RTS RIM Testing Services	Annex B to Hearing Aid Report for BlackBerry V	Page 1(35)				
Author Data	Dates	Report No	FCC ID			
Daoud Attayi	July 13-19, 31, 2006					

Annex B: Probe and dipole descriptions and calibration certificates

B.1 Probe and measurement chain descriptions and specifications

RTS RIM Testing Services	Annex B to Hearing Aic Report for BlackBerry V	Page 2(35)				
Author Data	Dates	Report No	FCC ID			
Daoud Attayi	July 13-19, 31, 2006					

DASY Dosimetric Assessment System by Schmid & Partner Engineering AG



Applications	ER3DV6 ISOTROPIC E-FIELD PROBE FOR GENERAL NEAR-FIELD MEASUREMENTS				
Support & Downloads Products DASY4 Packages	Download Produc	<u>ct Flyer</u> (PDF, 192kB)			
EASY4 Probes ET3DV6 - Isotropic Dos-Probe ES3DV3 - Isotropic Dos-Probe EVON14 - Isotropic Dos-Probe	Construction One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents glycolether)				
EX3DV4 - Isotropic Dos-Probe ET1DV3 - D-Probe	Calibration	In air from 100 MHz to 3.0 GHz (absolute accuracy ±6.0%, k=2)			
EUV3 - Universal Vector E-Probe H3DV6 - Isotropic H-Probe HUV4 - Universal Vector H-Probe T1V3 - Temp-Probe	Frequency Directivity	100 MHz to > 6 GHz; Linearity: ± 0.2 dB (100 MHz to 3 GHz) ± 0.2 dB in air (rotation around probe axis) ± 0.4 dB in air (rotation normal to probe axis)			
DP1 - Dummy-Probe • Data Acquisition System	Dynamic Range	2 V/m to > 1000 V/m; Linearity: ± 0.2 dB			
• Software • Phantoms • Robots	Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.5 mm			
Validation Kits & Calibration Dipoles Hearing Aid Compatibility (HAC) Ext Tissue Simulating Liquids	Application	General near-field measurements up to 6 GHz Field component measurements Fast automatic scanning in phantoms			
SPEAG Home					

http://www.dasy4.com/er3.htm

RTS RIM Testing Services	Annex B to Hearing Aid Report for BlackBerry V	Page 3(35)					
Author Data	Dates	hates Report No FCC ID					
Daoud Attayi	July 13-19, 31, 2006						

DASY Dosimetric Assessment System by Schmid & Partner Engineering AG

DASY Schmid & Partner Engineering AG News Sales Contact			
Applications	H3DV6 3-DIMENSIO	NAL H-FIELD PROBE FOR SMALL BAND	
Support & Downloads	-		
Products	囚 <u>Download Product Flyer</u> (PDF, 192kB)		
• DASV4 Packages			
EASY4 Probes ET3DV6 - Isotropic Dos-Probe ES3DV3 - Isotropic Dos-Probe EX3DV4 - Isotropic Dos-Probe	Construction	Three concentric loop sensors with 3.8 mm loop diameters Resistively loaded detector diodes for linear response Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)	
ET1DV3 - D-Probe ER3DV6 - Isotropic E-Probe	Frequency	200 MHz to 3 GHz (absolute accuracy ± 6.0%, k=2); Output linearized	
EUV3 - Universal Vector E-Probe	Directivity	± 0.25 dB (spherical isotropy error)	
HUV4 - Universal Vector H-Probe	Dynamic Range	10 mA/m to 2 A/m at 1 GHz	
T1V3 - Temp-Probe DP1 - Dummy-Probe	E-Field Interference	< 10% at 3 GHz (for plane wave)	
Data Acquisition System Software	Dimensions	Overall length: 330 mm (Tip: 40 mm) Tip diameter: 6 mm (Body: 12 mm) Distance from probe tip to dipole centers: 3 mm	
Phantoms Robots Validation Kits & Calibration Dipoles Hearing Aid Compatibility (HAC) Ext Tissue Simulating Liquids SPEAG Home	Application	General magnetic near-field measurements up to 3 GHz Field component measurements Surface current measurements Measurements in air or liquids Low interaction with the measured field	

http://www.dasy4.com/h3d.htm

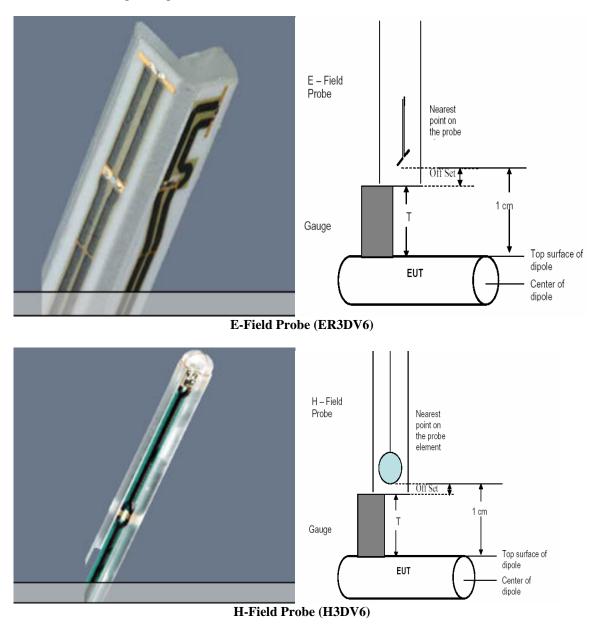
RTS RIM Testing Services	Annex B to Hearing Aid Report for BlackBerry V	Page 4(35)					
Author Data	Dates	Dates Report No FCC ID					
Daoud Attayi	July 13-19, 31, 2006	uly 13-19, 31, 2006 RTS-0373-0607-14 L6ARBF20CW					

All measurements were performed to the nearest element point as per the C63.19 standard. Offset distances were entered in the DASY4 software so that the measurement was to the nearest element.

Figures 1 and 2, provided by the manufacturer, illustrate detail of the probe tip and its dimensions.

ER3DV6 E-Field probe: The distances from the probe tip to the closest points on the dipole sensors are 1.45mm for X and Y and 1.25mm for Z. From the probe tip to the center of the sensors is 2.5mm.

H3DV6 H-Field probe: The distance from the probe tip to the closest point of the X, Y and Z loop sensors is 1.1mm. From the probe tip to the center of the sensor is 3.00mm.



RTS RIM Testing Services	Document Annex B to Hearing Aid C Report for BlackBerry Wir					
Author Data	Dates Report No FCC ID					
Daoud Attayi	July 13-19, 31, 2006					

The following information is from the system manufacturer user manual describing the process chain:

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$
(20.1)

with	V_i	= compensated signal of channel i	(i = x, y, z)
	U_i	= input signal of channel i	(i = x, y, z)
	cf	= crest factor of exciting field	(DASY parameter)
	dcp_i	= diode compression point	(DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

	$\mathrm{E-field probes}$:	$E_i = \sqrt{\frac{V_i}{Norm_i \cdot c}}$	ConvF
	$\mathbf{H}-\mathbf{fieldprobes}$:	$H_{\rm i} = \sqrt{V_i} \cdot \frac{a_{i0} + a_{\rm i1}}{2}$	$\frac{f + a_{i2}f^2}{f}$
with	= compensated signal of α = sensor sensitivity of cha $\mu V/(V/m)^2$ for E-field = sensitivity enhancement = sensor sensitivity factor = carrier frequency [GHz] = electric field strength α = magnetic field strength	annel i d Probes t in solution rs for H-field probes f channel i in V/m	$\begin{array}{l} (i=x,y,z) \\ (i=x,y,z) \end{array}$

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$
(20.2)

The measurement / integration time per point is > 500 ms, as per the system manufacturer:

The time response of the field probes has been assessed by exposing the probe to a well-controlled field producing signals larger than HAC E- and H-fields of class M4. The signal response time is evaluated as the time required by the system to reach 90% of the expected final value after an on/off switch of the power source with an integration time of 500 ms and a probe response time of <5 ms. In the current implementation, DASY4 waits longer than 100 ms after having reached the grid point before starting a measurement, i.e., the response time uncertainty is negligible.

