1.90 | | | | |
| | Delta [cm] | | -1.0 | 7.6 | -0.1 | |
| | closest Distance [cm] | | | | | 7.63 |
| | | | | | | |
| | Ratio | 0.25 | | | | |

Table 1.9.4. Highest SAR values & Peak Coordinates distance

BT & WiFi: BT Stand-alone and Simultaneous Transmission SAR are not required, since WiFi antenna is > 2.5 cm away and has max 1g SAR < 1.2 W/kg.

BT & GSM/CDMA:


BT Stand-alone is required, since the other antenna(s), which are < 2.5 cm away, has an output > PRef and max 1g SAR > 1.2 W/kg

BT ST SAR not required based on sum of 1 g SAR being < 1.6

GSM & WiFi: Simultaneous Transmission SAR is not required for head/body configuration based on the sum of 1-g SAR values for each pair of simultaneous transmitting antennas being < 1.6W/kg.

CDMA & WiFi: Simultaneous Transmission SAR is not required for head configuration based on ratio of SAR to peak SAR separation distance is < 0.3


- The device supports DTM, GPRS Category Class A, Multi-Slot Class 12 with maximum 5 slots (4-slots uplink and 1-slot downlink).

| | | | | |
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- For head SAR configuration, GSM 1-slot (CS) uplink and 2/3/4-slots DTM {GSM (SC) + EDGE (PD)} were evaluated.
- For body SAR configuration, 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.
- Each slot is set to maximum power, but there is software power reduction of ~ 2/4/6 dB in DTM/EDGE/GPRS 2/3/4-slots uplink modes.


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) CS4 | Max burst averaged conducted power (dBm) MCS1 | Max burst averaged conducted power (dBm) MCS4 | Max burst averaged conducted power (dBm) MCS5 | Max burst averaged conducted power (dBm) MCS9 |
|--------------------------------|----------------|---|---|--|--|--|--|
| 2-slots GPRS 850 MHz | 824.2 | 29.8 | 29.7 | N/A | N/A | N/A | N/A |
| | 836.8 | 30.1 | 30.1 | N/A | N/A | N/A | N/A |
| | 848.8 | 29.9 | 29.8 | N/A | N/A | N/A | N/A |
| 3-slots GPRS 850 MHz | 824.2 | 29.2 | 29.2 | N/A | N/A | N/A | N/A |
| | 836.8 | 29.1 | 29.1 | N/A | N/A | N/A | N/A |
| | 848.8 | 29.2 | 29.2 | N/A | N/A | N/A | N/A |
| 4-slots GPRS 850 MHz | 824.2 | 26.8 | 26.8 | N/A | N/A | N/A | N/A |
| | 836.8 | 26.8 | 26.8 | N/A | N/A | N/A | N/A |
| | 848.8 | 26.9 | 26.9 | N/A | N/A | N/A | N/A |
| 2-slots EDGE/DTM 850 MHz | 824.2 | 30.2 | 29.9 | 29.8 | 29.9 | 29.8 | 29.9 |
| | 836.8 | 30.4 | 30.2 | 30.1 | 30.1 | 30.3 | 30.0 |
| | 848.8 | 30.0 | 29.8 | 29.9 | 29.7 | 29.8 | 29.8 |
| 3-slots EDGE/DTM 850 MHz | 824.2 | 29.2 | 29.3 | 29.3 | 29.2 | 29.2 | 29.2 |
| | 836.8 | 29.1 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 |
| | 848.8 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 | 29.2 |
| 4-slots EDGE/DTM 850 MHz | 824.2 | 26.8 | 27.0 | 27.1 | 27.1 | 27.0 | 27.0 |
| | 836.8 | 26.8 | 27.0 | 27.0 | 27.1 | 27.1 | 26.9 |
| | 848.8 | 26.9 | 26.8 | 26.9 | 26.8 | 26.8 | 26.8 |
| 2-slots GPRS 1900 MHz | 1850.2 | 28.9 | 29.3 | N/A | N/A | N/A | N/A |
| | 1880.0 | 29.0 | 29.1 | N/A | N/A | N/A | N/A |
| | 1909.8 | 28.8 | 29.2 | N/A | N/A | N/A | N/A |
| 3-slots GPRS 1900 MHz | 1850.2 | 26.0 | 26.0 | N/A | N/A | N/A | N/A |
| | 1880.0 | 26.2 | 26.2 | N/A | N/A | N/A | N/A |
| | 1909.8 | 26.1 | 26.1 | N/A | N/A | N/A | N/A |

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| | | | | | | | |
|------------------------------------|--------|------------------------|------|---|------|------|------|
| 4-slots GPRS 1900 MHz | 1850.2 | 25.5 | 25.4 | N/A | N/A | N/A | N/A |
| | 1880.0 | 25.6 | 25.5 | N/A | N/A | N/A | N/A |
| | 1909.8 | 25.6 | 25.6 | N/A | N/A | N/A | N/A |
| 2-slots EDGE/DTM 1900 MHz | 1850.2 | 28.9 | 29.3 | 28.9 | 28.9 | 28.9 | 28.9 |
| | 1880.0 | 29.0 | 29.1 | 28.8 | 28.9 | 28.9 | 28.9 |
| | 1909.8 | 28.8 | 29.2 | 28.9 | 28.9 | 28.9 | 28.9 |
| 3-slots EDGE/DTM 1900 MHz | 1850.2 | 26.0 | 26.0 | 26.1 | 26.2 | 26.3 | 26.3 |
| | 1880.0 | 26.2 | 26.2 | 26.1 | 26.1 | 26.3 | 26.3 |
| | 1909.8 | 26.1 | 26.1 | 26.0 | 26.0 | 26.2 | 26.2 |
| 4-slots EDGE/DTM 1900 MHz | 1850.2 | 25.5 | 25.4 | 25.6 | 25.5 | 25.6 | 25.6 |
| | 1880.0 | 25.6 | 25.5 | 25.5 | 25.4 | 25.5 | 25.5 |
| | 1909.8 | 25.6 | 25.6 | 25.5 | 25.4 | 25.4 | 25.4 |
| Mode | | Freq. (MHz) | | Max burst averaged conducted power (dBm) | | | |
| 1-slot GSM (CS) 850 MHz | | 824.2 | | 32.6 | | | |
| | | 836.8 | | 32.8 | | | |
| | | 848.8 | | 32.7 | | | |
| 1-slot GSM (CS) 1900 MHz | | 1850.2 | | 29.8 | | | |
| | | 1880.0 | | 29.7 | | | |
| | | 1909.8 | | 29.7 | | | |

1.9.5. GSM/EDGE/GPRS channel vs. conducted power

| | | | | |
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2.0 DESCRIPTION OF THE TEST EQUIPMENT

2.1 SAR measurement system

SAR measurements were performed using a Dosimetric Assessment System (DASY4/52), an automated SAR measurement system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich, Switzerland.

