



	Date(s) of Evaluation December 11-12, 2008	Test Report Serial No. 120808K95-T944-S90P	Test Report Revision No. Rev. 1.0 (Initial Release)	 
	Test Report Issue Date December 19, 2008	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	


Test Lab Certificate No. 2470.01



## SAR TEST REPORT (FCC/IC)

### RF EXPOSURE EVALUATION

### SPECIFIC ABSORPTION RATE

APPLICANT / MANUFACTURER	BK RADIO INC. (c/o RELM Communications Inc.)			
DEVICE UNDER TEST (DUT)	PORTABLE ANALOG/DIGITAL PTT RADIO TRANSCEIVER			
DEVICE FREQUENCY RANGE(S)	764 - 777 MHz	794 - 806 MHz	806 - 824 MHz	851 - 870 MHz
DEVICE MODEL(S)	KNG-P800			
DEVICE IDENTIFIER(S)	FCC ID:	K95KNGP800	IC:	2116A-KNGP400
APPLICATION TYPE	Certification			
STANDARD(S) APPLIED	FCC 47 CFR §2.1093			
	Health Canada Safety Code 6			
PROCEDURE(S) APPLIED	FCC OET Bulletin 65, Supplement C (01-01)			
	FCC Mobile & Portable RF Exp. Proc. (KDB 447498 D01 v03r02)			
	Industry Canada RSS-102 Issue 2			
	IEEE 1528-2003			
	IEC 62209-1:2005			
FCC DEVICE CLASSIFICATION	Licensed Non-Broadcast Transmitter Held to Face (TNF)			
IC DEVICE CLASSIFICATION	Land Mobile Radio Transmitter/Receiver (27.41-960 MHz)			
RF EXPOSURE CATEGORY	Occupational / Controlled			
RF EXPOSURE EVALUATION	Face-held & Body-worn			
DATE(S) OF EVALUATION	December 11-12, 2008			
TEST REPORT SERIAL NO.	120808K95-T944-S90P			
TEST REPORT REVISION NO.	Revision 1.0	Initial Release	December 19, 2008	
TEST REPORT SIGNATORIES	Testing Performed By		Test Report Prepared By	
	Sean Johnston Celltech Labs Inc.		Jonathan Hughes Celltech Labs Inc.	
TEST LAB AND LOCATION	Celltech Compliance Testing and Engineering Lab			
	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada			
TEST LAB CONTACT INFO.	Tel.: 250-765-7650		Fax: 250-765-7645	
	info@celltechlabs.com		www.celltechlabs.com	
TEST LAB ACCREDITATION(S)	<div></div> <div>Test Lab Certificate No. 2470.01</div>			

Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		Freq. Range:	764 - 870 MHz	
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## DECLARATION OF COMPLIANCE SAR RF EXPOSURE EVALUATION

Test Lab Information	Name	CELLTECH LABS INC.				
	Address	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada				
Applicant Information	Name	BK RADIO INC. (C/O RELM COMMUNICATIONS INC.)				
	Address	7100 Technology Drive, West Melbourne, FL 32904 USA				
Standard(s) Applied	FCC	47 CFR §2.1093		IC	Health Canada Safety Code 6	
Procedure(s) Applied	FCC	OET Bulletin 65, Supplement C (Edition 01-01)				
	FCC	Mobile & Portable RF Exposure Procedures (KDB 447498 D01 v03r02)				
	IC	RSS-102 Issue 2	IEEE	1528-2003	IEC	62209-1:2005
Device Classification(s)	FCC	Licensed Non-Broadcast Transmitter Held to Face (TNF)				
	IC	Land Mobile Radio Transmitter/Receiver (27.41-960 MHz)				
Device RF Exposure Category	Portable	Occupational / Controlled Environment				
Device Identifier(s)	FCC ID:	K95KNGP800				
	IC:	2116A-KNGP400				
	Model(s)	KNG-P800				
	Serial No.	08410001 (Pre-production)				
Device Description	Portable Analog/Digital Push-To-Talk (PTT) Radio Transceiver					
Transmit Frequency Range(s)	764-777 MHz (Band 1)		794-806 MHz (Band 2)		806-824 MHz (Band 3)	851-870 MHz (Band 4)
Max. RF Output Power Tested	2.93 Watts	34.67 dBm	Conducted		764 MHz	764-777 MHz Band
	2.85 Watts	34.55 dBm	Conducted		770 MHz	
	2.80 Watts	34.47 dBm	Conducted		777 MHz	
	2.90 Watts	34.62 dBm	Conducted		800 MHz	794-806 MHz Band
	2.90 Watts	34.62 dBm	Conducted		806 MHz	806-824 MHz Band
	2.87 Watts	34.58 dBm	Conducted		815 MHz	
	2.85 Watts	34.55 dBm	Conducted		824 MHz	
	2.90 Watts	34.62 dBm	Conducted		860 MHz	851-870 MHz Band
Antenna Type(s) Tested	Detachable Whip	1/2 wave	Length: 195 mm		Gain: 1.0 dBi	P/N: KAA0825
Battery Type(s) Tested	Lithium-ion	Rechargeable	10.8 V		1950 mAh	P/N: KAA0100
Body-worn Accessories Tested	Belt-Clip		Contains Metal Components			P/N: 7011-31003-300
Audio Accessories Tested	Speaker-Microphone (P/N: KAA0200)					
Max. SAR Level(s) Evaluated	Face-held	1.39 W/kg	1g	50% duty cycle		Occupational / Controlled Exposure
	Body-worn	1.69 W/kg	1g	50% duty cycle		Occupational / Controlled Exposure
FCC/IC Spatial Peak SAR Limit	Head/Body	8.0 W/kg	1g	50% duty cycle		Occupational / Controlled Exposure

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada's Safety Code 6 for the Occupational/Controlled Exposure environment. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 2, IEEE 1528-2003 and IEC 62209-1:2005. All measurements were performed in accordance with the SAR system manufacturer recommendations.

I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

The results and statements contained in this report pertain only to the device(s) evaluated.

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**Test Report Approved By**



**Sean Johnston**

**Celltech Labs Inc.**



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	<b>Portable Analog/Digital PTT Radio Transceiver</b>		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

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Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver	Freq. Range:	764 - 870 MHz		
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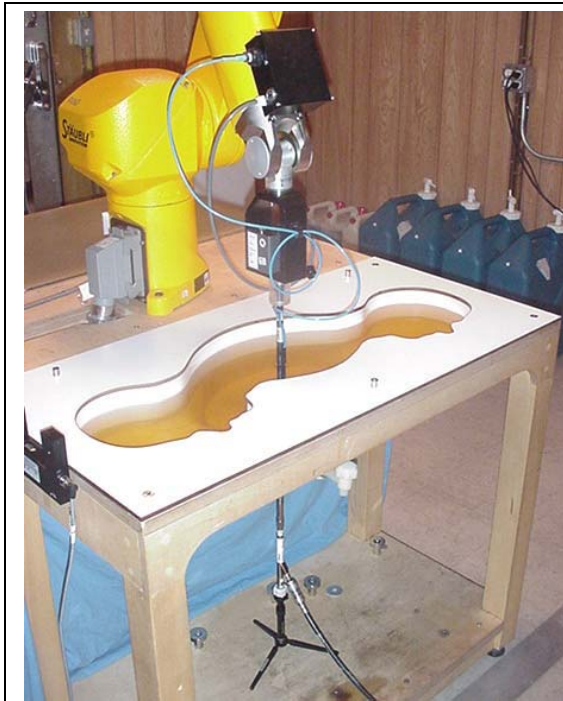
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## 1.0 INTRODUCTION

This measurement report demonstrates that the BK Radio Inc. (c/o RELM Communications Inc.) Model: KNG-P800 Portable Analog/Digital PTT Radio Transceiver complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the Occupational / Controlled Exposure environment. The measurement procedures described in FCC OET Bulletin 65, Supplement C (Edition 01-01) (see reference [3]), IC RSS-102 Issue 2 (see reference [4]), IEEE 1528-2003 (see reference [5]) and IEC 62209-1:2005 (see reference [6]) were employed. A description of the device, operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used and the various provisions of the rules are included within this test report.