If the device under test does not emit a CW signal, the integration time applied to measure the electric field at a specific point may introduce additional uncertainties due to the discretization. The tolerances for the different systems had the worst-case of 2.6%.

RTS RIM Testing Services	Annex B to Hearing Aid Report for BlackBerry V	Page 6(35)		
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF20C	W

B.2 Probe and dipole calibration certificates

ata	Dates	Report No	FCC ID	
d Attayi	July 13-19, 31, 200	06 RTS-0373-0607-	14 L6ARBF200	W
Calibration L	aboratory of	and a balance		
Schmid & Par	tner	Hac-MRA (SHISS S	Schweizerischer Kalibrierdienst Service suisse d'étalonnage	
Engineering Zeughausstrasse 4	AG 3, 8004 Zurich, Switzerland	RIGRATE S	Servizio svizzero di taratura Swiss Calibration Service	
Assessed in a day of the Co	Francisco Coltano da Maria da	-walater -		
The Swiss Accredit	viss Federal Office of Metrology and tation Service is one of the signate tent for the recognition of calibrat	ories to the EA	No.: SCS 108	
Client RIM	ione for the recognition of calibrat		ER3-2285 Apr06	88
CALIBRA	TION CERTIFICA	TF	-	
OALIDITA	HON OLIVINIOA			
Object	ER3DV6 - SN:	2285		
Calibration procedu	re(s) QA CAL-02.v4			
		cedure for E-field probes optimized f	or close near field	
	evaluations in	an		
Calibration date:	April 27, 2006		CONTRACTOR -	
Condition of the cali	brated item In Tolerance			
		national standards, which realize the physical units e probability are given on the following pages and		
All calibrations have	been conducted in the closed labor	atory facility: environment temperature (22 ± 3)*C :	and humidity < 70%.	
	Int used (M&TE critical for calibration			
Primary Standards	ID #		Schadulad Calibration	
Power meter E4419		Cal Date (Calibrated by, Certificate No.) 5-Apr-06 (METAS, No. 251-00557)	Scheduled Calibration Apr-07	-
Power sensor E4412		5-Apr-06 (METAS, No. 251-00557)	Apr-07	
Power sensor E4412 Reference 3 dB Atte		5-Apr-06 (METAS, No. 251-00557) 11-Aug-05 (METAS, No. 251-00499)	Apr-07 Aug-06	
Reference 20 dB Att		4-Apr-06 (METAS, No. 251-00558)	Apr-07	
Reference 30 dB Att		11-Aug-05 (METAS, No. 251-00500)	Aug-06	
Reference Probe EF DAE4	3DV6 SN: 2328 SN: 654	3-Oct-05 (SPEAG, No. ER3-2328_Oct05) 2-Feb-06 (SPEAG, No. DAE4-654_Feb06)	Oct-06 Feb-07	
Secondary Standard				
RF generator HP 86		Check Date (in house) 4-Aug-99 (SPEAG, in house check Nov-05)	Scheduled Check In house check: Nov-07	-
Network Analyzer Hi		18-Oct-01 (SPEAG, in house check Nov-05)		
Calibrated by:	Name Kotia Bakavia	Function	Signature	
Calibrated by:	Katja Pokovic	Technical Manager	the gift	
	Niels Kuster	Quality Manager	1. 18	
Approved by:			11/00	
Approved by:		/	,	

RTS RIM Testing Services	Annex B to Hearing Aid (Report for BlackBerry Wi	ions Test	Page 8(35)				
Author Data	Dates	Dates Report No FCC ID					
Daoud Attayi	July 13-19, 31, 2006						

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



- Schweizertscher Kalibrierdienst Service suisse d'étaionnage
- Servizio evizzero di tereture
- Swiss Collibration Service

Accreditation No.: SCS 108

Accredited by the Swist Federal Office of Metrology and Accreditation The Swiss Accreditation Service is one of the eignatories to the EA. Multilateral Agreement for the recognition of calibration certificates

Giossary:

NORMx,y,z	sensitivity in free space
DCP	diode compression point
Polarization ϕ	φ rotation around probe axis
Polarization 8	9 rotation around an axis that is in the plane normal to probe axis (at
	measurement center), i.e., 8 = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot
	coordinate system

Calibration is Performed According to the Following Standards:

 a) IEEE Std 1309-1996, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", 1998.

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 9 = 0 for XY sensors and 9 = 90 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz; R22 waveguide).
- NORM(f)x, y,z = NORMx, y,z * frequency_response (see Frequency Response Chart).
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency.
- Spherical isotropy (3D deviation from isotropy): in a locally homogeneous field realized using an open waveguide setup.
- Sensor Offset. The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

Certificate No: ER3-2285_Apr06

Page 2 of B

RTS RIM Testing Services				Page 9(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	CW

ER3DV6 SN:2285

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April 27, 2006

Probe ER3DV6

SN:2285

Manufactured: Last calibrated: Repaired: Recalibrated: September 20, 2002 November 11, 2005 April 20, 2006 April 27, 2006

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

Certificate No: ER3-2285_Apr06

Page 3 of 9

ER3DV6 \$N:2285

April 27, 2006

DASY - Parameters of Probe: ER3DV6 SN:2285

Sensitivity in Free Space [μV/(V/m) ²]			Diode Co	ompression ^A
	NormX	1.20 ± 10.1 % (k=2)	DCP X	93 mV
	NormY	1.40 ± 10.1 % (k=2)	DCP Y	93 mV
	NormZ	1. 54 ± 10.1 % (k=2)	DCP Z	98 mV

Frequency Correction

÷

x	0.0
Y	0.0
Z	0.0
Sensor Offset	(Probe Tip to Sensor Center)
x	2.5 mm
Y	2.5 mm
z	2.5 mm
Connector Angle	78 °

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A numerical linearization parameter: uncertainty not required

Certificate No: ER3-2285_Apr08

Pege 4 of 9

RTS RIM Testing Services		Compatibility RF Emiss Vireless Handheld Mode		Page 11(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	W W

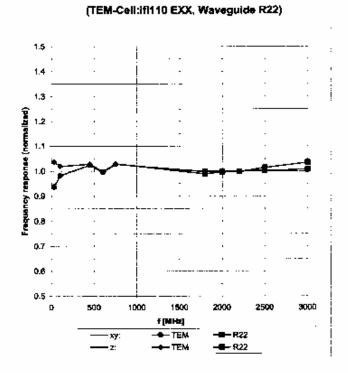
ER3DV6 \$N:2285

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April 27, 2006

Frequency Response of E-Field



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

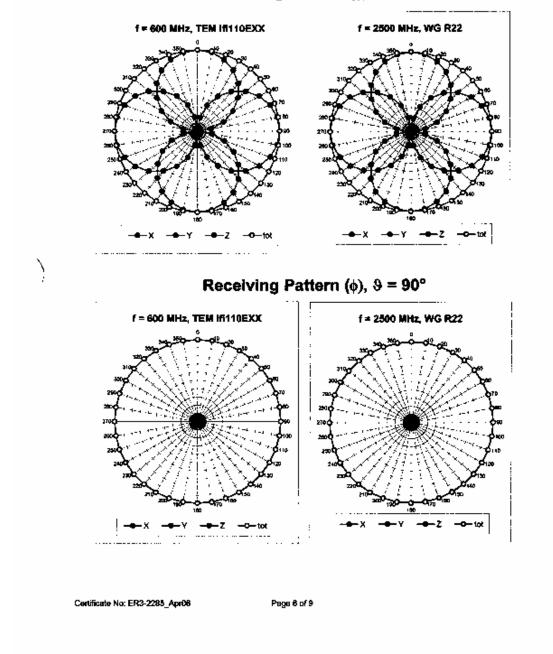
Certificate No: ER3-2265_Apr06

Page 5 of 9

RTS RIM Testing Services				Page 12(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	CW