The DASY 4/52 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 is to perform the time critical tasks such as signal filtering, surveillance of the robot operation fast movement interrupts.
- A computer operating Windows 2000.
- DASY 4 software version 4.7; or DASY52 software version 52.6(2).
- 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.

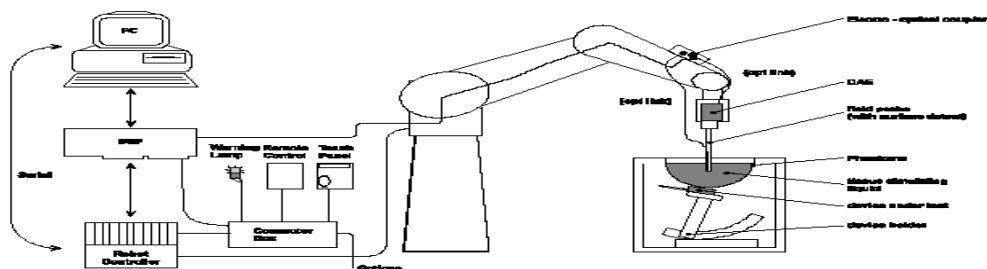




Figure 2.1.1. System Description

| | | | | |
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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 | ET3DV6 | 1643 | 03/09/2011 |
| SCHMID & Partner Engineering AG | E-field probe | ES3DV3 | 3225 | 01/13/2012 |
| SCHMID & Partner Engineering AG | E-field probe | EX3DV4 | 3548 | 01/20/2012 |
| SCHMID & Partner Engineering AG | Data Acquisition Electronics (DAE3) | DAE3 V1 | 472 | 05/17/2011 |
| SCHMID & Partner Engineering AG | Data Acquisition Electronics (DAE3) | DAE3 V2 | 473 | 01/21/2011 |
| SCHMID & Partner Engineering AG | Data Acquisition Electronics (DAE3) | DAE4 | 881 | 04/19/2011 |
| SCHMID & Partner Engineering AG | Dipole Validation Kit | D835V2 | 446 | 01/21/2013 |
| SCHMID & Partner Engineering AG | Dipole Validation Kit | D1900V2 | 545 | 01/13/2013 |
| SCHMID & Partner Engineering AG | Dipole Validation Kit | D2450V2 | 747 | 11/11/2011 |
| SCHMID & Partner Engineering AG | Dipole Validation Kit | D5GHzV2 | 1033 | 11/13/2011 |
| Agilent Technologies | Signal generator | 8648C | 4037U03155 | 09/24/2011 |
| Rohde & Schwarz | Signal generator | SMA 100A | 11-9428537-0045 | 11/29/2011 |
| Agilent Technologies | Power meter | E4419B | GB40202821 | 09/15/2011 |
| Agilent Technologies | Power sensor | 8481A | MY41095417 | 09/23/2011 |
| Agilent Technologies | Power sensor | N1921A | SG45240281 | 05/22/2011 |
| Agilent Technologies | Power sensor | N1921A | MY45241383 | 09/01/2011 |
| Agilent Technologies | Power meter | N1911A | MY45100905 | 05/01/2011 |
| Agilent Technologies | Power meter | N1911A | MY45100951 | 08/12/2011 |
| Amplifier Research | Amplifier | 5S1G4M3 | 300986 | CNR |
| CPI Wireless Solutions | Amplifier | VZC-6961K4 | SK4310E5 | CNR |
| Agilent Technologies | Network analyzer | 8753ES | US39174857 | 09/17/2011 |
| Rohde & Schwarz | Base Station Simulator | CMU 200 | 109747 | 11/25/2011 |
| Rohde & Schwarz | Bluetooth Tester | CBT | 100678 | 11/28/2011 |

Table 2.1.1. Equipment list

| | | | | |
|---|--|---|------------------------------|-------------------------------|
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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.
- 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 probe 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 ³ |
| Probe model EX3DV4 for 2.4 – 6 GHz | |
| 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

| | | | | |
|---|--|---|------------------------------|-------------------------------|
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3.2 Probe calibration and measurement uncertainty

The probe had been calibrated with an accuracy better than $\pm 12\%$. 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:

Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz] | Validity [MHz] ^c | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---------|-----------------------------|----------------|----------------|---------|---------|---------|-------|-------------------|
| 900 | $\pm 50 / \pm 100$ | $41.5 \pm 5\%$ | $0.97 \pm 5\%$ | 6.12 | 6.12 | 6.12 | 0.99 | $1.07 \pm 11.0\%$ |
| 1810 | $\pm 50 / \pm 100$ | $40.0 \pm 5\%$ | $1.40 \pm 5\%$ | 5.14 | 5.14 | 5.14 | 0.46 | $1.60 \pm 11.0\%$ |
| 1950 | $\pm 50 / \pm 100$ | $40.0 \pm 5\%$ | $1.40 \pm 5\%$ | 4.96 | 4.96 | 4.96 | 0.47 | $1.57 \pm 11.0\%$ |
| 2450 | $\pm 50 / \pm 100$ | $39.2 \pm 5\%$ | $1.80 \pm 5\%$ | 4.53 | 4.53 | 4.53 | 0.41 | $1.89 \pm 11.0\%$ |

Calibration Parameter Determined in Body Tissue Simulating Media

| f [MHz] | Validity [MHz] ^c | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---------|-----------------------------|----------------|----------------|---------|---------|---------|-------|-------------------|
| 900 | $\pm 50 / \pm 100$ | $55.0 \pm 5\%$ | $1.05 \pm 5\%$ | 5.97 | 5.97 | 5.97 | 0.98 | $1.12 \pm 11.0\%$ |
| 1810 | $\pm 50 / \pm 100$ | $53.3 \pm 5\%$ | $1.52 \pm 5\%$ | 4.90 | 4.90 | 4.90 | 0.35 | $2.07 \pm 11.0\%$ |
| 1950 | $\pm 50 / \pm 100$ | $53.3 \pm 5\%$ | $1.52 \pm 5\%$ | 4.83 | 4.83 | 4.83 | 0.32 | $2.45 \pm 11.0\%$ |
| 2450 | $\pm 50 / \pm 100$ | $52.7 \pm 5\%$ | $1.95 \pm 5\%$ | 4.32 | 4.32 | 4.32 | 0.74 | $1.27 \pm 11.0\%$ |

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher.

DASY v4.7/DASY 52 has been used for measurements, therefore ± 100 MHz tolerance is valid.


Measured dielectric parameters are within $\pm 5\%$ of the probe calibration values and target values.

Expanded probe calibration uncertainty (k=2) is $< 15\%$

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.