## 2.0 SAR MEASUREMENT SYSTEM


Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and alternate planar phantoms for brain and/or body SAR evaluations depending on the DUT. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the DASY4 measurement server. The DAE4 utilizes a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the DASY4 measurement server is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. The sensor systems are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.





DASY4 System with SAM Twin Phantom V4.0C



DASY4 SAR System with Plexiglas side planar phantom

<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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Test Lab Certificate No. 2470.01

### 3.0 MEASUREMENT SUMMARY

#### SAR EVALUATION RESULTS

SAR EVALUATION RESULTS																	
Test Type	Freq.	Band	DUT Position to Planar Phantom	Accessories			Antenna Distance to Planar Phantom	Cond. Power Before Test	Measured SAR 1g (W/kg)		SAR Drift During Test	Scaled SAR with droop 1g (W/kg)					
	MHz	MHz		Body-worn	Spacing	Audio			cm	Watts		Duty Cycle		Duty Cycle			
											100%	50%	dB	100%	50%		
Face	770 Mid 1	764-777 (1)	Front Side	--	2.5 cm	--	4.5	2.85	2.15	1.08	-1.11	2.78	1.39				
Face	800 Mid 2	794-806 (2)	Front Side	--	2.5 cm	--	4.5	2.90	1.73	0.865	-0.743	2.05	1.03				
Face	815 Mid 3	806-824 (3)	Front Side	--	2.5 cm	--	4.5	2.87	1.43	0.715	-0.468	1.59	0.796				
Face	860 Mid 4	851-869 (4)	Front Side	--	2.5 cm	--	4.5	2.90	1.15	0.575	-0.844	1.40	0.698				
Body	770 Mid 1	764-777 (1)	Back Side	Belt-Clip	1.5 cm	Spkr-Mic	2.5	2.85	2.65	1.33	-1.05	3.37	1.69				
Body	800 Mid 2	794-806 (2)	Back Side	Belt-Clip	1.5 cm	Spkr-Mic	2.5	2.90	1.66	0.830	-0.297	1.78	0.889				
Body	764 Low 1	764-777 (1)	Back Side	Belt-Clip	1.5 cm	Spkr-Mic	2.5	2.93	2.46	1.23	-1.02	3.11	1.56				
Body	777 High 1	764-777 (1)	Back Side	Belt-Clip	1.5 cm	Spkr-Mic	2.5	2.80	2.24	1.12	-1.08	2.87	1.44				
Body	815 Mid 3	806-824 (3)	Back Side	Belt-Clip	1.5 cm	Spkr-Mic	2.5	2.87	2.50	1.25	0.136	-	-				
Body	860 Mid 4	851-869 (4)	Back Side	Belt-Clip	1.5 cm	Spkr-Mic	2.5	2.90	2.07	1.04	-1.16	2.70	1.35				
Body	806 Low 3	806-824 (3)	Back Side	Belt-Clip	1.5 cm	Spkr-Mic	2.5	2.90	1.79	0.895	0.232	-	-				
Body	824 High 3	806-824 (3)	Back Side	Belt-Clip	1.5 cm	Spkr-Mic	2.5	2.85	3.03	1.52	0.220	-	-				
SAR LIMIT(S)					BRAIN		BODY	SPATIAL PEAK				RF EXPOSURE CATEGORY					
FCC 47 CFR 2.1093		Health Canada Safety Code 6			8.0 W/kg		8.0 W/kg	averaged over 1 gram				Occupational / Controlled					
Measured Fluid Type		775 MHz Brain - Dec. 12, 2008			805 MHz Brain - Dec. 12, 2008			815 MHz Brain - Dec. 12, 2008			865 MHz Brain - Dec. 12, 2008						
		Interp. Target	Meas.	Dev.	Interp. Target	Meas.	Dev.	Interp. Target	Meas.	Dev.	Interp. Target	Meas.	Dev.				
Dielectric Constant ε <sub>r</sub>		41.8	± 5%	42.1	+0.7%	41.7	± 5%	41.8	+0.2%	41.6	± 5%	41.5	-0.2%	41.5	± 5%	41.0	-1.2%
Conductivity σ (mho/m)		0.90	± 5%	0.86	-4.5%	0.90	± 5%	0.89	-1.0%	0.90	± 5%	0.91	+1.1%	0.93	± 5%	0.96	+3.2%
Measured Fluid Type		775 MHz Body - Dec. 11, 2008			805 MHz Body - Dec. 11, 2008			815 MHz Body - Dec. 11, 2008			865 MHz Body - Dec. 11, 2008						
		Interp. Target	Meas.	Dev.	Interp. Target	Meas.	Dev.	Interp. Target	Meas.	Dev.	Interp. Target	Meas.	Dev.				
Dielectric Constant ε <sub>r</sub>		55.4	± 5%	57.6	+4.0%	55.3	± 5%	57.2	+3.4%	55.3	± 5%	57.0	+3.0%	55.1	± 5%	56.8	+3.1%
Conductivity σ (mho/m)		0.97	± 5%	0.93	-4.2%	0.97	± 5%	0.94	-3.1%	0.97	± 5%	0.95	-2.0%	1.01	± 5%	1.01	0.0%
Date	Fluid Type	Ambient Temp.		Fluid Temp.		Fluid Depth		Atmospheric Pressure			Relative Humidity			ρ (Kg/m <sup>3</sup> )			
Dec 12	835 MHz Brain	22.0 °C		21.0 °C		≥ 15 cm		101.1 kPa			35 %			1000			
Dec 11	835 MHz Body	22.2 °C		21.5 °C		≥ 15 cm		101.1 kPa			35 %			1000			
Notes																	
1.	If the scaled SAR levels (50% duty cycle) evaluated at the mid channel of the frequency band were ≥ 3 dB below the SAR limit, SAR evaluation for the low and high channels was optional (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [3]).																
2.	The SAR droop measured by the DASY4 system for the duration of the SAR evaluations were added to the measured SAR levels to report scaled SAR results as shown in the above test data table. A SAR-versus-Time droop evaluation was performed in the maximum scaled SAR level configuration and the evaluation plot is shown in Appendix A (SAR Test Plots).																
3.	Test Mode		Continuous Wave				Power Source				Lithium-ion Rechargeable Battery						
4.	Maximum Conducted Power		100% PTT Duty Cycle		2.93 Watts (Measured)			50% PTT Duty Cycle			1.47 Watts (Measured)						
	SAR Evaluation Power Thresholds for PTT Devices, f ≤ 0.5 GHz (per FCC KDB 447498 D01 v03r02)		Exposure Conditions				P mW (General Population)				P mW (Occupational)						
			Held to face, d ≥ 2.5 cm				250				1250						
			Body-worn, d ≥ 1.5 cm				200				1000						
			Body-worn, d ≥ 1.0 cm				150				750						
			1) The time-averaged output power, corresponding to the required PTT duty factor, is compared with these thresholds. 2) The closest distance between the user and the device or its antenna is used to determine the power thresholds.														

Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		Freq. Range:	764 - 870 MHz	
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Test Lab Certificate No. 2470.01

## 4.0 DETAILS OF SAR EVALUATION

The BK Radio Inc. (c/o RELM Communications Inc.) Model: KNG-P800 Portable Analog/Digital PTT Radio Transceiver described in this report was compliant for localized Specific Absorption Rate (Occupational / Controlled Exposure) based on the test provisions and conditions described below. Detailed measurement plots showing the maximum SAR location of the DUT are reported in Appendix A. Detailed photographs of the test setup are shown in Appendix D.

### Test Configuration(s)

- The DUT was evaluated for face-held SAR with the front of the radio placed parallel to the outer surface of the planar phantom. A 2.5 cm spacing was maintained between the front side of the DUT and the outer surface of the planar phantom.
- The DUT was evaluated for body-worn SAR with the back of the radio placed parallel to the outer surface of the planar phantom. The attached belt-clip accessory was touching the planar phantom and provided a 1.5 cm spacing from the back of the DUT to the outer surface of the planar phantom. The DUT was evaluated for body-worn SAR with the customer-supplied speaker-microphone accessory connected to the audio port.

### Test Mode & Output Power


- The DUT was tested in unmodulated continuous transmit mode (Continuous Wave mode at 100% duty cycle) with the transmit key constantly depressed. For a push-to-talk device the 50% duty cycle compensation reported assumes a transmit/receive cycle of equal time base.
- The conducted output power levels referenced in this report were measured by Celltech Labs Inc. prior to the SAR evaluations at the antenna connector of the DUT using a Gigatronics 8652A Universal Power Meter in accordance with the procedures described in FCC 47 CFR §2.1046 and IC RSS-Gen.



### Test Conditions

- The fluid temperature was measured prior to and after the SAR evaluations to ensure the temperature remained within  $\pm 2^{\circ}\text{C}$  of the fluid temperature reported during the dielectric parameter measurements.
- The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using an HP 85070C Dielectric Probe Kit and HP 8753ET Network Analyzer (see Appendix C).

## 5.0 EVALUATION PROCEDURES

- The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated using the SAM phantom.
  - For body-worn and face-held devices a planar phantom was used.
- The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 15mm x 15mm.  
An area scan was determined as follows:
- Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.
- A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are  $> 2$  dB from the global maximum. The remaining maxima are then used to position the cube scans.  
A 1g and 10g spatial peak SAR was determined as follows:
- Extrapolation is used to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 mm (see probe calibration document in Appendix F). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.
- Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).
- A zoom scan volume of 32 mm x 32 mm x 30 mm (5 x 5 x 7 points) centered at the peak SAR location determined from the area scan is used for all zoom scans for devices with a transmit frequency  $< 800$  MHz. Zoom scans for frequencies  $\geq 800$  MHz are determined with a scan volume of 30 mm x 30 mm x 30 mm (7 x 7 x 7) to ensure complete capture of the peak spatial-average SAR.

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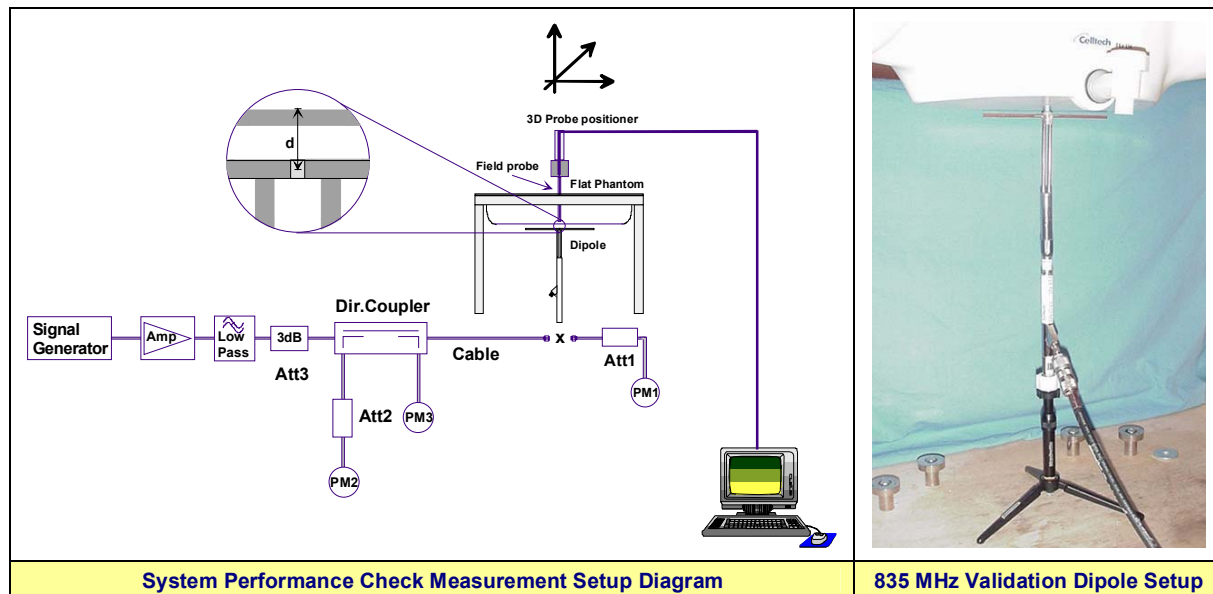
Test Lab Certificate No. 2470.01


## 6.0 SYSTEM PERFORMANCE CHECK



Prior to the SAR evaluations, daily system checks were performed using an 835 MHz dipole at the planar section of the SAM phantom in accordance with the procedures described in IEEE Standard 1528-2003 and IEC 62209-1:2005 (see Appendix B for system performance check test plots). The dielectric parameters of the simulated tissue mixtures were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C for measured fluid dielectric parameters). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of  $\pm 10\%$  from the system validation target SAR value (see Appendix E for system validation procedures).

### SYSTEM PERFORMANCE CHECK EVALUATIONS

Test Date	Equiv. Tissue	SAR 1g (W/kg)			Dielectric Constant $\epsilon_r$			Conductivity $\sigma$ (mho/m)			$\rho$ (Kg/m <sup>3</sup> )	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		Sys. Val Target	Meas.	Dev.	Sys. Val Target	Meas.	Dev.	Sys. Val Target	Meas.	Dev.						
12/11/08	Body	2.41 $\pm 10\%$	2.34	-2.9%	54.6 $\pm 5\%$	56.9	+4.2%	0.95 $\pm 5\%$	0.98	+3.2%	1000	22.0	20.4	$\geq 15$	35	101.1
	835															
12/12/08	Brain	2.41 $\pm 10\%$	2.37	-1.7%	41.7 $\pm 5\%$	41.5	-0.5%	0.89 $\pm 5\%$	0.93	+4.5%	1000	22.0	20.3	$\geq 15$	35	101.1
	835															
Note(s)		1. The target SAR value is referenced from the System Validation procedure performed by Celltech Labs Inc. (see Appendix E).														
		2. The target dielectric parameters are referenced from the System Validation procedure performed by Celltech Labs Inc. (see Appendix E).														
		3. The fluid temperature was measured prior to and after the system performance check to ensure the temperature remained within $\pm 2^\circ\text{C}$ of the fluid temperature reported during the dielectric parameter measurements.														
		4. The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).														



Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver	Freq. Range:	764 - 870 MHz		
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	
Test Lab Certificate No. 2470.01				


## 7.0 SIMULATED EQUIVALENT TISSUES

The simulated tissue mixtures consisted of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution. Preservation with a bactericide was added and visual inspection made to ensure air bubbles were not trapped during the mixing process. The fluid was prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).




SIMULATED TISSUE MIXTURES		
INGREDIENT	835 MHz Brain	835 MHz Body
	System Check & DUT Evaluation	System Check & DUT Evaluation
Water	40.71 %	53.79 %
Sugar	56.63 %	45.13 %
Salt	1.48 %	0.98 %
HEC	0.99 %	-
Bactericide	0.19 %	0.10 %

## 8.0 SAR LIMITS

SAR RF EXPOSURE LIMITS			
FCC 47 CFR 2.1093	Health Canada Safety Code 6	(General Population / Uncontrolled Exposure)	(Occupational / Controlled Exposure)
Spatial Average (averaged over the whole body)		0.08 W/kg	0.4 W/kg
Spatial Peak (averaged over any 1 g of tissue)		1.6 W/kg	8.0 W/kg
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)		4.0 W/kg	20.0 W/kg
The Spatial Average value of the SAR averaged over the whole body.			
The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.			
The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.			
Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.			
Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.			


<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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Test Lab Certificate No. 2470.01				

## 9.0 ROBOT SYSTEM SPECIFICATIONS


<u>Specifications</u>	
<b>Positioner</b>	Stäubli Unimation Corp. Robot Model: RX60L
<b>Repeatability</b>	0.02 mm
<b>No. of axis</b>	6
<u>Data Acquisition Electronic (DAE) System</u>	
<u>Cell Controller</u>	
<b>Processor</b>	AMD Athlon XP 2400+
<b>Clock Speed</b>	2.0 GHz
<b>Operating System</b>	Windows XP Professional
<u>Data Converter</u>	
<b>Features</b>	Signal Amplifier, multiplexer, A/D converter, and control logic
<b>Software</b>	Measurement Software: DASY4, V4.7 Build 44
	Postprocessing Software: SEMCAD, V1.8 Build 171
<b>Connecting Lines</b>	Optical downlink for data and status info., Optical uplink for commands and clock
<u>DASY4 Measurement Server</u>	
<b>Function</b>	Real-time data evaluation for field measurements and surface detection
<b>Hardware</b>	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
<b>Connections</b>	COM1, COM2, DAE, Robot, Ethernet, Service Interface
<u>E-Field Probe</u>	
<b>Model</b>	ET3DV6
<b>Serial No.</b>	1590
<b>Construction</b>	Triangular core fiber optic detection system
<b>Frequency</b>	10 MHz to 6 GHz
<b>Linearity</b>	±0.2 dB (30 MHz to 3 GHz)
<u>Evaluation Phantom</u>	
<b>Type</b>	Side Planar Phantom
<b>Shell Material</b>	Plexiglas
<b>Bottom Thickness</b>	2.0 mm ± 0.1 mm
<b>Outer Dimensions</b>	75.0 cm (L) x 22.5 cm (W) x 20.5 cm (H); Back Plane: 25.7 cm (H)
<u>Validation Phantom</u>	
<b>Type</b>	SAM V4.0C
<b>Shell Material</b>	Fiberglass
<b>Thickness</b>	2.0 ±0.1 mm
<b>Volume</b>	Approx. 25 liters

<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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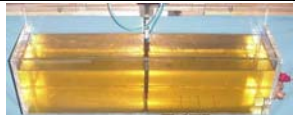
Test Lab Certificate No. 2470.01

## 10.0 PROBE SPECIFICATION (ET3DV6)

Construction:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, glycol)	
Calibration:	In air from 10 MHz to 2.5 GHz In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm 8\%$ )	
Frequency:	10 MHz to $> 6$ GHz; Linearity: $\pm 0.2$ dB (30 MHz to 3 GHz)	
Directivity:	$\pm 0.2$ dB in brain tissue (rotation around probe axis) $\pm 0.4$ dB in brain tissue (rotation normal to probe axis)	
Dynamic Range:	5 $\mu$ W/g to $> 100$ mW/g; Linearity: $\pm 0.2$ dB	
Surface Detect:	$\pm 0.2$ mm repeatability in air and clear liquids over diffuse reflecting surfaces	
Dimensions:	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm	
Application:	General dosimetry up to 3 GHz Compliance tests of mobile phone	


ET3DV6 E-Field Probe

## 11.0 EVALUATION PLANAR PHANTOM

The side planar phantom is constructed of Plexiglas material with a 2.0 mm shell thickness for face-held and body-worn SAR evaluations of portable radio transceivers. The side planar phantom is mounted on the side of the DASY4 compact system table.	
--	--

Plexiglas Side Planar Phantom

## 12.0 SAM PHANTOM V4.0C


The SAM phantom V4.0C is a fiberglass shell phantom with a 2.0 mm ( $\pm 0.2$ mm) shell thickness for left and right head and flat planar area integrated in a wooden table. The shape of the fiberglass shell corresponds to the phantom defined by SCC34-SC2. The device holder positions are adjusted to the standard measurement positions in the three sections (see Appendix G for specifications of the SAM phantom V4.0C).	
--	---




SAM Twin Phantom V4.0C

## 13.0 DEVICE HOLDER

The DASY4 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of $65^\circ$ . The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections.	
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Device Holder



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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Test Lab Certificate No. 2470.01				

## 14.0 TEST EQUIPMENT LIST

TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED		CALIBRATION DUE DATE	
USED	DESCRIPTION						
x	Schmid & Partner DASY4 System	-	-	-	-	-	-
x	-DASY4 Measurement Server	00158	1078	CNR	CNR	CNR	CNR
x	-Robot	00046	599396-01	CNR	CNR	CNR	CNR
x	-DAE4	00019	353	22Apr08	22Apr09	22Apr09	22Apr09
x	-ET3DV6 E-Field Probe	00017	1590	21Jul08	21Jul09	21Jul09	21Jul09
x	-835 MHz Validation Dipole (Celltech)	00022	411	Brain	10Dec08	Brain	10Dec09
x				Body	28Aug08	Body	28Aug09
x	-SAM Phantom V4.0C	00154	1033	CNR	CNR	CNR	CNR
x	-Barski Planar Phantom	00155	03-01	CNR	CNR	CNR	CNR
x	-Side Planar Phantom	00156	161	CNR	CNR	CNR	CNR
x	HP 85070C Dielectric Probe Kit	00033	US39240170	CNR	CNR	CNR	CNR
x	Gigatronics 8652A Power Meter	00007	1835272	23Apr08	23Apr09	23Apr09	23Apr09
x	Gigatronics 80701A Power Sensor	00014	1833699	23Apr08	23Apr09	23Apr09	23Apr09
x	HP 8753ET Network Analyzer	00134	US39170292	28Apr08	28Apr09	28Apr09	28Apr09
x	HP 8648D Signal Generator	00005	3847A00611	CNR	CNR	CNR	CNR
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR	CNR	CNR
Abbr.	CNR = Calibration Not Required						