ER3DV6 SN:2285

April 27, 2006



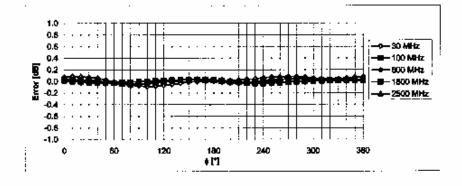
Receiving Pattern (ϕ), $\vartheta = 0^{\circ}$

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RTS RIM Testing Services		l Compatibility RF Emiss Vireless Handheld Mode		Page 13(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	CW

ER3DV6 \$N:2285

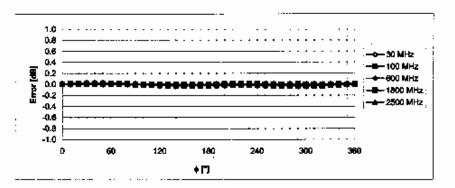
April 27, 2006



Receiving Pattern (ϕ), ϑ = 0°

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

Receiving Pattern (ϕ), $\vartheta = 90^{\circ}$



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

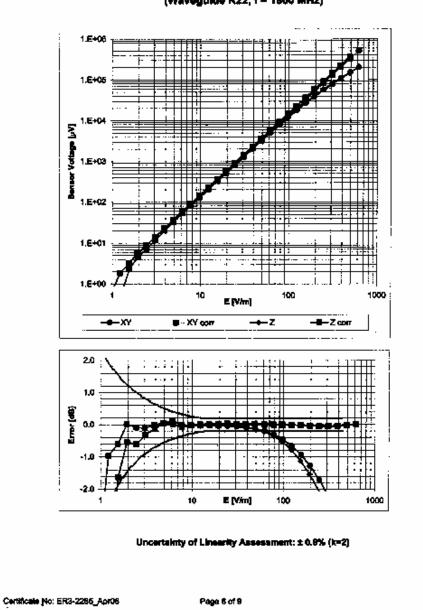
Certificate No: ER3-2265_Apr06

Page 7 of 9

RTS RIM Testing Services		l Compatibility RF Emiss Wireless Handheld Mode		Page 14(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	CW

ER3DV6 \$N:2285

April 27, 2006



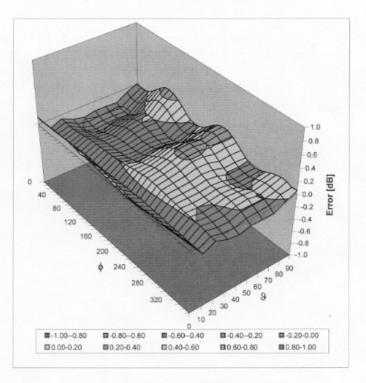
Dynamic Range f(E-field) (Waveguide R22, f = 1600 MHz)

RTS RIM Testing Services				Page 15(35)
Author Data Daoud Attayi	Dates July 13-19, 31, 2006	Report No RTS-0373-0607-14	FCC ID L6ARBF200	:w