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

| f (MHz) | Limits / Measured (MM/DD/YY) | SAR (W/kg) 1 g/ 10 g | Dielectric Parameters | | Liquid Temp (°C) |
|------------|---------------------------------|-------------------------|-----------------------|----------------|---------------------|
| | | | ϵ_r | σ [S/m] | |
| 835 | Measured (02/07/2011) | 9.38/6.15 | 42.1 | 0.90 | 22.3 |
| | Measured (03/07/2011) | 9.47/6.18 | 40.5 | 0.90 | 22.5 |
| | Measured (04/20/2011) | 9.10/5.97 | 40.1 | 0.87 | 22.1 |
| | Recommended Limits | 9.50/6.27 | 41.5 | 0.90 | N/A |
| 1900 | Measured (02/23/2011) | 37.6/20.0 | 38.2 | 1.38 | 22.2 |
| | Measured (02/24/2011) | 39.1/20.7 | 38.4 | 1.33 | 22.2 |
| | Measured (02/28/2011) | 39.8/20.9 | 39.8 | 1.38 | 22.2 |
| | Measured (04/18/2011) | 37.5/19.7 | 38.2 | 1.38 | 22.4 |
| | Recommended Limits | 39.5/20.8 | 40.0 | 1.40 | N/A |
| 2450 | Measured (03/03/2011) | 53.4/24.5 | 37.5 | 1.86 | 21.8 |
| | Recommended Limits | 53.2/24.8 | 39.2 | 1.80 | N/A |
| 5200 | Measured (05/24/2011) | 84.4/24.4 | 35.3 | 4.80 | 23.0 |
| | Recommended Limits | 77.2/23.2 | 36.0 | 4.66 | N/A |
| 5500 | Measured (05/24/2011) | 87.4/25.1 | 35.0 | 4.87 | 22.8 |
| | Recommended Limits | 82.9/23.2 | 35.6 | 4.96 | N/A |
| 5800 | Measured (05/24/2011) | 81.9/23.4 | 34.7 | 5.50 | 22.9 |
| | Recommended Limits | 75.6/21.3 | 35.3 | 5.27 | N/A |

Table 4.1.1. System accuracy (validation for head adjacent use)

| | | | | |
|---|--|---|------------------------------|-------------------------------|
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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 ≥ 15 cm is maintained in the phantom for all the measurements.



Figure 5.0.1. SAM Twin Phantom

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6.0 TISSUE DIELECTRIC PROPERTIES

6.1 Composition of tissue simulant

The composition of the brain and muscle simulating liquids for 800-900 MHz and 1800-1900 MHz, 2450 MHz, and 5-6 GHz 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 |
| Control Company | Digital Thermometer | 15-077-21 | 51129471 | 04/29/2011 |
| Control Company | Digital Thermometer | 23609-234 | 21352860 | 09/14/2011 |
| IKA Works Inc. | Hot Plate | RC Basic | 3.107433 | N/A |
| Agilent Technologies | Network Analyzer | 8753ES | US39174857 | 09/17/2011 |
| Agilent Technologies | Dielectric probe kit | HP 85070C | US9936135 | CNR |

Table 6.1.2. Tissue simulant preparation equipment

| | | | | |
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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”, DASY manual and from FCC Tissue Dielectric Properties web page at <http://www.fcc.gov/fcc-bin/dielec.sh>

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| f (MHz) | Tissue Type | Limits / Measured | Dielectric Parameters | | Liquid Temp (°C) |
|---------|-------------|-----------------------|-----------------------|----------------|------------------|
| | | | ϵ_r | σ [S/m] | |
| 835 | Head | Measured (02/07/2011) | 42.1 | 0.90 | 21.8 |
| | | Measured (03/07/2011) | 40.5 | 0.90 | 22.5 |
| | | Measured (04/20/2011) | 40.1 | 0.88 | 22.1 |
| | | Recommended Limits | 41.5 | 0.90 | N/A |
| | Muscle | Measured (02/07/2011) | 52.5 | 0.96 | 22.0 |
| | | Measured (03/07/2011) | 52.4 | 1.01 | 22.5 |
| | | Measured (04/20/2011) | 53.6 | 0.98 | 22.1 |
| | | Recommended Limits | 55.2 | 0.97 | N/A |
| 1900 | Head | Measured (02/23/2011) | 38.2 | 1.38 | 22.2 |
| | | Measured (02/24/2011) | 38.4 | 1.33 | 22.2 |
| | | Measured (02/28/2011) | 39.8 | 1.38 | 22.2 |
| | | Measured (04/18/2011) | 38.2 | 1.38 | 22.4 |
| | | Recommended Limits | 40.0 | 1.40 | N/A |
| | Muscle | Measured (02/23/2011) | 51.4 | 1.54 | 22.0 |
| | | Measured (02/24/2011) | 50.7 | 1.49 | 22.0 |
| | | Measured (02/28/2011) | 51.5 | 1.55 | 22.1 |
| | | Measured (04/18/2011) | 51.1 | 1.54 | 22.4 |
| | | Recommended Limits | 53.3 | 1.52 | N/A |
| 2450 | Head | Measured (03/03/2011) | 37.5 | 1.86 | 21.8 |
| | | Recommended Limits | 39.2 | 1.80 | N/A |
| | Muscle | Measured (03/03/2011) | 50.1 | 2.03 | 21.9 |
| | | Recommended Limits | 52.7 | 1.95 | N/A |
| 5200 | Head | Measured (05/24/2011) | 35.3 | 4.83 | 23.0 |
| | | Recommended Limits | 36.0 | 4.66 | N/A |
| | Muscle | Measured (05/24/2011) | 46.6 | 5.46 | 22.8 |
| | | Recommended Limits | 49.0 | 5.30 | N/A |
| 5500 | Head | Measured (05/24/2011) | 35.0 | 4.87 | 22.8 |
| | | Recommended Limits | 35.6 | 4.96 | N/A |
| | Muscle | Measured (05/24/2011) | 46.5 | 5.93 | 22.8 |
| | | Recommended Limits | 48.6 | 5.65 | N/A |
| 5800 | Head | Measured (05/24/2011) | 34.7 | 5.50 | 22.9 |
| | | Recommended Limits | 35.3 | 5.27 | N/A |
| | Muscle | Measured (05/24/2011) | 45.8 | 6.10 | 22.7 |
| | | Recommended Limits | 48.2 | 6.00 | N/A |

Table 6.2.1. Electrical parameters of tissue simulating liquid

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6.2.2 Test Configuration

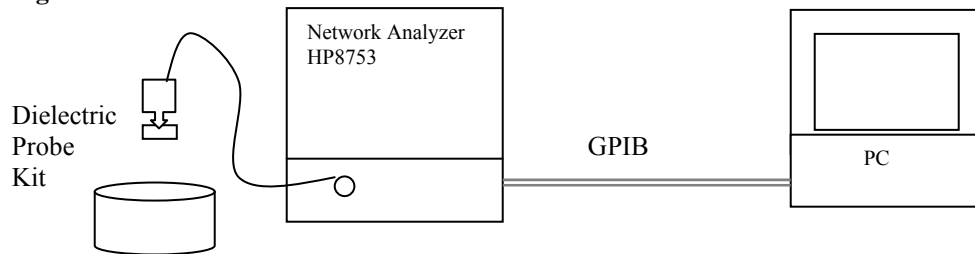



Figure 6.2.1 Test configuration

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 ϵ''

$$\sigma = \omega \epsilon_0 \epsilon''$$
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 DASY4/52 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).