<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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Test Lab Certificate No. 2470.01

## 15.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION									
Uncertainty Component	IEEE 1528 Section	Uncertainty Value $\pm\%$	Probability Distribution	Divisor	ci 1g	ci 10g	Uncertainty Value $\pm\%$ (1g)	Uncertainty Value $\pm\%$ (10g)	$V_i$ or $V_{eff}$
<b>Measurement System</b>									
Probe Calibration (835 MHz)	E.2.1	5.5	Normal	1	1	1	5.5	5.5	$\infty$
Axial Isotropy	E.2.2	4.7	Rectangular	1.732050808	0.7	0.7	1.9	1.9	$\infty$
Hemispherical Isotropy	E.2.2	9.6	Rectangular	1.732050808	0.7	0.7	3.9	3.9	$\infty$
Boundary Effect	E.2.3	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	$\infty$
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	$\infty$
Response Time	E.2.7	0.8	Rectangular	1.732050808	1	1	0.5	0.5	$\infty$
Integration Time	E.2.8	2.6	Rectangular	1.732050808	1	1	1.5	1.5	$\infty$
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	$\infty$
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	$\infty$
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	$\infty$
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
<b>Test Sample Related</b>									
Test Sample Positioning	E.4.2	2.9	Normal	1	1	1	2.9	2.9	12
Device Holder Uncertainty	E.4.1	3.6	Normal	1	1	1	3.6	3.6	8
SAR Drift Measurement	6.6.2	5	Rectangular	1.732050808	1	1	2.9	2.9	$\infty$
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	$\infty$
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	$\infty$
Liquid Conductivity (measured)	E.3.3	4.5	Normal	1	0.64	0.43	2.9	1.9	$\infty$
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	$\infty$
Liquid Permittivity (measured)	E.3.3	4	Normal	1	0.6	0.49	2.4	2.0	$\infty$
<b>Combined Standard Uncertainty</b>			<b>RSS</b>				<b>11.01</b>	<b>10.58</b>	
<b>Expanded Uncertainty (95% Confidence Interval)</b>			<b>k=2</b>				<b>22.02</b>	<b>21.15</b>	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005

Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		Freq. Range:	764 - 870 MHz	
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## MEASUREMENT UNCERTAINTIES (CONT.)

UNCERTAINTY BUDGET FOR SYSTEM PERFORMANCE CHECK									
Uncertainty Component	IEEE 1528 Section	Uncertainty Value $\pm\%$	Probability Distribution	Divisor	ci 1g	ci 10g	Uncertainty Value $\pm\%$ (1g)	Uncertainty Value $\pm\%$ (10g)	$V_i$ or $V_{eff}$
<b>Measurement System</b>									
Probe Calibration (835 MHz)	E.2.1	5.5	Normal	1	1	1	6	5.5	$\infty$
Axial Isotropy	E.2.2	4.7	Rectangular	1.732050808	1	1	2.7	2.7	$\infty$
Hemispherical Isotropy	E.2.2	0	Rectangular	1.732050808	1	1	0.0	0.0	$\infty$
Boundary Effect	E.2.3	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	$\infty$
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	$\infty$
Response Time	E.2.7	0	Rectangular	1.732050808	1	1	0.0	0.0	$\infty$
Integration Time	E.2.8	0	Rectangular	1.732050808	1	1	0.0	0.0	$\infty$
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	$\infty$
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	$\infty$
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	$\infty$
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
<b>Dipole</b>									
Dipole Positioning	E.4.2	2	Normal	1.732050808	1	1	1.2	1.2	$\infty$
SAR Drift Measurement	6.6.2	4.7	Normal	1.732050808	1	1	2.7	1.2	$\infty$
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	$\infty$
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	$\infty$
Liquid Conductivity (measured)	E.3.3	4.5	Normal	1	0.64	0.43	2.9	1.9	$\infty$
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	$\infty$
Liquid Permittivity (measured)	E.3.3	4.2	Normal	1	0.6	0.49	2.5	2.1	$\infty$
<b>Combined Standard Uncertainty</b>			<b>RSS</b>				<b>9.33</b>	<b>8.47</b>	
<b>Expanded Uncertainty (95% Confidence Interval)</b>			<b>k=2</b>				<b>18.66</b>	<b>16.93</b>	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005


Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		Freq. Range:	764 - 870 MHz	
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	


## 16.0 REFERENCES



- [1] Federal Communications Commission - "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093.
- [2] Health Canada - "Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz", Safety Code 6: 1999.
- [3] Federal Communications Commission - "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields", OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.
- [4] Industry Canada - "Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 2: November 2005.
- [5] IEEE Standard 1528-2003 - "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques": December 2003.
- [6] IEC International Standard 62209-1:2005 - "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures."
- [7] Federal Communications Commission, Office of Engineering and Technology - "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies"; KDB 447498 D01 v03r02: July 27, 2008.

<b>Applicant:</b>	<b>BK Radio Inc. c/o RELM Communications</b>	<b>FCC ID:</b>	<b>K95KNGP800</b>	<b>IC:</b>	<b>2116A-KNGP400</b>	
<b>Model(s):</b>	<b>KNG-P800</b>	<b>Portable Analog/Digital PTT Radio Transceiver</b>	<b>Freq. Range:</b>	<b>764 - 870 MHz</b>		
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## APPENDIX A - SAR MEASUREMENT DATA

<b>Applicant:</b>	<b>BK Radio Inc. c/o RELM Communications</b>	<b>FCC ID:</b>	<b>K95KNGP800</b>	<b>IC:</b>	<b>2116A-KNGP400</b>	
<b>Model(s):</b>	<b>KNG-P800</b>	<b>Portable Analog/Digital PTT Radio Transceiver</b>		<b>Freq. Range:</b>	<b>764 - 870 MHz</b>	
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Test Lab Certificate No. 2470.01				

Date Tested: 12/12/2008

## Face-held SAR - 764-777 MHz Band (1) - Mid Channel - 770 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**

Ambient Temp: 22°C; Fluid Temp: 20.3°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 770 MHz; Duty Cycle: 1:1

RF Output Power: 2.85 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: HSL835 Medium parameters used:  $f = 775 \text{ MHz}$ ;  $\sigma = 0.86 \text{ mho/m}$ ;  $\epsilon_r = 42.1$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.54, 6.54, 6.54); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

