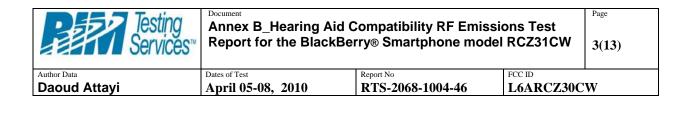
| Testing Services™ | Document Annex B_Hearing Aid Compatibility RF Emissions Test Report for the BlackBerry® Smartphone model RCZ31CW | | | Page 1(13) |
|----------------------|--|------------------|-----------|---------------|
| Author Data | Dates of Test | Report No | FCC ID | |
| Daoud Attayi | April 05-08, 2010 | RTS-2068-1004-46 | L6ARCZ30C | W |

Annex B: Probe and dipole descriptions and calibration certificates

B.2 Dipole calibration certificate

| Testi Servi | Document | B_Hearing Aid | Comnatihi | lity DE Emise | ione Toet | Page |
|--|------------------------------|--|--|--|-----------------|-------|
| Contra | Benort | for the BlackBe | | • | | 0(10) |
| Servi | Ces. Report | | riy⊚ Sinai | riphone mode | | 2(13) |
| r Data | Dates of Test | | Report No | | FCC ID | |
| oud Attayi | April 05 | 5-08, 2010 | RTS-206 | 8-1004-46 | L6ARCZ300 | CW |
| | | | | | | |
| Calibration Laborato Schmid & Partner Engineering AG reughausstrasse 43, 8004 Zurl | | | 1 N N | Schweizerischer Kalibri Service suisse d'étalom Servizio svizzero di tara Swiss Calibration Servi | nage itura | |
| Accredited by the Swiss Accre The Swiss Accreditation Servic Multilateral Agreement for the I | e is one of the signatori | | Accreditation N | io.: SCS 108 | | |
| Client RTS (RIM Test | ing Services) | | Certificate No: | CD835V3-1011_N | ov09 | |
| CALIBRATION | CERTIFICAT | E | | - A - J | | |
| Object | CD835V3 - SN: | 1011 | | | 3 ⁵⁷ | |
| Calibration procedure(s) | QA CAL-20.v4 | 1 1 1 A | | | R. | |
| | Calibration proc | edure for dipoles in ai | r st | and the second second | 50 50 | |
| Calibration date: | November 17, 2 | 1009 | 10 M 10 M | ent the second second | M. | |
| This calibration certificate docur All calibrations have been condu Calibration Equipment used (M& | ucted in the closed laborati | ory facility: environment temp | | | | |
| Primary Standards | ID # | Cal Date (Certificate No.) | | Scheduled Calibration | on | |
| Power meter EPM-442A | GB37480704 | 06-Oct-09 (No. 217-0108 | | Oct-10 | | |
| Power sensor HP 8481A | US37292783 | 06-Oct-09 (No. 217-0108 | 6) | Oct-10 | | |
| Probe ER3DV6 | SN: 2336 | 22-Dec-08 (No. ER3-233) | 6_Dec08) | Dec-09 | 1 | |
| Probe H3DV6 DAE4 | SN: 6065 SN: 781 | 22-Dec-08 (No. H3-6065_ 20-Feb-09 (No. DAE4-78 | - , | Dec-09 Feb-10 | | |
| | | 101000000000000000000000000000000000000 | | | | |
| Secondary Standards | ID # | Check Date (in house) | | Scheduled Check | | |
| Power meter Agilent 4419B | SN: GB42420191 | 09-Oct-09 (in house chec | , | In house check: Oct | | |
| Power sensor HP 8482H Power sensor HP 8482A | SN: 3318A09450 | 09-Oct-09 (in house chec | | In house check: Oct | | |
| Network Analyzer HP 8753E | SN: US37295597 US37390585 | 09-Oct-09 (in house chec 18-Oct-01 (in house chec | | In house check: Oct In house check: Oct | | |
| RF generator E4433B | MY 41000675 | 03-Nov-04 (in house chec | | In house check: Oct | | |
| - | - | | | | | |
| | Name | Function | a di la fasta di secolo di | Signature | Lindia - and - | |
| Calibrated by: | Mike Melli | Laboratory Tr | echnician | n.tein | 1. L | |
| Approved by: | Fin Bomholt | Technical Dir | ector | F. Bomlin | 11- | |
| | | | | Issued: November 1 | 9, 2009 | |
| This calibration certificate shall r | tot be reproduced except | in full without written approval | of the laboratory. | | | |
| This calibration certificate shall | | Page 1 of 6 | of the laboratory. | | | |