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7.0 SAR SAFETY LIMITS

| Standards/Guideline | Localized SAR Limit (W/kg) General public (uncontrolled) | Localized SAR Limits (W/kg) Workers (controlled) |
|----------------------------|--|--|
| ICNIRP (1998) Standard | 2.0 (10g) | 10.0 (10g) |
| IEEE C95.1 (1999) Standard | 1.6 (1g) | 8.0 (1g) |


Table 7.0.1. SAR safety limits for Controlled / Uncontrolled environment

| Human Exposure | Localized SAR Limits (W/kg) 10g, ICNIRP (1998) Standard | Localized SAR Limits (W/kg) 1g, IEEE C95.1 (1999) Standard |
|--|---|--|
| 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).

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8.0 DEVICE POSITIONING

8.1 Device holder for SAM Twin Phantom

The Device was positioned for all test configurations using the DASY4/52 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).

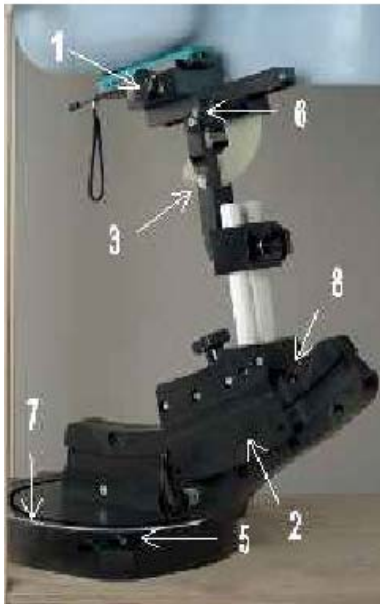



Figure 8.1.1. Device Holder

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.

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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).

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”.

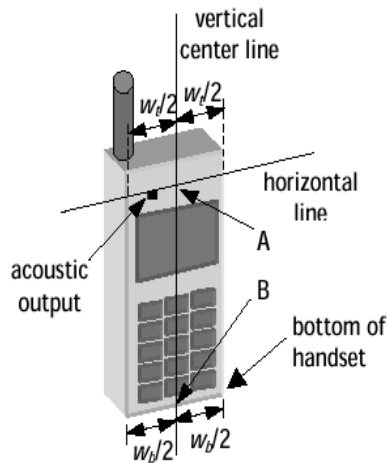


Figure 8.2.1a. Handset vertical and horizontal reference lines – fixed case

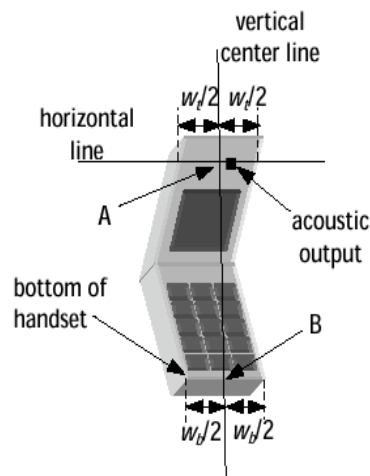



Figure 8.2.1b. Handset vertical and horizontal reference lines – “clam-shell”

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8.2.1.1 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 8.2.1a and 8.2.1b), 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 8.2.1a). 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 8.2.1b), 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), 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).

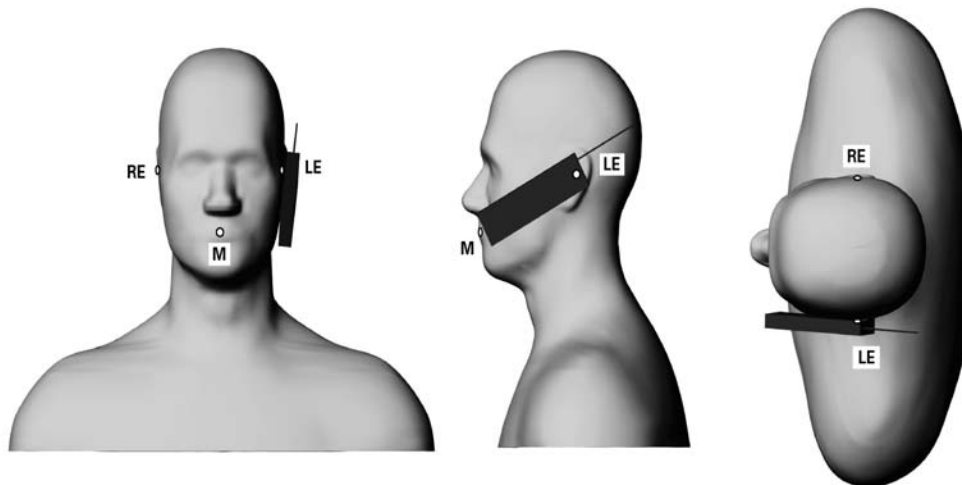



Figure 8.2.2. Phone position 1, “cheek” or “touch” position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated. The shoulders are shown for illustration purposes only.

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8.2.1.2 Definition of the “Tilted” Position

- 1) Repeat steps 1 to 7 of 5.4.1 (in this report 8.2.1.1) to replace the device in the “cheek position.”
- 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.

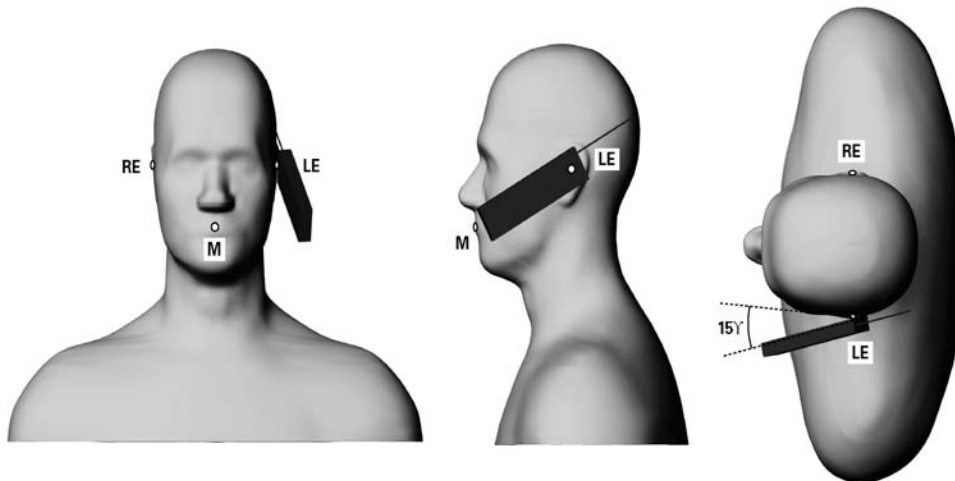



Figure 8.2.3. Phone position 2, “tilted position.” The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated. The shoulders are shown for illustration purposes only.