ER3DV6 SN:2285

April 27, 2006

Deviation from Isotropy in Air Error (\u00f3, \u0093), f = 900 MHz



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

Certificate No: ER3-2285_Apr06

Page 9 of 9

IM Testing Services		-			Report No		FCC ID	
ud Attayi			8-19, 31, 200	6	RTS-0373-060	7-14	L6ARBF200	CW
Sc	alibration L chmid & Par Engineering	tner AG		lac-MR	A (2 0 3)	Service sul	scher Kalibrierdienst sse d'étalonnage izzero di taratura	
Zeu	ughausstrasse 4	3, 8004 Zurich	, Switzerland	Mahaladala	(ARA)	S Swiss Cali	bration Service	
Th	e Swiss Accredit	tation Service	flice of Metrology and A Is one of the signator	ries to the EA	Accreditatio	on No.: SCS	108	
	ient RIM	lent for the re	cognition of calibratio	on certificates	Certificate 1	No: H3-6168	Mar06	
	International In		EDTIFICAT		Continenter			
C	ALIBRA	HON C	ERTIFICAT	E				
0	bject		H3DV6 - SN:61	68				
c	alibration procedu	re(s)	QA CAL-03.v4 Calibration proc evaluations in a		field probes optimize	ed for close	near field	
G	alibration date:		March 16, 2006	3				
0	ondition of the cali	ibrated item	In Tolerance					
) "	he measurements	and the uncer	tainties with confidence	e probability are gi	which realize the physical user on the following pages a mean temperature (22 ± 3)	and are part of t	ne certificate.	
	alibration Equipme	ent used (M&TI	E critical for calibration))				
Ca			1	Cal Date (Ca				
	rimary Standards		ID #	an mana faa	librated by, Certificate No.)	Sched	uled Calibration	
Pr	ower meter E4419		GB41293874	3-May-05 (M	ETAS, No. 251-00466)	May-06	}	
Pr Pc Pc	ower meter E4419 ower sensor E441	2A	GB41293874 MY41495277	3-May-05 (M 3-May-05 (M	ETAS, No. 251-00466) ETAS, No. 251-00466)	May-06 May-06	1	
Pr Pc Pc Pc	ower meter E4419	2A 2A	GB41293874	3-May-05 (M 3-May-05 (M 3-May-05 (M	ETAS, No. 251-00466)	May-06		
Pr Pc Pc Rc	ower meter E4419 ower sensor E441 ower sensor E441	2A 2A enuator	GB41293874 MY41495277 MY41498087	3-May-05 (M 3-May-05 (M 3-May-05 (M 11-Aug-05 (N	ETAS, No. 251-00466) ETAS, No. 251-00466) ETAS, No. 251-00466)	May-06 May-06 May-06	8	
Pr Po Po Ro Ro Ro	ower meter E4419 ower sensor E441 ower sensor E441 eference 3 dB Atte eference 20 dB At eference 30 dB At	2A 2A enuator ttenuator ttenuator	GB41293874 MY41495277 MY41498087 SN: S5054 (3c)	3-May-05 (M 3-May-05 (M 3-May-05 (M 11-Aug-05 (M 3-May-05 (M 11-Aug-05 (M	ETAS, No. 251-00486) ETAS, No. 251-00486) ETAS, No. 251-00486) IETAS, No. 251-00499) ETAS, No. 251-00467) IETAS, No. 251-00500)	May-06 May-06 May-06 Aug-06		
Pr Pc Pc Rc Rc Rc Rc Rc Rc Rc	ower meter E4419 ower sensor E441 ower sensor E441 eference 3 dB Atte eference 20 dB At eference 30 dB At eference 30 dB At	2A 2A enuator ttenuator ttenuator	GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 6182	3-May-05 (M 3-May-05 (M 3-May-05 (M 11-Aug-05 (M 3-May-05 (M 11-Aug-05 (N 3-Oct-05 (SF	ETAS, No. 251-00486) ETAS, No. 251-00466) ETAS, No. 251-00466) IETAS, No. 251-00467) ETAS, No. 251-00467) TETAS, No. 251-00500) 'EAG, No. H3-6182_Oct05)	May-06 May-06 Aug-06 May-06 Aug-06 Aug-06 Oct-06		
Pr Pc Pc Rc Rc Rc Rc Rc Rc Rc	ower meter E4419 ower sensor E441 ower sensor E441 eference 3 dB Atte eference 20 dB At eference 30 dB At	2A 2A enuator ttenuator ttenuator	GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b)	3-May-05 (M 3-May-05 (M 3-May-05 (M 11-Aug-05 (M 3-May-05 (M 11-Aug-05 (N 3-Oct-05 (SF	ETAS, No. 251-00486) ETAS, No. 251-00486) ETAS, No. 251-00486) IETAS, No. 251-00499) ETAS, No. 251-00467) IETAS, No. 251-00500)	May-06 May-06 Aug-06 May-06 Aug-06 Aug-06 Oct-06		
Pr Pc Pc Rd Rd Rd DJ	ower meter E4419 ower sensor E441 ower sensor E441 eference 3 dB Atte eference 20 dB At eference 30 dB At eference 30 dB At	2A 2A enuator ttenuator ttenuator 3DV6	GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 6182	3-May-05 (M 3-May-05 (M 3-May-05 (M 11-Aug-05 (M 3-May-05 (M 11-Aug-05 (N 3-Oct-05 (SF	ETAS, No. 251-00486) ETAS, No. 251-00466) ETAS, No. 251-00466) METAS, No. 251-00499) ETAS, No. 251-00499) ETAS, No. 251-00600) (EAG, No. H3-6182_Oct05) PEAG, No. DAE4-654_Feb00	May-06 May-06 Aug-06 May-06 Aug-06 Oct-06 Oct-06 6) Feb-07		
Pr Pc Pc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc	ower meter E4419 ower sensor E441 ower sensor E441 eference 3 dB Atte eference 30 dB Att eference 20 dB At eference Probe H: AE4 econdary Standard F generator HP 86	2A 2A enuator ttenuator 3DV6 ds 348C	GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (20b) SN: S5129 (30b) SN: 6182 SN: 654	3-May-05 (M 3-May-05 (M 3-May-05 (M 11-Aug-05 (M 3-May-05 (M 11-Aug-05 (M 3-Oct-05 (SF 2-Feb-06 (SF Check Date	ETAS, No. 251-00486) ETAS, No. 251-00466) ETAS, No. 251-00466) METAS, No. 251-00499) ETAS, No. 251-00499) ETAS, No. 251-00600) (EAG, No. H3-6182_Oct05) PEAG, No. DAE4-654_Feb00	May-06 May-06 Aug-06 Aug-06 Aug-06 Oct-06 6) Feb-07 Schedi	5	
Pr Pc Pc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc	ower meter E4419 ower sensor E441 ower sensor E441 eference 3 dB Att eference 20 dB At eference 20 dB At eference Probe H: AE4 econdary Standard	2A 2A enuator ttenuator 3DV6 ds 348C	GB41293874 MY41495277 MY41498087 SN: 55054 (3c) SN: 55056 (20b) SN: 55129 (30b) SN: 5182 SN: 654 ID #	3-May-05 (M 3-May-05 (M 11-Aug-05 (M 11-Aug-05 (M 11-Aug-05 (M 3-May-05 (M 3-Oct-05 (SF 2-Feb-06 (SF Check Date I 4-Aug-99 (SF	ETAS, No. 251-00486) ETAS, No. 251-00466) ETAS, No. 251-00466) AETAS, No. 251-00467) AETAS, No. 251-00467) AETAS, No. 251-00500) EAG, No. H3-6182_Oct05) PEAG, No. DAE4-654_Feb0 In house)	May-0(May-0(May-0(May-0) May-0(May-0) Oct-06 6) Feb-07 Schedi 05) In hous	i i i i i i i i i	
Pr Pc Pc Ra Rk Rk BJ St Rf Nk	ower meter E4419 ower sensor E441 ower sensor E441 eference 3 dB Att eference 30 dB Att eference 90 dB Att eference Probe H3 AE4 econdary Standard F generator HP 86 etwork Analyzer H	2A 2A enuator ttenuator 3DV6 ds 348C	GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 55129 (30b) SN: 6182 SN: 654 ID # US3642U01700 US37390585 Name	3-May-05 (M 3-May-05 (M 3-May-05 (M 11-Aug-05 (M 11-Aug-05 (N 3-May-05 (SF 2-Feb-06 (SF 2-Feb-06 (SF Check Date 4-Aug-99 (SF 18-Oct-01 (S	ETAS, No. 251-00486) ETAS, No. 251-00466) ETAS, No. 251-00466) IETAS, No. 251-00467) IETAS, No. 251-00467) IETAS, No. 251-00467) IETAS, No. 251-00500) IEAG, No. Ha-6182_Oct05) IEAG, No. DAE4-654_Feb0 In house) PEAG, in house check Nov- Function	May-0(May-0(May-0(May-0) May-0(May-0) Oct-06 6) Feb-07 Schedi 05) In hous	aled Check be check: Nov-07 be check: Nov 06	
Pr Pc Pc Ra Rk Rk BJ St Rf Nk	ower meter E4419 ower sensor E441 ower sensor E441 eference 3 dB Atte eference 30 dB Att eference 20 dB At eference Probe H: AE4 econdary Standard F generator HP 86	2A 2A enuator ttenuator 3DV6 ds 348C	GB41293874 MY41495277 MY41498087 SN: 55054 (3c) SN: 55056 (20b) SN: 55129 (30b) SN: 5129 (30b) SN: 6182 SN: 654 ID # US3642U01700 US37390585	3-May-05 (M 3-May-05 (M 3-May-05 (M 11-Aug-05 (M 11-Aug-05 (N 3-May-05 (SF 2-Feb-06 (SF 2-Feb-06 (SF Check Date 4-Aug-99 (SF 18-Oct-01 (S	ETAS, No. 251-00486) ETAS, No. 251-00466) ETAS, No. 251-00466) IETAS, No. 251-00467) IETAS, No. 251-00467) IETAS, No. 251-00500) IEAG, No. 251-00500) IEAG, No. 251-00500) IEAG, No. 251-00500 In house In house PEAG, in house check Nov-	May-06 May-06 May-06 May-00 May-00 Oct-06 Oct-06 Oct-06 Feb-07 Schedri 05 In hous	aled Check be check: Nov-07 be check: Nov 06	
Pr Pc Pc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc Rc	ower meter E4419 ower sensor E441 ower sensor E441 eference 3 dB Att eference 30 dB Att eference 90 dB Att eference Probe H3 AE4 econdary Standard F generator HP 86 etwork Analyzer H	2A 2A enuator ttenuator 3DV6 ds 348C	GB41293874 MY41495277 MY41498087 SN: S5054 (3c) SN: S5086 (20b) SN: S5129 (30b) SN: 55129 (30b) SN: 6182 SN: 654 ID # US3642U01700 US37390585 Name	3-May-05 (M 3-May-05 (M 11-Aug-05 (M 3-May-05 (M 3-May-05 (M 11-Aug-05 (M 3-Oct-05 (SF 2-Feb-06 (SF 2-Feb-06 (SF Check Date (4-Aug-99 (SF 18-Oct-01 (S	ETAS, No. 251-00486) ETAS, No. 251-00466) ETAS, No. 251-00466) IETAS, No. 251-00467) IETAS, No. 251-00467) IETAS, No. 251-00467) IETAS, No. 251-00500) IEAG, No. Ha-6182_Oct05) IEAG, No. DAE4-654_Feb0 In house) PEAG, in house check Nov- Function	May-06 May-06 May-06 May-00 May-00 Oct-06 Oct-06 Oct-06 Feb-07 Schedri 05 In hous	aled Check be check: Nov-07 be check: Nov 06	
Pr Pc Pc Ra Ra Ra DJ Sk RF Ne Ca	ower meter E4419 ower sensor E441 ower sensor E441 eference 3 dB Atte eference 3 dB Atte eference 20 dB At eference Probe H: AE4 econdary Standard F generator HP 86 etwork Analyzer H allbrated by:	2A 2A enuator ttenuator 3DV6 ds 348C IP 8753E	GB41293874 MY41495277 MY41498087 SN: 55056 (20b) SN: 55056 (20b) SN: 55129 (30b) SN: 6182 SN: 654 ID # US3642U01700 US37390585 Name Katja Pokovic Niels Kuster	3-May-05 (M 3-May-05 (M 11-Aug-05 (M 11-Aug-05 (M 3-May-05 (M 3-Oct-05 (SF 2-Feb-06 (SF Check Date (4-Aug-99 (SR 18-Oct-01 (S	ETAS, No. 251-00486) ETAS, No. 251-00466) ETAS, No. 251-00466) AETAS, No. 251-00467) METAS, No. 251-00467) METAS, No. 251-00500) ETAS, No. 251-00500) ETAS, No. 251-00500) ETAS, No. 13-6182_Oct05) PEAG, No. DAE4-654_Feb0 (In house) PEAG, In house check Nov- Function Technical Manager	May-06 Ma	aled Check be check: Nov-07 be check: Nov 06	
Pr Pc Pc Ra Ra Ra DJ Sk RF Ne Ca	ower meter E4419 ower sensor E441 ower sensor E441 eference 3 dB Atte eference 3 dB Atte eference 20 dB At eference Probe H: AE4 econdary Standard F generator HP 86 etwork Analyzer H allbrated by:	2A 2A enuator ttenuator 3DV6 ds 348C IP 8753E	GB41293874 MY41495277 MY41498087 SN: 55056 (20b) SN: 55056 (20b) SN: 55129 (30b) SN: 5182 SN: 654 ID # US3642U01700 US37390585 Name Katja Pokovic Niels Kuster	3-May-05 (M 3-May-05 (M 11-Aug-05 (M 11-Aug-05 (M 3-May-05 (M 3-Oct-05 (SF 2-Feb-06 (SF Check Date (4-Aug-99 (SR 18-Oct-01 (S	ETAS, No. 251-00486) ETAS, No. 251-00466) ETAS, No. 251-00466) METAS, No. 251-00469) ETAS, No. 251-00499) ETAS, No. 251-00467) METAS, No. 251-00500) (EAG, No. H3-6182_Oct05) PEAG, No. DAE4-654_Feb0(In house) PEAG, In house check Nov- Function Technical Manager	May-06 Ma	aled Check are check: Nov-07 we check: Nov 05 ure	