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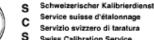


SNISS

'ORP

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





Service suisse d'étalonnage

- Servizio svizzero di taratura
- Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS)

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

References

[1]ANSI-C63.19-2006 American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

ANSI-C63.19-2007 [2]

American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

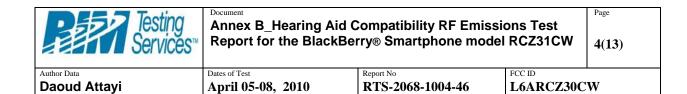
Methods Applied and Interpretation of Parameters:

- Coordinate System: y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with the standards [1, 2], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- Measurement Conditions: Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- Antenna Positioning: The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY5 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- Feed Point Impedance and Return Loss: These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminating by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- E- field distribution: E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1, 2], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- H-field distribution: H-field is measured with an isotropic H-field probe with 100mW forward power to the antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the feed point.

Certificate No: CD835V3-1011_Nov09

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1 Measurement Conditions

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

| DASY Version | DASY5 | V5.2 B157 |
|---------------------------------------|------------------|----------------------|
| DAST VEISION | DASIS | V5.2 D157 |
| DASY PP Version | SEMCAD X | V14.0 B57 |
| Phantom | HAC Test Arch | SD HAC P01 BA, #1070 |
| Distance Dipole Top - Probe Center | 10 mm | |
| Scan resolution | dx, dy = 5 mm | area = 20 x 180 mm |
| Frequency | 835 MHz ± 1 MHz | |
| Forward power at dipole connector | 20.0 dBm = 100mW | |
| Input power drift | < 0.05 dB | |

2 Maximum Field values

| | H-field 10 mm above dipole surface | condition | interpolated maximum |
|----|---|----------------------|----------------------|
| | Maximum measured | 100 mW forward power | 0.464 A/m |
| ų, | Incertainty for H-field measurement: 8.2% (k=2) | | |

| E-field 10 mm above dipole surface | condition | Interpolated maximum |
|------------------------------------|----------------------|----------------------|
| Maximum measured above high end- | 100 mW forward power | 168.6 V/m |
| Maximum measured above low end | 100 mW forward power | 157.4 V/m |
| Averaged maximum above arm | 100 mW forward power | 163.0 V/m |

Uncertainty for E-field measurement: 12.8% (k=2)

3 Appendix

3.1 Antenna Parameters

| Frequency | Return Loss | Impedance |
|-----------|-------------|--------------------|
| 800 MHz | 15.7 dB | (44.8 – j14.9) Ohm |
| 835 MHz | 31.8 dB | (48.5 + j2.0) Ohm |
| 900 MHz | 17.7 dB | (54.3 – j12.9) Ohm |
| 950 MHz | 20.5 dB | (44.7 + j7.2) Ohm |
| 960 MHz | 16.3 dB | (51.0 + j15.7) Ohm |

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

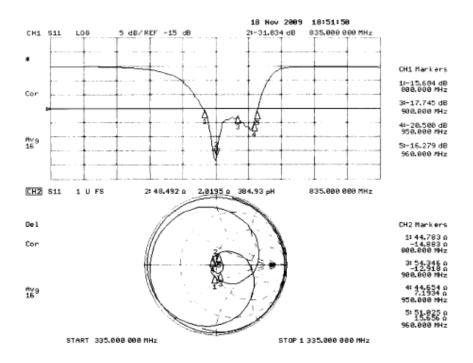
Certificate No: CD835V3-1011_Nov09

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| Testing Services™ | Document Annex B_Hearing Aid Compatibility RF Emissions Test Report for the BlackBerry® Smartphone model RCZ31CW | | | Page 5(13) |
|----------------------|--|------------------|-----------|-------------------|
| Author Data | Dates of Test | Report No | FCC ID | |
| Daoud Attayi | April 05-08, 2010 | RTS-2068-1004-46 | L6ARCZ30C | W |