8.2.2 Body Holster Configuration

Body worn holsters, as shown on Figure 1.4.1, have been test with the device for FCC RF exposure compliance. The EUT 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.

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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 / 24x24x20 with 7.5mm / 4.0 resolution in (x,y) and 5mm / 2.5mm 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.

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10.0 MEASUREMENT UNCERTAINTY

| DASY4 Uncertainty Budget According to IEEE P1528 [1] | | | | | | | | |
|---|-------------------|-------------|------|--------------|---------------|----------------|-----------------|---------------------|
| Error Description | Uncertainty value | Prob. Dist. | Div. | (c_1) 1g | (c_1) 10g | Std. Unc. (1g) | Std. Unc. (10g) | (v_i) v_{eff} |
| Measurement System | | | | | | | | |
| Probe Calibration | ±4.8 % | N | 1 | 1 | 1 | ±4.8 % | ±4.8 % | ∞ |
| 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 | ±1.0 % | R | √3 | 1 | 1 | ±0.6 % | ±0.6 % | ∞ |
| 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 | ±1.0 % | N | 1 | 1 | 1 | ±1.0 % | ±1.0 % | ∞ |
| 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 Conditions | ±3.0 % | R | √3 | 1 | 1 | ±1.7 % | ±1.7 % | ∞ |
| Probe Positioner | ±0.4 % | R | √3 | 1 | 1 | ±0.2 % | ±0.2 % | ∞ |
| Probe Positioning | ±2.9 % | R | √3 | 1 | 1 | ±1.7 % | ±1.7 % | ∞ |
| Max. SAR Eval. | ±1.0 % | R | √3 | 1 | 1 | ±0.6 % | ±0.6 % | ∞ |
| Test Sample Related | | | | | | | | |
| 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 % | ∞ |
| Phantom and Setup | | | | | | | | |
| 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 | | | | | | ±10.3 % | ±10.0 % | 330 |
| Expanded STD Uncertainty | | | | | | ±20.6 % | ±20.1 % | |


Table 10.0.1. Worst-Case uncertainty budget for DASY4 assessed according to IEEE P1528.
Source: Schmid & Partner Engineering AG.

| | | | | |
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| DASY5 Uncertainty Budget According to IEEE 1528/2010 and IEC 62209-1/2010 (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} |
| Measurement System | | | | | | | | |
| Probe Calibration | ±5.5 % | N | 1 | 1 | 1 | ±5.5 % | ±5.5 % | ∞ |
| 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 | ±1.0 % | R | √3 | 1 | 1 | ±0.6 % | ±0.6 % | ∞ |
| Linearity | ±4.7 % | R | √3 | 1 | 1 | ±2.7 % | ±2.7 % | ∞ |
| System Detection Limits | ±1.0 % | R | √3 | 1 | 1 | ±0.6 % | ±0.6 % | ∞ |
| Modulation Response | ±2.4 % | R | √3 | 1 | 1 | ±1.4 % | ±1.4 % | ∞ |
| 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 | ±0.4 % | R | √3 | 1 | 1 | ±0.2 % | ±0.2 % | ∞ |
| Probe Positioning | ±2.9 % | R | √3 | 1 | 1 | ±1.7 % | ±1.7 % | ∞ |
| Max. SAR Eval. | ±1.0 % | R | √3 | 1 | 1 | ±0.6 % | ±0.6 % | ∞ |
| Test Sample Related | | | | | | | | |
| 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 % | ∞ |
| Power Scaling | ±0 % | R | √3 | 1 | 1 | ±0.0 % | ±0.0 % | ∞ |
| Phantom and Setup | | | | | | | | |
| Phantom Uncertainty | ±4.0 % | R | √3 | 1 | 1 | ±2.3 % | ±2.3 % | ∞ |
| SAR correction | ±1.9 % | R | √3 | 1 | 0.84 | ±1.1 % | ±0.9 % | ∞ |
| Liquid Conductivity (meas.) | ±2.5 % | N | 1 | 0.78 | 0.71 | ±2.0 % | ±1.8 % | ∞ |
| Liquid Permittivity (meas.) | ±2.5 % | N | 1 | 0.26 | 0.26 | ±0.6 % | ±0.7 % | ∞ |
| Temp. unc. - Conductivity | ±1.7 % | R | √3 | 0.78 | 0.71 | ±0.8 % | ±0.7 % | ∞ |
| Temp. unc. - Permittivity | ±0.3 % | R | √3 | 0.23 | 0.26 | ±0.0 % | ±0.0 % | ∞ |
| Combined Std. Uncertainty | | | | | | ±10.6 % | ±10.5 % | 361 |
| Expanded STD Uncertainty | | | | | | ±21.2 % | ±21.1 % | |


Table 10.0.2. 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.

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| | SAR Compliance Test Report for the BlackBerry® Smartphone Model RDU71CW | | | 36(49) |
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| DASY5 Uncertainty Budget for the 3 - 6 GHz range | | | | | | | | |
|--|---------------|-------------|------|----------------------|-----------------------|----------------|-----------------|------------------------------------|
| Error Description | Uncert. value | Prob. Dist. | Div. | (c ₁) 1g | (c ₁) 10g | Std. Unc. (1g) | Std. Unc. (10g) | (v ₁) v _{eff} |
| Measurement System | | | | | | | | |
| 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 % | ∞ |
| Test Sample Related | | | | | | | | |
| 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 % | ∞ |
| Phantom and Setup | | | | | | | | |
| 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.

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11.0 TEST RESULTS

11.1 SAR Measurement results at highest power measured against the head

| Test Position | Mode | f (MHz) | Cond. Output Power (dBm) | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|---------------------|--------------------------|---------|--------------------------|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| Right Head Cheek | 4-slots GSM/EDGE 850 MHz | 824.2 | | | | | |
| | | 836.8 | 26.8 | 22.1 | 0.30 | 0.17 | 0.30 |
| | | 848.8 | | | | | |
| Right Head Cheek | 3-slots GSM/EDGE 850 MHz | 824.2 | | | | | |
| | | 836.8 | 29.1 | 22.2 | 0.39 | 0.17 | 0.39 |
| | | 848.8 | | | | | |
| Right Head Cheek | 2-slots GSM/EDGE 850 MHz | 824.2 | | | | | |
| | | 836.8 | 30.4 | 22.3 | 0.30 | 0.14 | 0.30 |
| | | 848.8 | | | | | |
| Right Head 15° Tilt | 3-slots GSM/EDGE 850 MHz | 824.2 | | | | | |
| | | 836.8 | 29.1 | 22.1 | 0.30 | 0.28 | 0.30 |
| | | 848.8 | | | | | |
| Right Head Cheek | 1-slot GSM 850 MHz | 824.2 | | | | | |
| | | 836.8 | 32.8 | 22.2 | 0.34 | 0.32 | 0.34 |
| | | 848.8 | | | | | |
| Left Head Cheek | 3-slots GSM/EDGE 850 MHz | 824.2 | | | | | |
| | | 836.8 | 29.1 | 22.1 | 0.41 | -0.17 | 0.41 |
| | | 848.8 | | | | | |
| Left Head 15° Tilt | 3-slots GSM/EDGE 850 MHz | 824.2 | | | | | |
| | | 836.8 | 29.1 | 22.0 | 0.28 | -0.14 | 0.28 |
| | | 848.8 | | | | | |