## Face-held SAR - 2.5 cm Spacing from Front Side of DUT to Planar Phantom - Mid Channel - Band 1

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 2.21 mW/g

## Face-held SAR - 2.5 cm Spacing from Front Side of DUT to Planar Phantom - Mid Channel - Band 1

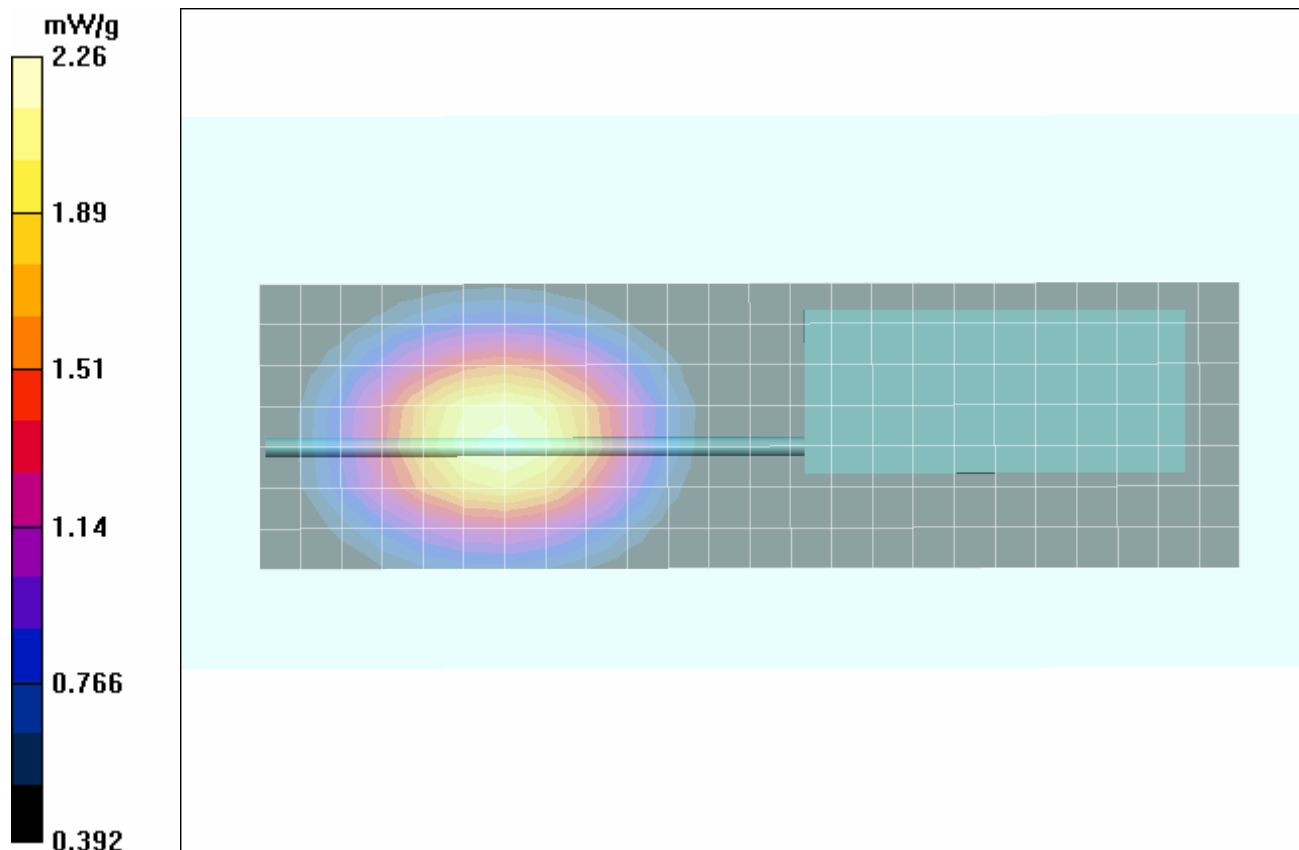
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 14.5 V/m; Power Drift = -1.11 dB



Peak SAR (extrapolated) = 2.52 W/kg

**SAR(1 g) = 2.15 mW/g; SAR(10 g) = 1.65 mW/g**

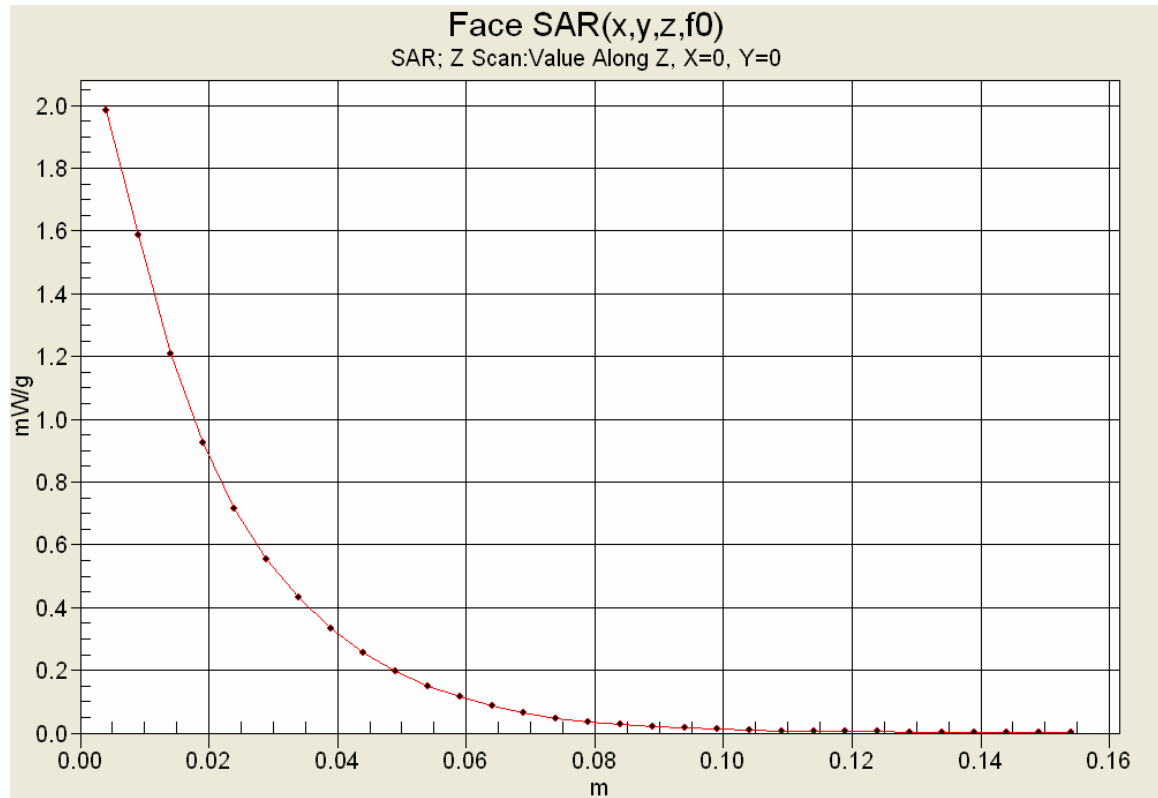
Maximum value of SAR (measured) = 2.26 mW/g






Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver	Freq. Range:	764 - 870 MHz		
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	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

## Z-Axis Scan



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 12/12/2008

## Face-held SAR - 794-806 MHz Band (2) - Mid Channel - 800 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**

Ambient Temp: 22°C; Fluid Temp: 20.3°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 800 MHz; Duty Cycle: 1:1