RTS RIM Testing Services		l Compatibility RF Emiss Wireless Handheld Mode		Page 17(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	W W

Calibration Laboratory of Schmid & Partner Engineering AG Zeughaustrasse 43, 8804 Zurich, Setterland



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- 2 vizio svizzero di terelura
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Accreditation No.: SCS 108

Accredited by the Swisa Federal Office of Matrology and Accreditation The Swiss Accreditation Bervice is one of the signatories to the EA Multileteral Agreement for the recognition of calibration certificates

Glossary:

NORMx,y,z	sensitivity in free space
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization 9	9 rotation around an axis that is in the plane normal to probe axis (at
Connector Angle	measurement center), i.e., $\theta = 0$ is normal to probe axis information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1309-1996, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz*, 1996.

Methods Applied and Interpretation of Parameters:

- X,Y,Z_a0a1a2: Assessed for E-field polarization 3 = 90 for XY sensors and 9 = 0 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz; R22 waveguide).
- X,Y,Z(f)_a0a1a2= X,Y,Z_a0a1a2* frequency_response (see Frequency Response Chart).
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency.
- Spherical isotropy (3D deviation from isotropy): in a locally homogeneous field realized using an open waveguide setup.
- Sensor Offset. The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required,
- Connector Angle: The angle is assessed using the information gained by determining the X_a0a1a2 (no uncertainty required).

Certificate No: H3-6168_Mar08

Page 2 of 8

RTS RIM Testing Services		Compatibility RF Emiss Vireless Handheld Mode		Page 18(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	CW

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March 16, 2006

Probe H3DV6

SN:6168

Manufactured: Last calibrated: Recalibrated: July 9, 2003 March 11, 2005 March 16, 2006

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

Certificate No: H3-6168_Mar06

Page 3 of 8

March 16, 2006

DASY - Parameters of Probe: H3DV6 SN:6168

Sensitivity in Fr	ee Space	(A/m / √ (μV))]
	a0	a1 a	a2
х	2.692E-03	-9.319E-5	-3.997E-5 ± 5.1 % (k=2)
Y	2.562E-03	-2.205E-5	-5.626E-5 ± 5.1 % (k=2)
z	3.084E-03	-1.376E-4	5.128E-6 ± 5.1 % (k=2)
Diode Compres	ision ¹		
DCP X 86	3 mV		
DCP Y 86	5 mV		
DCP Z 85	5 mV		
Sensor Offset		(Probe Tip to	Sensor Center)
×		3.0 n	nm
Y		3.0 n	ńm
z		3.0 n	nm
Connector Angle	8	127 °	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

" numerical insertation parameters uncertainty not required

Certificate No: H3-6168_Mar08

Pege 4 of 8

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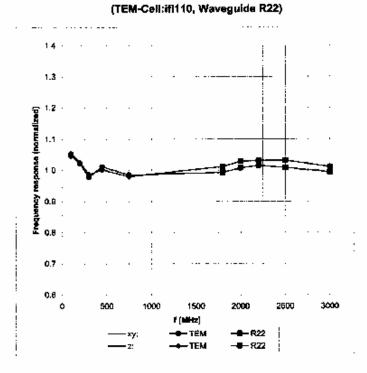
RTS RIM Testing Services		l Compatibility RF Emiss Wireless Handheld Mode		Page 20(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF20	CW

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March 16, 2006

Frequency Response of H-Field



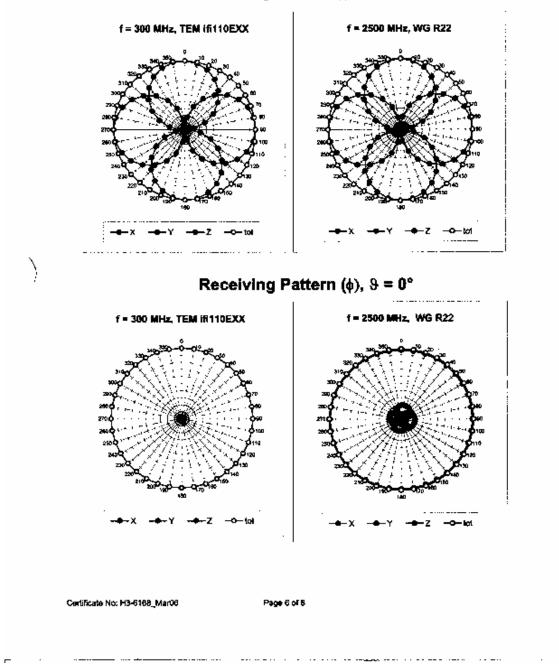
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Certificate No: H3-8168_Mar06

Page 5 of 8

RTS	Annex B to Hearing Aid Compatibility RF Emissions Test			
RIM Testing Services	Report for BlackBerry Wireless Handheld Model RBF20CW			
Author Data	Dates	Report No	FCC ID	ŚW
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	

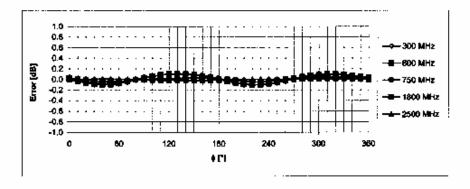
March 16, 2006



Receiving Pattern (ϕ), ϑ = 90°

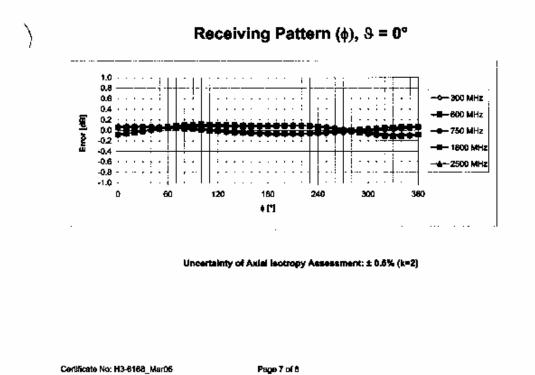
RTS RIM Testing Services		Compatibility RF Emiss Vireless Handheld Mode		Page 22(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	CW