Table 11.1.1. SAR results for GSM/EDGE 850 head configuration


Note 1: If the power drift is ≤ -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) | Cond. Output Power (dBm) | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|------------------|--------------------------|---------|--------------------------|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| Right Head Cheek | 3-slots GSM/EDGE 850 MHz | 824.2 | | | | | |
| | | 836.8 | 29.1 | 22.3 | 0.51 | 0.75 | 0.51 |
| | | 848.8 | | | | | |
| Left Head Cheek | 3-slots GSM/EDGE 850 MHz | 824.2 | | | | | |
| | | 836.8 | 29.1 | 22.2 | 0.39 | 0.57 | 0.39 |
| | | 848.8 | | | | | |

Table 11.1.2. Rev3 SAR results for GSM/EDGE 850 head configuration

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| | SAR Compliance Test Report for the BlackBerry® Smartphone Model RDU71CW | | | 38(49) |
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| Test Position | Mode | f (MHz) | Peaks | Cond. Output Power (dBm) | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|---------------------|---------------|---------|--------|--------------------------|-------------------|------------------------|------------------|----------------------|
| | | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| Right Head Cheek | CDMA 800 MHz | 824.70 | | | | | | |
| | | 836.52 | | 24.7 | 22.2 | 0.54 | -0.24 | 0.57 |
| | | 848.52 | | | | | | |
| Right Head 15° Tilt | CDMA 800 MHz | 824.70 | | | | | | |
| | | 836.52 | | 24.7 | 22.2 | 0.35 | 0.05 | 0.35 |
| | | 848.52 | | | | | | |
| Left Head Cheek | CDMA 800 MHz | 824.70 | | | | | | |
| | | 836.52 | | 24.7 | 22.1 | 0.49 | -0.23 | 0.52 |
| | | 848.52 | | | | | | |
| Left Head 15° Tilt | CDMA 800 MHz | 824.70 | | | | | | |
| | | 836.52 | | 24.7 | 22.1 | 0.33 | 0.05 | 0.33 |
| | | 848.52 | | | | | | |
| Right Head Cheek | CDMA 1900 MHz | 1851.25 | | 23.7 | 21.9 | 1.10 | -0.07 | 1.10 |
| | | 1880.00 | | 23.8 | 22.0 | 1.12 | -0.17 | 1.12 |
| | | 1908.50 | | 23.8 | 21.9 | 1.05 | 0.13 | 1.05 |
| Right Head 15° Tilt | CDMA 1900 MHz | 1851.25 | | | | | | |
| | | 1880.00 | | 23.8 | 21.9 | 0.44 | -0.15 | 0.44 |
| | | 1908.50 | | | | | | |
| Left Head Cheek | CDMA 1900 MHz | 1851.25 | Peak 1 | 23.7 | 21.8 | 1.15 | -0.16 | 1.15 |
| | | 1851.25 | Peak 2 | 23.7 | 21.8 | 1.15 | -0.04 | 1.15 |
| | | 1880.00 | | 23.8 | 21.9 | 1.29 | -0.28 | 1.38 |
| | | 1908.50 | | 23.8 | 22.0 | 1.19 | -0.06 | 1.19 |
| Left Head 15° Tilt | CDMA 1900 MHz | 1851.25 | | | | | | |
| | | 1880.00 | | 23.8 | 22.1 | 0.56 | -0.05 | 0.56 |
| | | 1908.50 | | | | | | |

Table 11.1.3. SAR results for CDMA 800/1900 for head configuration


| | | | | |
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| | SAR Compliance Test Report for the BlackBerry® Smartphone Model RDU71CW | | | 39(49) |
| Author Data Hang Wang | Dates of Test Feb 7 – May 25, 2011 | Test Report No RTS-3933-1105-11 | FCC ID: L6ARDU70CW | IC ID 2503A-RDU70CW |

| Test Position | Mode | f (MHz) | Cond. Output Power (dBm) | Peaks | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|------------------|--------------|---------|--------------------------|--------|-------------------|------------------------|------------------|----------------------|
| | | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| Right Head Cheek | CDMA 800 MHz | 824.70 | | | | | | |
| | | 836.52 | 24.7 | | 22.3 | 0.50 | -0.77 | 0.60 |
| | | 848.52 | | | | | | |
| Left Head Cheek | CDMA 800 MHz | 824.70 | | | | | | |
| | | 836.52 | 24.7 | Peak 1 | 22.2 | 0.53 | 0.11 | 0.53 |
| | | 836.52 | 24.7 | Peak 2 | 22.2 | 0.51 | 0.07 | 0.51 |
| | | 848.52 | | | | | | |

Table 11.1.4. Rev3 SAR results for CDMA 800/1900 for head configuration

| Test Position | Mode | f (MHz) | Cond. Output Power (dBm) | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|---------------------|---------------------------|---------|--------------------------|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| Right Head Cheek | 4-slots GSM/EDGE 1900 MHz | 1850.2 | | | | | |
| | | 1880.0 | 25.6 | 21.7 | 0.90 | 0.26 | 0.90 |
| | | 1909.8 | | | | | |
| Right Head Cheek | 3-slots GSM/EDGE 1900 MHz | 1850.2 | | | | | |
| | | 1880.0 | 26.2 | 21.8 | 0.85 | -0.15 | 0.85 |
| | | 1909.8 | | | | | |
| Right Head Cheek | 2-slots GSM/EDGE 1900 MHz | 1850.2 | 28.9 | 21.7 | 1.04 | -0.07 | 1.04 |
| | | 1880.0 | 29.0 | 21.8 | 1.12 | 0.19 | 1.12 |
| | | 1909.8 | 28.8 | 21.9 | 1.08 | 0.12 | 1.08 |
| Right Head 15° Tilt | 2-slots GSM/EDGE 1900 MHz | 1850.2 | | | | | |
| | | 1880.0 | 29.0 | 21.9 | 0.35 | -0.06 | 0.35 |
| | | 1909.8 | | | | | |
| Right Head Cheek | 1-slot GSM 1900 MHz | 1850.2 | | | | | |
| | | 1880.0 | 29.7 | 22.0 | 0.84 | 0.04 | 0.84 |
| | | 1909.8 | | | | | |
| Left Head Cheek | 2-slots GSM/EDGE 1900 MHz | 1850.2 | 28.9 | 21.9 | 0.85 | 0.12 | 0.85 |
| | | 1880.0 | 29.0 | 21.7 | 0.91 | 0.09 | 0.91 |
| | | 1909.8 | 28.8 | 21.9 | 0.82 | -0.11 | 0.82 |
| Left Head 15° Tilt | 2-slots GSM/EDGE 1900 MHz | 1850.2 | | | | | |
| | | 1880.0 | 29.0 | 21.8 | 0.53 | 0.11 | 0.53 |
| | | 1909.8 | | | | | |