RF Output Power: 2.90 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: HSL835 Medium parameters used:  $f = 805 \text{ MHz}$ ;  $\sigma = 0.89 \text{ mho/m}$ ;  $\epsilon_r = 41.8$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.54, 6.54, 6.54); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### Face-held SAR - 2.5 cm Spacing from Front Side of DUT to Planar Phantom - Mid Channel - Band 2

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.35 mW/g

### Face-held SAR - 2.5 cm Spacing from Front Side of DUT to Planar Phantom - Mid Channel - Band 2

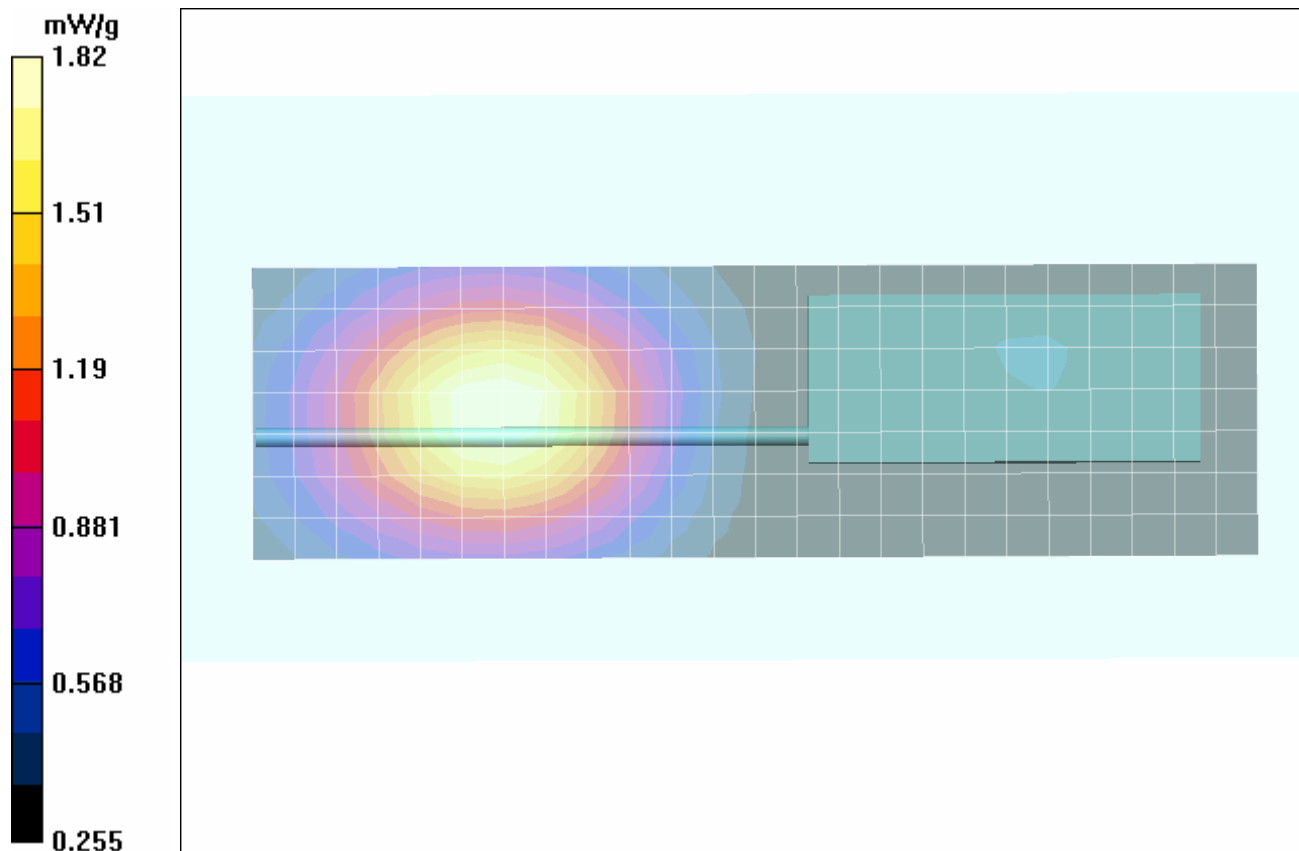
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 7.91 V/m; Power Drift = -0.743 dB

Peak SAR (extrapolated) = 2.06 W/kg



**SAR(1 g) = 1.73 mW/g; SAR(10 g) = 1.29 mW/g**

Maximum value of SAR (measured) = 1.82 mW/g



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	<b>Portable Analog/Digital PTT Radio Transceiver</b>	<b>Freq. Range:</b>	764 - 870 MHz		
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 12/12/2008

## Face-held SAR - 806-824 MHz Band (3) - Mid Channel - 815 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**

Ambient Temp: 22°C; Fluid Temp: 20.3°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 815 MHz; Duty Cycle: 1:1

RF Output Power: 2.87 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: HSL835 Medium parameters used:  $f = 815 \text{ MHz}$ ;  $\sigma = 0.91 \text{ mho/m}$ ;  $\epsilon_r = 41.5$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.54, 6.54, 6.54); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

## Face-held SAR - 2.5 cm Spacing from Front Side of DUT to Planar Phantom - Mid Channel - Band 3

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.71 mW/g

## Face-held SAR - 2.5 cm Spacing from Front Side of DUT to Planar Phantom - Mid Channel - Band 3

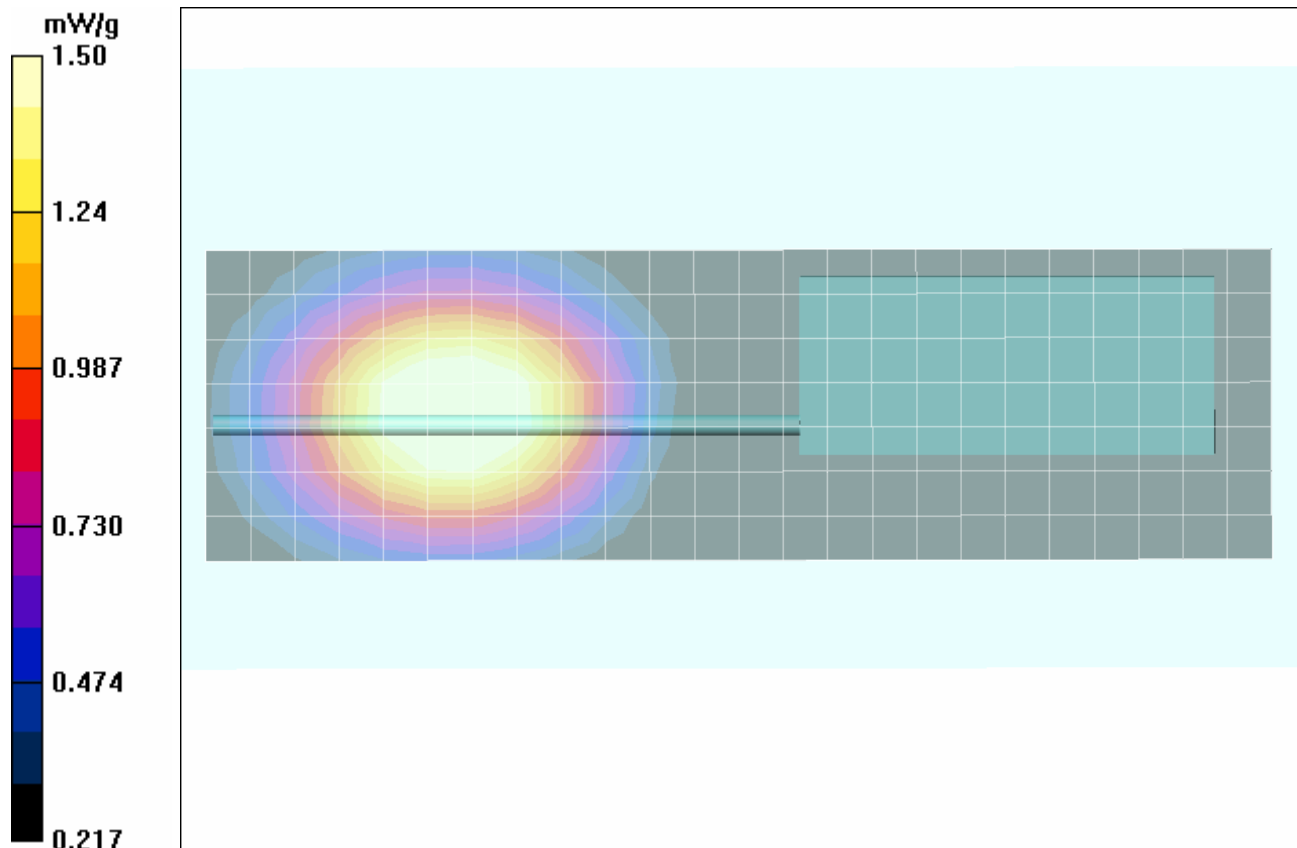
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 8.88 V/m; Power Drift = -0.468 dB