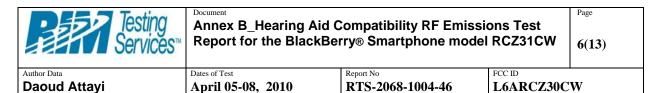
3.3 Measurement Sheets

3.3.1 Return Loss and Smith Chart



Certificate No: CD835V3-1011_Nov09

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3.3.2 DASY4 H-field Result

Date/Time: 17.11.2009 15:02:26

Test Laboratory: SPEAG Lab2

HAC RF_CD835_1011_091117_H_MM DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011 Communication System: CW; Frequency: 835 MHz Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: RF Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY5 Configuration: • Probe: H3DV6 - SN6065; ; Calibrated: 22.12.2008 • Sensor-Surface: (Fix Surface)

Sensor-Surface: (Fix Surface)

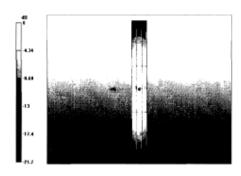
Electronics: DAE4 Sn781; Calibrated: 20.02.2009
Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070

Phantoni, FAC Test Aren with AMCC, Type 3D FAC FOT DA Solida. 1070
Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

Dipole H-Field measurement @ 835MHz/H Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 0.464 A/m Probe Modulation Factor = 1 Device Reference Point: 0, 0, -6.3 mm Reference Value = 0.494 A/m; Power Drift = -0.00467 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB)

| Grid 1 | Grid 2 | Grid 3 |
|--------|--------|--------|
| 0.384 | 0.405 | 0.386 |
| M4 | M4 | M4 |
| Grid 4 | Grid 5 | Grid 6 |
| 0.441 | 0.464 | 0.439 |
| M4 | M4 | M4 |
| Grid 7 | Grid 8 | Grid 9 |
| 0.390 | 0.409 | 0.382 |
| M4 | M4 | M4 |



0 dB = 0.464A/m

Certificate No: CD835V3-1011_Nov09

Page 5 of 6



| Daoud Attayi | April 05-08, 2010 | RTS-20 |
|--------------|-------------------|---------------|
| | | |

68-1004-46

3.3.3 DASY4 E-field Result

Date/Time: 17.11.2009 11:56:37

Test Laboratory: SPEAG Lab2

HAC RF_CD835_1011_091117_E_MM DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011 Communication System: CW; Frequency: 835 MHz Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³ Phantom section: RF Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY5 Configuration:

Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 22.12.2008

Sensor-Surface: (Fix Surface)

Electronics: DAE4 Sn781; Calibrated: 20.02,2009

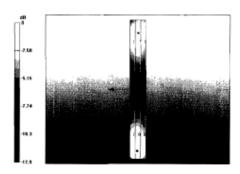
Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070

Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

Dipole E-Field measurement @ 835MHz/E Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 168.6 V/m Probe Modulation Factor = 1 Device Reference Point: 0, 0, -6.3 mm Reference Value = 109.2 V/m; Power Drift = -0.023 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB)

| Peak E-field | in V/m | |
|--------------|--------|--------|
| Grid I | Grid 2 | Grid 3 |
| 152.1 | 157.4 | 154.5 |
| M4 | M4 | M4 |
| Grid 4 | Grid 5 | Grid 6 |
| 84.1 | 86.8 | 84.5 |
| M4 | M4 | M4 |
| Grid 7 | Grid 8 | Grid 9 |
| 165.5 | 168.6 | 158.2 |
| M4 | M4 | M4 |