Table 11.1.5. SAR results for GSM/EDGE 1900 head configuration

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| Test Position | Mode | f (MHz) | Cond. Output Power (dBm) | Liquid Temp. (°C) | 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 | | | | | |
| | | 1880.0 | 29.0 | 22.3 | 0.77 | 0.19 | 0.77 |
| | | 1909.8 | | | | | |
| Left Head Cheek | 2-slots GSM/EDGE 1900 MHz | 1850.2 | | | | | |
| | | 1880.0 | 29.0 | 22.1 | 0.66 | -0.14 | 0.66 |
| | | 1909.8 | | | | | |

Table 11.1.6. Rev3 SAR results for GSM/EDGE 1900 head configuration

| Test Position | Mode | f (MHz) | Cond. Output Power (dBm) | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|---------------------|-------------------|---------|--------------------------|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| Right Head Cheek | 802.11 b 2450 MHz | 2412 | | | | | |
| | | 2437 | 19.0 | 21.8 | 0.21 | 0.04 | 0.21 |
| | | 2462 | | | | | |
| Right Head 15° Tilt | 802.11 b 2450 MHz | 2412 | | | | | |
| | | 2437 | 19.0 | 21.8 | 0.18 | -0.07 | 0.18 |
| | | 2462 | | | | | |
| Left Head Cheek | 802.11 b 2450 MHz | 2412 | | | | | |
| | | 2437 | 19.0 | 21.7 | 0.52 | 0.11 | 0.52 |
| | | 2462 | | | | | |
| Left Head 15° Tilt | 802.11 b 2450 MHz | 2412 | | | | | |
| | | 2437 | 19.0 | 21.7 | 0.22 | -0.04 | 0.22 |
| | | 2462 | | | | | |

Table 11.1.7. SAR results for WiFi/WLAN/802.11b head configuration


***Note:** Tested only highest output power channel

| | | | | |
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| Test Position | Mode | f (MHz) | Cond. Output Power (dBm) | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|---------------------|------------------------|---------|--------------------------|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| Right Head Cheek | 802.11 a 5180-5805 MHz | 5180 | 11.05 | 22.5 | 0.01 | 0.60 | 0.01 |
| | | 5240 | | | | | |
| | | 5260 | 12.00 | 22.5 | 0.01 | 0.64 | 0.01 |
| | | 5320 | | | | | |
| | | 5520 | 14.12 | 22.2 | 0.03 | 0.42 | 0.03 |
| | | 5580 | | | | | |
| | | 5680 | | | | | |
| | | 5745 | 13.35 | 22.1 | 0.18 | -0.12 | 0.18 |
| | | 5805 | | | | | |
| Right Head 15° Tilt | 802.11 a 5180-5805 MHz | 5745 | 13.35 | 22.0 | 0.00 | -0.45 | 0.00 |
| Left Head Cheek | 802.11 a 5180-5805 MHz | 5180 | 11.05 | 22.5 | 0.04 | 0.43 | 0.04 |
| | | 5240 | | | | | |
| | | 5260 | 12.00 | 22.3 | 0.04 | 0.29 | 0.04 |
| | | 5320 | | | | | |
| | | 5520 | 14.12 | 22.3 | 0.05 | 1.56 | 0.05 |
| | | 5580 | | | | | |
| | | 5680 | | | | | |
| | | 5745 | 13.35 | 22.2 | 0.04 | 0.85 | 0.04 |
| | | 5805 | | | | | |
| Left Head 15° Tilt | 802.11 a 5180-5805 MHz | 5520 | 14.12 | 22.2 | 0.04 | 3.54 | 0.04 |


Table 11.1.8. Rev4 SAR results for 802.11a head configuration

***Note:** Tested only highest output power channel per band

| | | | | |
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| Test Position | Mode | f (MHz) | Cond. Output Power (dBm) | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|---------------------|--------------------|---------|--------------------------|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| Right Head Cheek | Bluetooth 2450 MHz | 2402 | | | | | |
| | | 2441 | 10.67 | 21.8 | 0.00 | 1.36 | 0.00 |
| | | 2480 | | | | | |
| Right Head 15° Tilt | Bluetooth 2450 MHz | 2402 | | | | | |
| | | 2441 | 10.67 | 22.0 | 0.00 | 0.32 | 0.00 |
| | | 2480 | | | | | |
| Left Head Cheek | Bluetooth 2450 MHz | 2402 | | | | | |
| | | 2441 | 10.67 | 21.9 | 0.01 | 0.98 | 0.01 |
| | | 2480 | | | | | |
| Left Head 15° Tilt | Bluetooth 2450 MHz | 2402 | | | | | |
| | | 2441 | 10.67 | 22.0 | 0.00 | 0.97 | 0.00 |
| | | 2480 | | | | | |

Table 11.1.9. SAR results for Bluetooth head configuration

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

| Mode | Freq. (MHz) | Cond. Power (dBm) | Holster type / device configuration | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|----------------------|-------------|-------------------|--|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| 2-slots GPRS 850 MHz | 836.8 | 30.1 | 15mm Spacer, back side facing phantom | 22.0 | 0.44 | -0.13 | 0.44 |
| | 836.8 | 30.1 | 15mm Spacer, front side facing phantom | 22.1 | 0.37 | -0.02 | 0.37 |
| | 836.8 | 30.1 | Vertical Holster, back side facing phantom | 22.1 | 0.41 | 0.03 | 0.41 |
| | 836.8 | 30.1 | 15mm Spacer, headset, back side facing phantom | 22.0 | 0.40 | -0.12 | 0.40 |
| 3-slots GPRS 850 MHz | 836.8 | 29.1 | 15mm Spacer, back side facing phantom | 21.9 | 0.60 | -0.04 | 0.60 |
| 4-slots GPRS 850 MHz | 836.8 | 26.8 | 15mm Spacer, back side facing phantom | 21.9 | 0.47 | 0.32 | 0.47 |

Table 11.2.1. SAR results for GPRS850 body-worn configurations


Note 1: If the power drift is ≤ -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.

| Mode | Freq. (MHz) | Cond. Power (dBm) | Holster type / device configuration | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|----------------------|-------------|-------------------|---------------------------------------|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| 3-slots GPRS 850 MHz | 836.8 | 29.1 | 15mm Spacer, back side facing phantom | 22.3 | 0.66 | -0.50 | 0.74 |