March 16, 2006



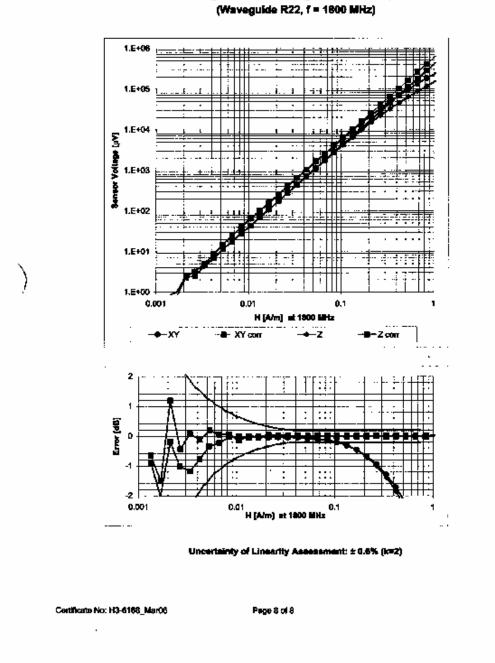
Receiving Pattern (ϕ), ϑ = 90°

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



RTS RIM Testing Services		l Compatibility RF Emiss Vireless Handheld Mode		Page 23(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	W W

March 16, 2006



Dynamic Range f(H-field)

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A A	Dates	Report No	FCC ID	
Attayi	July 13-19, 31, 20	006 RTS-0373-0607-	14 L6ARBF20	CW
Calibration Labo Schmid & Partne Engineering AC Zeughausstrasse 43, 80 Accredited by the Swiss I	r	Hac-MRA C C C C C C S	Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service Io.: SCS 108	
The Swiss Accreditation	n Service is one of the signato for the recognition of calibration	ries to the EA		
Client RIM		Certificate No:	CD835V3-1011_Dec05	
CALIBRATIC	ON CERTIFICAT	F		
OTLIBIT	CH OLIVINIOAN	-		-
Object	CD835V3 - SN	: 1011		
Calibration procedure(s)	QA CAL-20.v4 Calibration proc	cedure for dipoles in air		
Calibration date:	December 5, 2	005		
Condition of the calibrate	d item In Tolerance		of maceurements (SI)	
Condition of the calibrate This calibration certificat All calibrations have bee	ed item In Tolerance	ational standards, which realize the physical units emperature (22 ± 3)°C and humidity < 70%.	of measurements (SI).	
Condition of the calibrate This calibration certificat All calibrations have bee	e documents the traceability to n n conducted at an environment t	ational standards, which realize the physical units emperature (22 ± 3)°C and humidity < 70%.	of measurements (SI). Scheduled Calibration	
Condition of the calibrate This calibration certificat All calibrations have bee Calibration Equipment us Primary Standards Power meter EPM-442A	ed item In Tolerance e documents the traceability to n in conducted at an environment to seed (M&TE critical for calibration ID # GB37480704	ational standards, which realize the physical units emperature (22 ± 3)°C and humidity < 70%.) Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516)	Scheduled Calibration Oct-06	
Condition of the calibrate This calibration certificat All calibrations have bee Calibration Equipment us Primary Standards Power meter EPM-442A Power sensor HP 8481A	e documents the traceability to n n conducted at an environment t sed (M&TE critical for calibration ID # GB37480704 US37292783	ational standards, which realize the physical units emperature (22 ± 3)°C and humidity < 70%.) Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516)	Scheduled Calibration Oct-06 Oct-06	
Condition of the calibrate This calibration certificat All calibrations have bee Calibration Equipment us Primary Standards Power meter EPM-442A	e documents the traceability to n n conducted at an environment to sed (M&TE critical for calibration ID # GB37480704 US37292783 ator SN: 5086 (20g)	ational standards, which realize the physical units emperature (22 ± 3)°C and humidity < 70%.) Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516)	Scheduled Calibration Oct-06	
Condition of the calibrate This calibration certificat All calibrations have bee Calibration Equipment us Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenue Reference 10 dB Attenue	ad item In Tolerance e documents the traceability to m in conducted at an environment to sed (M&TE critical for calibration ID # GB37480704 US37292763 ator SN: 5086 (20g) ator SN: 5047.2 (10r)	ational standards, which realize the physical units emperature (22 ± 3)°C and humidity < 70%.) Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No 251-00498)	Scheduled Calibration Oct-06 Oct-06 Aug-06 Aug-06	
Condition of the calibrate This calibration certificat All calibrations have bee Calibration Equipment u Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenue Reference 10 dB Attenue Secondary Standards	ed item In Tolerance e documents the traceability to n in conducted at an environment to sed (M&TE critical for calibration ID # GB37480704 US37292783 ator SN: 5086 (20g) ator SN: 5047.2 (10r) ID #	ational standards, which realize the physical units emperature (22 ± 3)*C and humidity < 70%.) Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No 251-00498) 11-Aug-05 (METAS, No 251-00498) Check Date (in house)	Scheduled Calibration Oct-06 Oct-06 Aug-06 Aug-06 Scheduled Check	
Condition of the calibrate This calibration certificat All calibrations have bee Calibration Equipment us Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenus Reference 10 dB Attenus Secondary Standards Power meter EPM-44196	ad item In Tolerance e documents the traceability to n n conducted at an environment to seed (M&TE critical for calibration ID # GB37480704 US37292783 ator SN: 5086 (20g) ator SN: 5047.2 (10r) ID # B GB43310788	ational standards, which realize the physical units emperature (22 ± 3)°C and humidity < 70%.) Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No 251-00498) 11-Aug-05 (METAS, No 251-00498) Check Date (in house) 12-Aug-03 (SPEAG, in house check Oct-05)	Scheduled Calibration Oct-06 Oct-06 Aug-06 Aug-06 Scheduled Check In house check: Oct-06	
Condition of the calibrate This calibration certificat All calibrations have bee Calibration Equipment u Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenue Reference 10 dB Attenue Secondary Standards	ad item In Tolerance e documents the traceability to n in conducted at an environment to seed (M&TE critical for calibration ID # GB37480704 US37292783 ator SN: 5086 (20g) ator SN: 5047.2 (10r) ID # B GB43310788 MY41093312	ational standards, which realize the physical units emperature (22 ± 3)*C and humidity < 70%.) Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No 251-00498) 11-Aug-05 (METAS, No 251-00498) Check Date (in house)	Scheduled Calibration Oct-06 Oct-06 Aug-06 Aug-06 Scheduled Check In house check: Oct-06 In house check: Oct-07	
Condition of the calibrate This calibration certificat All calibrations have bee Calibration Equipment us Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenus Reference 10 dB Attenus Secondary Standards Power meter EPM-4419 Power sensor HP 8481A	ed item In Tolerance e documents the traceability to n in conducted at an environment to sed (M&TE critical for calibration ID # GB37480704 US37292783 ator SN: 5086 (20g) ator SN: 5086 (20g) ator SN: 5047.2 (10r) ID # B GB43310788 MY41093312 MY41093315	ational standards, which realize the physical units emperature (22 ± 3)°C and humidity < 70%.) Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) Check Date (in house) 12-Aug-03 (SPEAG, in house check Oct-05) 10-Aug-03 (SPEAG, in house check Oct-05)	Scheduled Calibration Oct-06 Oct-06 Aug-06 Aug-06 Scheduled Check In house check: Oct-06 In house check: Oct-07	
Condition of the calibrate This calibration certificat All calibrations have bee Calibration Equipment us Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 10 dB Attenus Reference 10 dB Attenus Secondary Standards Power meter EPM-44191 Power sensor HP 8481A Power sensor HP 8481A Network Analyzer HP 87 RF generator R&S SMT0	In Tolerance e documents the traceability to m n conducted at an environment to sed (M&TE critical for calibration ID # GB37480704 US37292783 ator SN: 5086 (20g) ator SN: 5047.2 (10r) ID # GB43310768 MY41093312 MY41093315 53E US37390585	ational standards, which realize the physical units emperature (22 ± 3)*C and humidity < 70%.) Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) Check Date (in house) 12-Aug-03 (SPEAG, in house check Oct-05) 10-Aug-03 (SPEAG, in house check Oct-05) 18-Oct-01 (SPEAG, in house check Nov-05) 26-Jul-04 (SPEAG, in house check Nov-05)	Scheduled Calibration Oct-06 Oct-06 Aug-05 Aug-05 Scheduled Check In house check: Oct-06 In house check: Oct-07 In house check: Oct-07	
Condition of the calibrate This calibration certificat All calibrations have bee Calibration Equipment us Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 10 dB Attenus Secondary Standards Power meter EPM-44190 Power sensor HP 8481A Power sensor HP 8481A Network Analyzer HP 87 RF generator R&S SMT0 DAE4	ad item In Tolerance e documents the traceability to n in conducted at an environment to seed (M&TE critical for calibration ID # GB37480704 US37292783 ator SN: 5086 (20g) ator SN: 5086 (20g) ator SN: 5047.2 (10r) ID # B GB43310788 MY41093315 S3E US37390585 26 100005 SN: 660	ational standards, which realize the physical units emperature (22 ± 3)°C and humidity < 70%.) Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) 12-Aug-03 (SPEAG, in house check Oct-05) 10-Aug-03 (SPEAG, in house check Oct-05) 10-Aug-03 (SPEAG, in house check Oct-05) 18-Oct-01 (SPEAG, in house check Oct-05) 18-Oct-01 (SPEAG, in house check Nov-05) 16-Dec-04 (SPEAG, No. DAE4-901_Dec04)	Scheduled Calibration Oct-06 Oct-06 Aug-05 Aug-05 Scheduled Check In house check: Oct-06 In house check: Oct-07 In house check: Oct-07 In house check: Oct-06 In house check: Nov-06 In house check: Nov-05 In house check: Nov-07 Calibration, Dec-05	
Condition of the calibrate This calibration certificat All calibrations have bee Calibration Equipment us Primary Standards Power meter EPM-442A Power sensor HP 8481A Reference 20 dB Attenus Reference 10 dB Attenus Secondary Standards Power meter EPM-44199 Power sensor HP 8481A Power sensor HP 8481A Power sensor HP 8481A Network Analyzer HP 87 RF generator R&S SMT0 DAE4 Probe ER3DV6	In Tolerance a documents the traceability to n n conducted at an environment to seed (M&TE critical for calibration ID # GB37480704 US37292783 ator SN: 5086 (20g) ator SN: 5047.2 (10r) ID # GB43310788 MY41093315 MY41093315 53E US37390585 100005 SN: 660 SN: 2336 SN: 2336	ational standards, which realize the physical units emperature (22 ± 3)°C and humidity < 70%.) Cal Date (Calibrated by, Certificate No.) 04-Oct-05 (METAS, No. 251-00516) 04-Oct-05 (METAS, No. 251-00516) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-05 (METAS, No. 251-00498) 11-Aug-03 (SPEAG, in house check Oct-05) 10-Aug-03 (SPEAG, in house check Oct-05) 10-Aug-03 (SPEAG, in house check Oct-05) 10-Aug-03 (SPEAG, in house check Nor-05) 26-Jul-04 (SPEAG, in house check Nor-05) 26-Jul-04 (SPEAG, No. DAE4-901_Dec04) 20-Jan-05 (SPEAG, No. ER3-2336_Jan05)	Scheduled Calibration Oct-06 Oct-06 Aug-05 Aug-05 Scheduled Check In house check: Oct-06 In house check: Oct-07 In house check: Oct-07 In house check: Oct-07 In house check: Nov-05 In house check: Nov-07 Calibration, Dec-05 Calibration, Jan-06	
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RTS RIM Testing Services	Annex B to Hearing Aid C Report for BlackBerry Wi			Page 25(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF20C	W