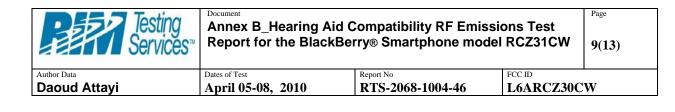
0 dB = 168.6V/m

Certificate No: CD835V3-1011_Nov09

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| r Data | Dates of Test | | Report No | FCC ID | |
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| oud Attayi | April 05 | -08, 2010 | RTS-2068-1004-46 | L6ARCZ300 | CW |
| | | | | | |
| Calibration Laborato | ry of | | S Schweizerischer Kalit | rierdienst | |
| Schmid & Partner Engineering AG Jeughausstrasse 43, 8004 Zuri | ch, Switzerland | | C Service suisse d'étalo C Servizio svizzero di ta S Swiss Calibration Ser | nnage ratura | |
| Accredited by the Swiss Accre The Swiss Accreditation Servio Multilateral Agreement for the | ce is one of the signatori | ies to the EA | Accreditation No.: SCS 108 | | |
| Client RTS (RIM Tes | anon Cable Ann Bros | allen de G | Certificate No: CD1880V3-1008 | Nov09 | |
| CALIBRATION | CERTIFICAT | B | | | |
| Object | CD1880V3 - SN | 1008 | and an article second | 25°; | |
| Calibration procedure(s) | QA CAL-20.v4 Calibration proc | edure for dipoles in air | | 60° 600 | |
| | a la constante de la constante | and the second | | and the second s | |
| Calibration date: | November 18, 2 | 009 | | | |
| Celibration date: | an a | 009 | | 18** 19*1 | |
| | November 18, 2 | annengo sano ni - ogo ni - ganger i - ganger i - | e physical units of measurements (SI). | 86-1. 1864 | |
| This calibration certificate docur All calibrations have been conde | November 18, 2 nents the traceability to na acted in the closed laborat | ational standards, which realize th ory facility: environment temperat | e physical units of measurements (SI). ture (22 ± 3)°C and humidity < 70%. | 38er. | |
| This calibration certificate docur All calibrations have been condi Calibration Equipment used (Ma | November 18, 2 ments the traceability to na ucted in the closed laborat kTE critical for calibration) | ational standards, which realize th ory facility: environment temperat | ture (22 ± 3)*C and humidity < 70%. | | |
| This calibration certificate docur | November 18, 2 nents the traceability to na acted in the closed laborat | ational standards, which realize th ory facility: environment temperat | | | |
| This calibration certificate docur All calibrations have been condi Calibration Equipment used (Ma Primary Standards | November 18, 2 ments the traceability to na ucted in the closed laborat kTE critical for calibration) | ational standards, which realize th ory facility: environment temperal Cal Date (Certificate No.) | ture (22 ± 3)*C and humidity < 70%. Scheduled Calibra | | |
| This calibration certificate docur All calibrations have been condi Calibration Equipment used (M4 Primery Standards Power meter EPM-442A Power sensor HP 8481A Probe ER3DV6 | November 18, 2 nemts the traceability to na acted in the closed laborat STE critical for calibration) ID # GB37480704 US37292783 SN: 2336 | ational standards, which realize th ory facility: environment temperal Cal Date (Certificate No.) 06-Oct-09 (No. 217-01086) 06-Oct-09 (No. 217-01086) 22-Dec-08 (No. ER3-2336_D | ture (22 ± 3)*C and humidity < 70%. Scheduled Calibra Oct-10 Oct-10 Nec08) Dec-09 | | |
| This calibration certificate docur All calibrations have been condi Calibration Equipment used (M& Primary Standards Power meter EPM-442A Power sensor HP 8481A Probe ER3DV6 Probe H3DV6 | November 18, 2 nents the traceability to na acted in the closed laborat ATE critical for calibration) ID # GB37480704 US37292783 SN: 2336 SN: 6065 | ational standards, which realize th ory facility: environment temperat Cal Date (Certificate No.) 06-Oct-09 (No. 217-01086) 06-Oct-09 (No. 217-01086) 22-Dec-08 (No. H3-6005Dr | Scheduled Calibra Oct-10 Oct-10 Oct-10 Dec-09 bcc08) Dec-09 | | |