Table 11.2.2. Rev3 SAR results for GPRS850 body-worn configurations


| | | | | |
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| Mode | Freq. (MHz) | Cond. Power (dBm) | Holster type / device configuration | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|---------------|-------------|-------------------|--|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| CDMA 800 MHz | 836.5 | 24.7 | 15mm Spacer, back side facing phantom | 22.0 | 0.78 | -0.06 | 0.78 |
| | 836.5 | 24.7 | 15mm Spacer, back side facing phantom | 21.9 | 0.45 | 0.24 | 0.45 |
| | 836.5 | 24.7 | 15mm Spacer, headset, back side facing phantom | 21.9 | 0.78 | -0.08 | 0.78 |
| CDMA 1900 MHz | 1880.0 | 23.8 | 15mm Spacer, back side facing phantom | 22.4 | 0.74 | -0.10 | 0.74 |
| | 1880.0 | 23.8 | 15mm Spacer, front side facing phantom | 22.3 | 0.50 | -0.01 | 0.50 |
| | 1880.0 | 23.8 | Vertical Holster, back side facing phantom | 22.3 | 0.51 | -0.09 | 0.51 |
| | 1880.0 | 23.8 | 15mm Spacer, headset, back side facing phantom | 22.2 | 0.72 | 0.02 | 0.72 |

Table 11.2.3. SAR results for CDMA 800/1900 body-worn configurations


| Mode | Freq. (MHz) | Cond. Power (dBm) | Peak | Holster type / device configuration | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|--------------|-------------|-------------------|--------|--|-------------------|------------------------|------------------|----------------------|
| | | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| CDMA 800 MHz | 836.5 | 24.7 | Peak 1 | 15mm Spacer, back side facing phantom | 22.1 | 0.78 | -0.20 | 0.78 |
| | 836.5 | 24.7 | Peak 2 | 15mm Spacer, back side facing phantom | 22.1 | 0.78 | -0.17 | 0.78 |
| | 836.5 | 24.7 | | Vertical Holster, back side facing phantom | 22.3 | 0.64 | -0.04 | 0.64 |

Table 11.2.4. Rev3 SAR results for CDMA 800/1900 body-worn configurations

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| Mode | Freq. (MHz) | Cond. Power (dBm) | Holster type / device configuration | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|-----------------------------|----------------|-------------------------|--|-------------------------|------------------------|------------------------|-------------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| 2-Slots GPRS 1900 MHz | 1880.0 | 29.0 | 15mm Spacer, back side facing phantom | 22.0 | 0.58 | -0.12 | 0.58 |
| | 1880.0 | 29.0 | Vertical Holster, back side facing phantom | 22.1 | 0.47 | 0.12 | 0.47 |
| | 1880.0 | 29.0 | 15mm Spacer, front side facing phantom | 22.2 | 0.35 | -0.15 | 0.35 |
| | 1880.0 | 29.0 | 15mm Spacer, headset #1, back side facing phantom | 22.1 | 0.59 | -0.10 | 0.59 |
| | 1880.0 | 29.0 | 15mm Spacer, headset #2, back side facing phantom | 22.0 | 0.59 | 0.22 | 0.59 |
| | 1880.0 | 29.0 | 15mm Spacer, headset #3, back side facing phantom | 21.9 | 0.62 | 0.04 | 0.62 |
| 3-Slots GPRS 1900 MHz | 1880.0 | 26.2 | 15mm Spacer, headset #3, back side facing phantom | 22.0 | 0.43 | -0.33 | 0.46 |
| 4-Slots GPRS 1900 MHz | 1880.0 | 25.6 | 15mm Spacer, headset #3, back side facing phantom | 22.0 | 0.50 | -0.10 | 0.50 |

Table 11.2.5. SAR results for GPRS 1900 body-worn configurations

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| Mode | Freq. (MHz) | Cond. Power (dBm) | Holster type / device configuration | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|-----------------------|-------------|-------------------|---|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| 802.11b/WLAN 2450 MHz | 2437 | 19.0 | 15mm Spacer, back side facing phantom | 21.9 | 0.49 | 2.88 | 0.49 |
| | 2437 | 19.0 | Vertical Holster, back side facing phantom | 21.9 | 0.48 | -0.38 | 0.52 |
| | 2437 | 19.0 | Vertical Holster, front side facing phantom | 21.8 | 0.04 | -0.23 | 0.04 |
| | 2437 | 19.0 | Vertical Holster, headset, back side facing phantom | 21.7 | 0.46 | -0.19 | 0.46 |

Table 11.2.6. SAR results for WiFi/WLAN/802.11b body-worn configurations

***Note:** Tested only highest output power channel

| Mode | Freq. (MHz) | Cond. Power (dBm) | Holster type / device configuration | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|--------------------|-------------|-------------------|---|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| Bluetooth 2450 MHz | 2441 | 10.5 | 15mm Spacer, back side facing phantom | 21.9 | 0.00 | -0.19 | 0.00 |
| | 2441 | 10.5 | Vertical Holster, back side facing phantom | 21.9 | 0.00 | 0.61 | 0.00 |
| | 2441 | 10.5 | Vertical Holster, front side facing phantom | 21.8 | 0.00 | 1.97 | 0.00 |
| | 2441 | 10.5 | Vertical Holster, headset, back side facing phantom | 21.8 | 0.00 | 0.88 | 0.00 |


Table 11.2.7. SAR results for Bluetooth body-worn configurations

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| Mode | Freq. (MHz) | Cond. Power (dBm) | Holster type / device configuration | Liquid Temp. (°C) | SAR, averaged over 1 g | | |
|---------------------------|-------------|-------------------|--|-------------------|------------------------|------------------|----------------------|
| | | | | | Measured (W/kg) | Power Drift (dB) | *Extrapolated (W/kg) |
| 802.11 a 5180-5805 MHz | 5180 | 11.05 | No holster, 15 mm, back side facing | 22.4 | 0.08 | -0.17 | 0.08 |
| | 5240 | | No holster, 15 mm, back side facing | | | | |
| | 5260 | 12.00 | No holster, 15 mm, back side facing | 22.1 | 0.10 | 0.23 | 0.10 |
| | 5320 | | No holster, 15 mm, back side facing | | | | |
| | 5520 | 14.12 | No holster, 15 mm, back side facing, 1 st hotspot | 21.9 | 0.12 | -0.11 | 0.12 |
| | 5580 | | No holster, 15 mm, back side facing | | | | |
| | 5680 | | No holster, 15 mm, back side facing | | | | |
| | 5745 | 13.35 | No holster, 15 mm, back side facing | 22.0 | 0.08 | 0.03 | 0.08 |
| | 5805 | | No holster, 15 mm, back side facing | | | | |
| | 5520 | 14.12 | Vertical Holster, back side facing | 22.1 | 0.10 | -0.20 | 0.10 |
| | 5520 | 14.12 | No holster, 15 mm, front side facing | 22.2 | 0.01 | 1.65 | 0.01 |
| | 5520 | 14.12 | No holster, 15 mm, back side facing, headset | 22.2 | 0.12 | 0.09 | 0.12 |

Table 11.2.8. SAR results for 802.11a body-worn configurations

***Note:** Tested only highest output power channel per band

| | | | | |
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