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



S Schweizerischer Kalibrierdienst C Service suisse d'étaionnage

Servizio svizzero di taratura

Swiss Calibration Service

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Accreditation No.: SCS 108

Accredited by the Swiss Federal Office of Metrology and Accreditation The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

References

[1] ANSI-PC63.19-2001 (Draft 3.x, 2005)

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 standard [1], 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 monifored 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 DASY4 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], 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_Dec05

Page 2 of 6

RTS RIM Testing Services		Compatibility RF Emiss Vireless Handheld Mode		Page 26(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	CW

1 Measurement Conditions

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

DASY Version	DASY4	V4.6 B23
DASY PP Version	SEMCAD	V1.8 B160
Phantom	HAC Test Arch	SD HAC P01 BA, #1002
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	0.446 A/m
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	162.2 V/m
Maximum measured above low end	100 mW forward power	161.0 V/m
Averaged maximum above arm	100 mW forward power	161.6 V/m

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

3 Appendix

3.1 Antenna Parameters

Frequency	Return Loss	Impedance
800 MHz	16.1 dB	(40.2 – j10.4) Ohm
835 MHz	26.7 dB	(53.4 + j3.4) Ohm
900 MHz	16.5 dB	(48.9 – j15.0) Ohm
950 MHz	19.7 dB	(47.5 + j9.8 <u>)</u> Ohm
960 MHz	16.1 dB	(57.0 + j15.5) 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.

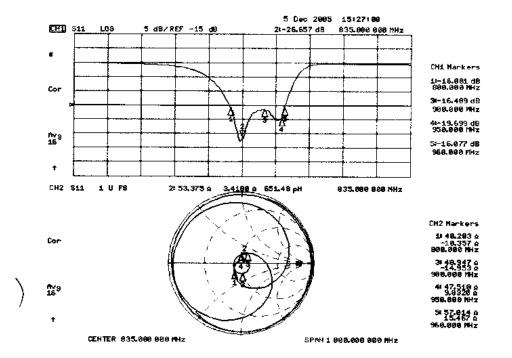
Certificate No: CD835V3-1011 Dec05

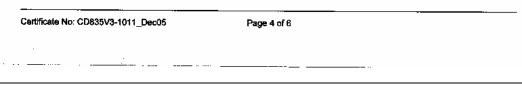
Page 3 of 6

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3.3 Measurement Sheets

3.3.1 Return Loss and Smith Chart





3.3.2 DASY4 H-field result

Date/Time: 12/5/2005 3:57:25 PM

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011

 $\begin{array}{l} \mbox{Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1 } \\ \mbox{Medium: Air} \\ \mbox{Medium parameters used: } \sigma=0 \mbox{ mho/m, } \epsilon_r=1; \mbox{ } \rho=1 \mbox{ kg/m}^3 \end{array}$

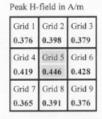
Phantom section: H Dipole Section

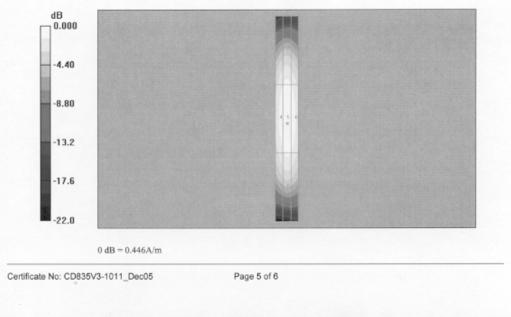
DASY4 Configuration:

- Probe: H3DV6 SN6065; Calibrated: 12/10/2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn660; Calibrated: 12/16/2004
- · Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: 1002
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