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| This calibration certificate docur All calibrations have been conde Calibration Equipment used (M2 Primary Standards Power sensor HP 8481A Probe FR3DV6 Probe H3DV6 DAE4 | November 18, 2 nents the traceability to na acted in the closed laborat ATE critical for calibration) ID # GB37480704 US37292783 SN: 2336 SN: 6065 | ational standards, which realize th ory facility: environment temperat Cal Date (Certificate No.) 06-Oct-09 (No. 217-01086) 06-Oct-09 (No. 217-01086) 22-Dec-08 (No. H3-6005Dr | Scheduled Calibra Oct-10 Oct-10 Oct-10 Dec-09 bcc08) Dec-09 | | |
| This calibration certificate docur All calibrations have been condi Calibration Equipment used (M4 Primery Standards Power meter EPM-442A Power sensor HP 8481A Probe ER3DV6 Probe H3DV6 DAE4 Secondary Standards | November 16, 2 ments the traceability to na acted in the closed laborat ATE critical for calibration) ID # GB37480704 US37292783 SN: 2336 SN: 6065 SN: 781 | Cal Date (Certificate No.) O6-Oct-09 (No. 217-01066) 06-Oct-09 (No. 217-01066) 06-Oct-09 (No. 217-01066) 22-Dec-08 (No. ER3-2336_D 22-Dec-08 (No. ER3-2365Da 20-Feb-09 (No. DAE4-781_F | Scheduled Calibra Oct-10 Oct-10 Nec08) Dec-09 Nec09) Feb-10 Scheduled Check | tion | |
| This calibration certificate docur All calibrations have been condi Calibration Equipment used (Ma Primary Standards Power meter EPM-442A Power sensor HP 8481A Probe ER3DV6 Probe H3DV6 DAE4 Secondary Standards Power meter Agilent 4419B Power sensor HP 8482H | November 18, 2 nents the traceability to na acted in the closed laborat ATE critical for calibration) ID # GB37480704 US37292783 SN: 2336 SN: 2336 SN: 6065 SN: 781 ID # ID # SN: GB42420191 SN: 3318A09450 | ational standards, which realize th ory facility: environment temperat Cal Date (Certificate No.) 06-Oct-09 (No. 217-01086) 06-Oct-09 (No. 217-01086) 22-Dec-08 (No. ER3-2336_D 22-Dec-08 (No. ER3-2336_D 22-Dec-08 (No. DAE4-781_F Check Date (in house) | scheduled Calibra Oct-10 Oct-10 bcc08) Dec-09 bc09) Feb-10 Scheduled Check Cct-09) In house check: O | tion ct-10 | |
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| This calibration certificate docur All calibrations have been condi Calibration Equipment used (M2 Primary Standards Power meter EPM-442A Power sensor HP 8481A Probe H3DV6 DAE4 Secondary Standards Power meter Agilent 4419B Power sensor HP 8482H Power sensor HP 8482A Network Analyzer HP 8753E | November 16, 2 nerits the traceability to na ucted in the closed laborati ATE critical for calibration) ID # GB37480704 US37282783 SN: 2336 SN: 2365 SN: 781 ID # ID # SN: GB42420191 SN: 3318A09450 SN: US37295597 | ational standards, which realize th ory facility: environment temperat 06-Oct-09 (No. 217-01086) 06-Oct-09 (No. 217-01086) 02-Dec-08 (No. H3-6065_Dr 20-Peb-09 (No. DAE4-781_F Check Date (in house) 09-Oct-09 (in house check O 09-Oct-09 (in house check O 09-Oct-09 (in house check O | Scheduled Calibra Oct-10 Oct-10 Oct-10 bcc09 bc09 Feb-10 Scheduled Check ct-09 in house check: O ct-09 in house check: O in house check: O | tion ct-10 ct-10 ct-10 ct-10 ct-10 | |
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



Service suisse d'étalonnage С Servizio svizzero di taratura s

Schweizerischer Kalibrierdienst

Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS) The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

References

ANSI-C63.19-2006 [1]

American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

[2] ANSI-C63.19-2007

American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

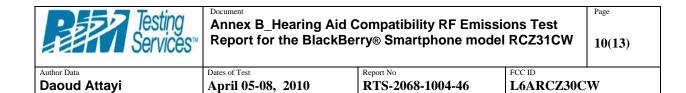
Methods Applied and Interpretation of Parameters:

- Coordinate System: y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms, x-axis is normal to the other axes. In coincidence with the standards [1, 2], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- Measurement Conditions: Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- Antenna Positioning: The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY5 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- Feed Point Impedance and Return Loss: These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminating by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles
- E- field distribution: E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1, 2], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- H-field distribution: H-field is measured with an isotropic H-field probe with 100mW forward power to the antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the feed point.

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1. Measurement Conditions

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

| DASY Version | DASY5 | V5.2 B157 |
|------------------------------------|------------------|----------------------|
| DASY PP Version | SEMCAD X | V14.0 B57 |
| Phantom | HAC Test Arch | SD HAC P01 BA, #1070 |
| Distance Dipole Top - Probe Center | 10 mm | |
| Scan resolution | dx, dy = 5 mm | area = 20 x 90 mm |
| Frequency | 1880 MHz ± 1 MHz | |
| Forward power at dipole connector | 20.0 dBm = 100mW | |
| Input power drift | < 0.05 dB | |
| | | |

2. Maximum Field values

| H-field 10 mm above dipole surface | | condition | Interpolated maximum | |
|---|-----|----------------------|----------------------|--|
| Maximum measu | red | 100 mW forward power | 0.471 A/m | |
| Incontainty for H-field measurement: 8 2% /k=2) | | | | |

Uncertainty for H-field measurement: 8.2% (k=2)

| E-field 10 mm above dipole surface | condition | Interpolated maximum |
|------------------------------------|----------------------|----------------------|
| Maximum measured above high end | 100 mW forward power | 136.2 V/m |
| Maximum measured above low end | 100 mW forward power | 132.1 V/m |
| Averaged maximum above arm | 100 mW forward power | 134.2 V/m |

Uncertainty for E-field measurement: 12.8% (k=2)

3. Appendix

3.1 Antenna Parameters

| Frequency | Return Loss | Impedance |
|-----------|-------------|----------------------|
| 1710 MHz | 22.8 dB | (52.2 + j7.1) Ohm |
| 1880 MHz | 20.0 dB | (50.5 + j10.1) Ohm |
| 1900 MHz | 20.9 dB | (53.2 + j8.8) Ohm |
| 1950 MHz | 29.5 dB | (52.3 + j2.6) Ohm |
| 2000 MHz | 18.7 dB | (43.2 + j8.4) Ohm |

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

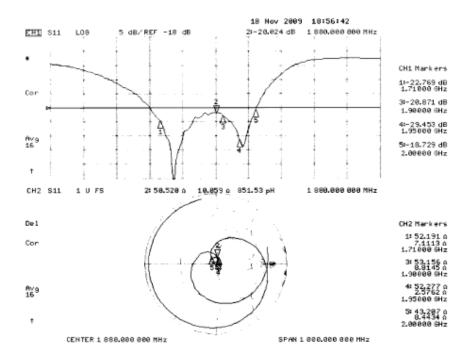
Certificate No: CD1880V3-1008_Nov09

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| Testing Services™ | Document Annex B_Hearing Aid Compatibility RF Emissions Test Report for the BlackBerry® Smartphone model RCZ31CW | | Page 11(13) | |
|----------------------|--|------------------|-------------|---|
| Author Data | Dates of Test | Report No | FCC ID | |
| Daoud Attayi | April 05-08, 2010 | RTS-2068-1004-46 | L6ARCZ30C | W |