H Scan 10mm above CD 835 MHz/Hearing Aid Compatibility Test (41x361x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 0.446 A/m Probe Modulation Factor = 1.00 Reference Value = 0.474 A/m; Power Drift = 0.012 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)





3.3.3 DASY4 E-Field result

Date/Time: 12/5/2005 12:21:35 PM

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011

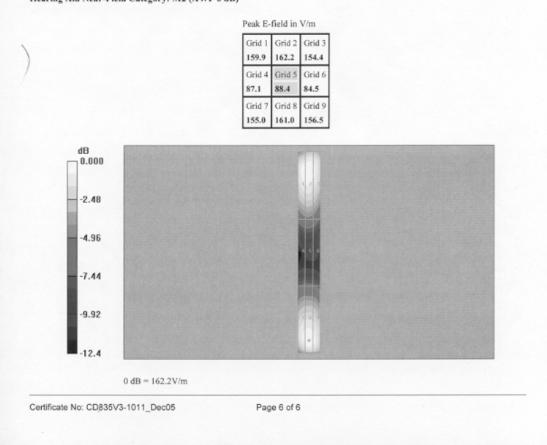
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_{\tau} = 1$; $\rho = 1000$ kg/m³ Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: ER3DV6 SN2336; ConvF(1, 1, 1); Calibrated: 1/20/2005
- · Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn660; Calibrated: 12/16/2004
- · Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: 1002
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

E Scan 10mm above CD 835 MHz/Hearing Aid Compatibility Test (41x361x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 162.2 V/m Probe Modulation Factor = 1.00 Reference Value = 105.0 V/m; Power Drift = -0.027 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)



RTS M Testing Services	Annex B to He Report for Bla	Document Annex B to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry Wireless Handheld Model RBF20CW			
or Data Ioud Attayi	Dates July 13-19, 31	2006	Report No RTS-0373-0607-	14 L6ARBF20	cw
	July 13-19, 31	, 2006	RIS-03/3-060/-		
Calibration La Schmid & Partr Engineering / Zeughausstrasse 43,	ner	ilac-m	SANISS S CRUBRING S	Schweizerischer Kalibrierdien Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service	st
The Swiss Accredita	iss Federal Office of Metrology ation Service is one of the si ent for the recognition of cal	gnatories to the EA	Accreditation	No.: SCS 108	
Client RIM			Certificate No	CD1880V3-1008_Dec0	5
CALIBRAT	TION CERTIFIC	ATE			
CALIBRAT	HON CERTIFIC				
Object	CD1880V3	3 - SN: 1008			
Calibration procedure		0.v4 procedure for d	ipoles in air		
Calibration date:	December	6, 2005			
Condition of the calib	orated item In Toleran	ce			
This calibration certifi The measurements a All calibrations have t	ficate documents the traceabil and the uncertainties with cont	ity to national standard fidence probability are laboratory facility: envi	s, which realize the physical uni given on the following pages and ronment temperature $(22\pm3)^{*}C$	d are part of the certificate.	
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RTS RIM Testing Services	Annex B to Hearing Aid C Report for BlackBerry Wir			Page 31(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF20C	W

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



Schweizerischer Kalibrierdienst s С s

Service suisse d'étalonnage

Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 108

Accredited by the Swiss Federal Office of Metrology and Accreditation The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

References

ANSI-PC63.19-2001 (Draft 3.x, 2005) [1] 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 standard [1], 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 DASY4 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], 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 (suborid 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: CD1880V3-1008_Dec05

Page 2 of 6

RTS RIM Testing Services		Annex B to Hearing Aid Compatibility RF Emissions Test Report for BlackBerry Wireless Handheld Model RBF20CW		
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF20C	W

1 Measurement Conditions

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

DASY Version	DASY4	V4.6 B23
DASY PP Version	SEMCAD	V1.8 B160
Phantom	HAC Test Arch	SD HAC P01 BA, #1002
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 measured	100 mW forward power	0.454 A/m
Incertainty 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	132.9 V/m	
Maximum measured above low end	100 mW forward power	131.8 V/m	
Averaged maximum above arm	100 mW forward power	132.4 V/m	

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

Appendix

3.1 Antenna Parameters

Frequency	Return Loss	Impedance
1710 MHz	22.7 dB	(56.4 + j4.5) Ohm
1880 MHz	20.1 dB	(58.4 + j6.6 Ohm
1900 MHz	20.9 dB	(58.6 + j4.6) Ohm
1950 MHz	27.7 dB	(54.3 – j0.4) Ohm
2000 MHz	18.7 dB	(52.1 + j11.7) 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.

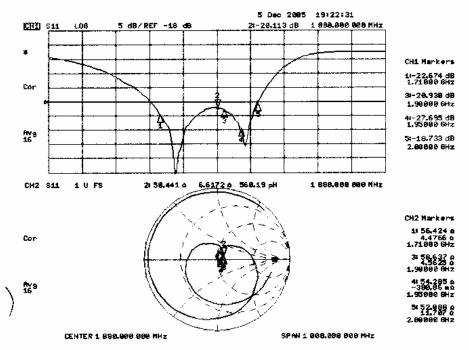
Certificate No: CD1880V3-1008_Dec05

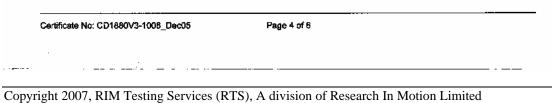
Page 3 of 6

RTS RIM Testing Services	Annex B to Hearing Aid Report for BlackBerry V	Compatibility RF Emiss Vireless Handheld Mode		Page 33(35)
Author Data	Dates	Report No	FCC ID	
Daoud Attayi	July 13-19, 31, 2006	RTS-0373-0607-14	L6ARBF200	CW

3.3 Measurement Sheets

3.3.1 Return Loss and Smith Chart





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3.3.2 DASY4 H-field result

Date/Time: 12/6/2005 7:35:29 PM

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1008

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: H Dipole Section

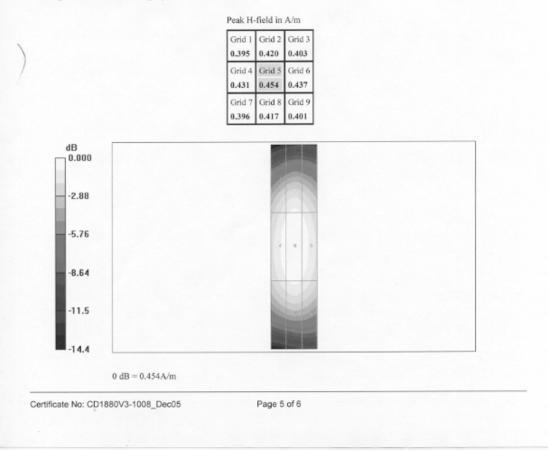
BURNING C. ...

DASY4 Configuration:

- Probe: H3DV6 SN6065; Calibrated: 12/10/2004
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn660; Calibrated: 12/16/2004
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1002
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

H Scan 10mm above CD1880V3/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 0.454 A/m Probe Modulation Factor = 1.00 Reference Value = 0.480 A/m; Power Drift = -0.009 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)



3.3.3 DASY4 E-Field result

Date/Time: 12/6/2005 8:20:46 PM

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1008

 $\begin{array}{l} \mbox{Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1 \\ \mbox{Medium: Air} \\ \mbox{Medium parameters used: } \sigma = 0 \mbox{ mho/m, } \epsilon_r = 1; \mbox{$\rho = 1000 \mbox{ kg/m}^3$} \end{array}$

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: ER3DV6 SN2336; ConvF(1, 1, 1); Calibrated: 1/20/2005
- · Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn660; Calibrated: 12/16/2004
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1002
- Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 160

E Scan 10mm above CD1880V3/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 132.9 V/m Probe Modulation Factor = 1.00 Reference Value = 147.2 V/m; Power Drift = 0.033 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)