3.3 Measurement Sheets

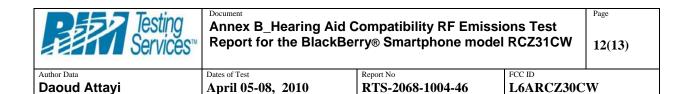
3.3.1 Return Loss and Smith Chart



Certificate No: CD1880V3-1008_Nov09

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3.3.2 DASY4 H-Field Result

Date/Time: 18.11.2009 12:32:23

Test Laboratory: SPEAG Lab2

HAC RF CD1880 1008 091118 H CL DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1008 Communication System: CW; Frequency: 1880 MHz Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: RF Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY5 Configuration: Probe: H3DV6 - SN6065; ; Calibrated: 22.12.2008 ٠ ٠

Sensor-Surface: (Fix Surface)

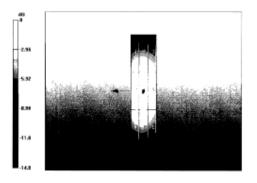
Electronics: DAE4 Sn781; Calibrated: 20.02.2009

- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

Dipole H-Field measurement @ 1880MHz/H Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.471 A/m Probe Modulation Factor = 1 Device Reference Point: 0, 0, -6.3 mm Reference Value = 0.499 A/m; Power Drift = 0.00498 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)

| Peak H-field in A/m | | | |
|---------------------|--------|--------|--|
| Grid I | Grid 2 | Grid 3 | |
| 0.408 | 0.423 | 0.398 | |
| M2 | M2 | M2 | |
| Grid 4 | Grid 5 | Grid 6 | |
| 0.456 | 0.471 | 0.439 | |
| M2 | M2 | M2 | |
| Grid 7 | Grid 8 | Grid 9 | |
| 0.420 | 0.435 | 0.400 | |
| M2 | M2 | M2 | |



0 dB = 0.471A/m

Certificate No: CD1880V3-1008_Nov09

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| Testing Services™ | Annex B_Hearing Aid Compatibility RF Emissions Test Report for the BlackBerry® Smartphone model RCZ31CW | | Page 13(13) | |
|----------------------|--|------------------|----------------|---|
| Author Data | Dates of Test | Report No | FCC ID | |
| Daoud Attayi | April 05-08, 2010 | RTS-2068-1004-46 | L6ARCZ30C | W |

3.3.3 DASY4 E-Field Result

Date/Time: 18.11.2009 17:16:43

Test Laboratory: SPEAG Lab2

 $\label{eq:hardware} \begin{array}{l} \mbox{HAC_RF_CD1880_1008_091118_E_CL} \\ \mbox{DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1008} \\ \mbox{Communication System: CW; Frequency: 1880 MHz} \\ \mbox{Medium parameters used: $\sigma = 0 mho/m, $\epsilon_r = 1$; $\rho = 1000 kg/m^3$} \\ \mbox{Phantom section: RF Section} \\ \mbox{Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)} \\ \mbox{DASY5 Configuration:} \\ \mbox{Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 22.12.2008} \\ \mbox{Sensor-Surface: (Fix Surface)} \end{array}$

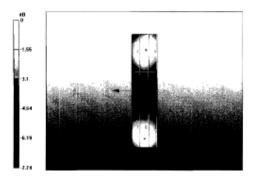
Electronics: DAE4 Sn781; Calibrated: 20.02.2009

- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

Dipole E-Field measurement @ 1880MHz/E Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 136.2 V/m Probe Modulation Factor = 1 Device Reference Point: 0, 0, -6.3 mm Reference Value = 152.3 V/m; Power Drift = -0.00386 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)

| Peak E-field in V/m | | | |
|---------------------|--------|--------|--|
| Grid I | Grid 2 | Grid 3 | |
| 124.7 | 132.1 | 131.1 | |
| M2 | M2 | M2 | |
| Grid 4 | Grid 5 | Grid 6 | |
| 86.6 | 90.1 | 87.7 | |
| M3 | M3 | M3 | |
| Grid 7 | Grid 8 | Grid 9 | |
| 130.7 | 136.2 | 132.2 | |
| M2 | M2 | M2 | |



0 dB = 136.2V/m

Certificate No: CD1880V3-1008_Nov09

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