Peak SAR (extrapolated) = 1.70 W/kg

**SAR(1 g) = 1.43 mW/g; SAR(10 g) = 1.08 mW/g**

Maximum value of SAR (measured) = 1.50 mW/g



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	
Test Lab Certificate No. 2470.01				

Date Tested: 12/12/2008

## Face-held SAR - 851-870 MHz Band (4) - Mid Channel - 860 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**

Ambient Temp: 22°C; Fluid Temp: 20.3°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 860 MHz; Duty Cycle: 1:1

RF Output Power: 2.90 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: HSL835 Medium parameters used:  $f = 865 \text{ MHz}$ ;  $\sigma = 0.96 \text{ mho/m}$ ;  $\epsilon_r = 41$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.54, 6.54, 6.54); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### Face-held SAR - 2.5 cm Spacing from Front Side of DUT to Planar Phantom - Mid Channel - Band 4

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.11 mW/g

### Face-held SAR - 2.5 cm Spacing from Front Side of DUT to Planar Phantom - Mid Channel - Band 4

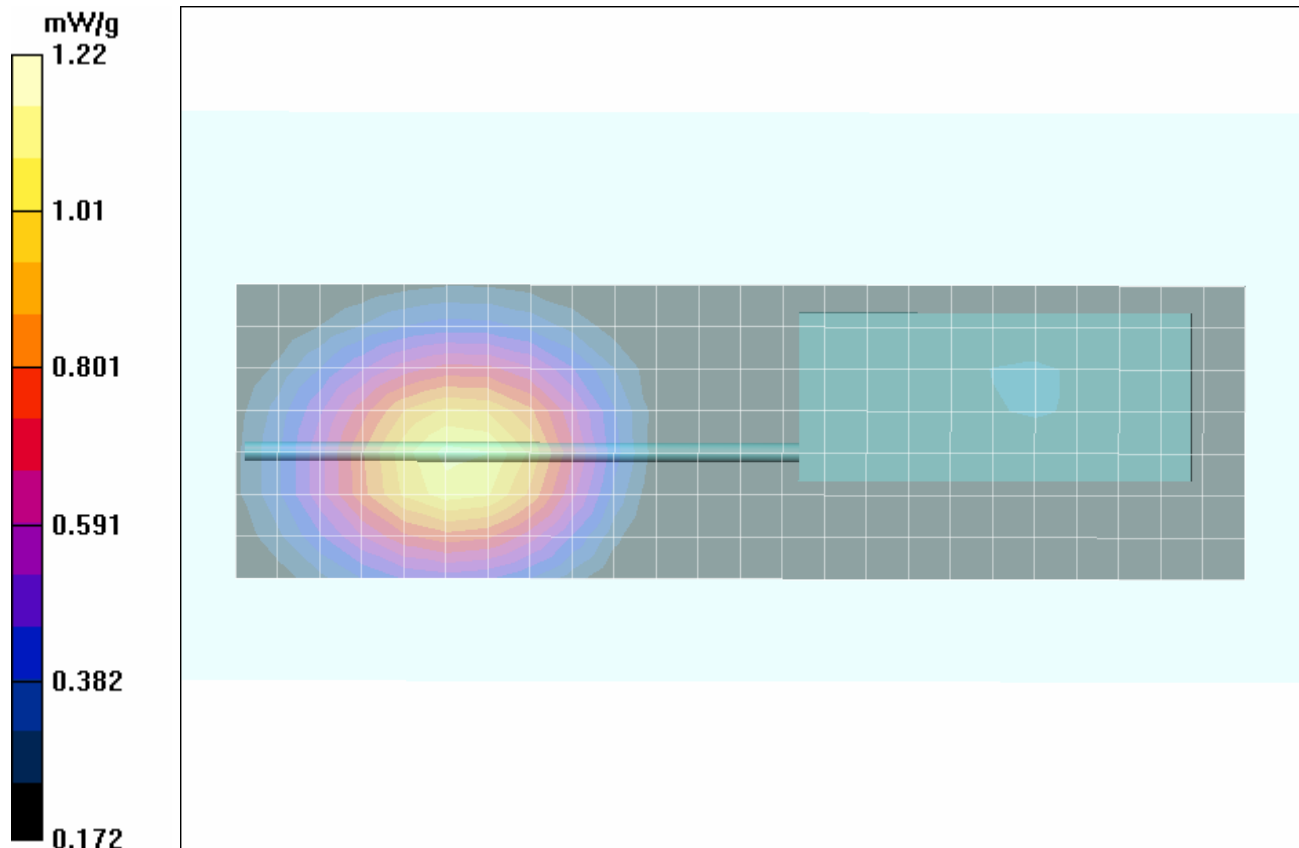
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 9.90 V/m; Power Drift = -0.844 dB



Peak SAR (extrapolated) = 1.39 W/kg

**SAR(1 g) = 1.15 mW/g; SAR(10 g) = 0.863 mW/g**

Maximum value of SAR (measured) = 1.22 mW/g



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	
Test Lab Certificate No. 2470.01				

Date Tested: 12/11/2008

## Body-worn SAR - 764-777 MHz Band (1) - Mid Channel - 770 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**  
**Body-worn Accessory: Belt-Clip (P/N: KAA0400); Audio Accessory: Speaker-Microphone (P/N: KAA0200)**

Ambient Temp: 22°C; Fluid Temp: 20.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 770 MHz; Duty Cycle: 1:1

RF Output Power: 2.85 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: MSL835 Medium parameters used:  $f = 775 \text{ MHz}$ ;  $\sigma = 0.93 \text{ mho/m}$ ;  $\epsilon_r = 57.6$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

## Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Mid Channel - Band 1

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 2.94 mW/g

## Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Mid Channel - Band 1

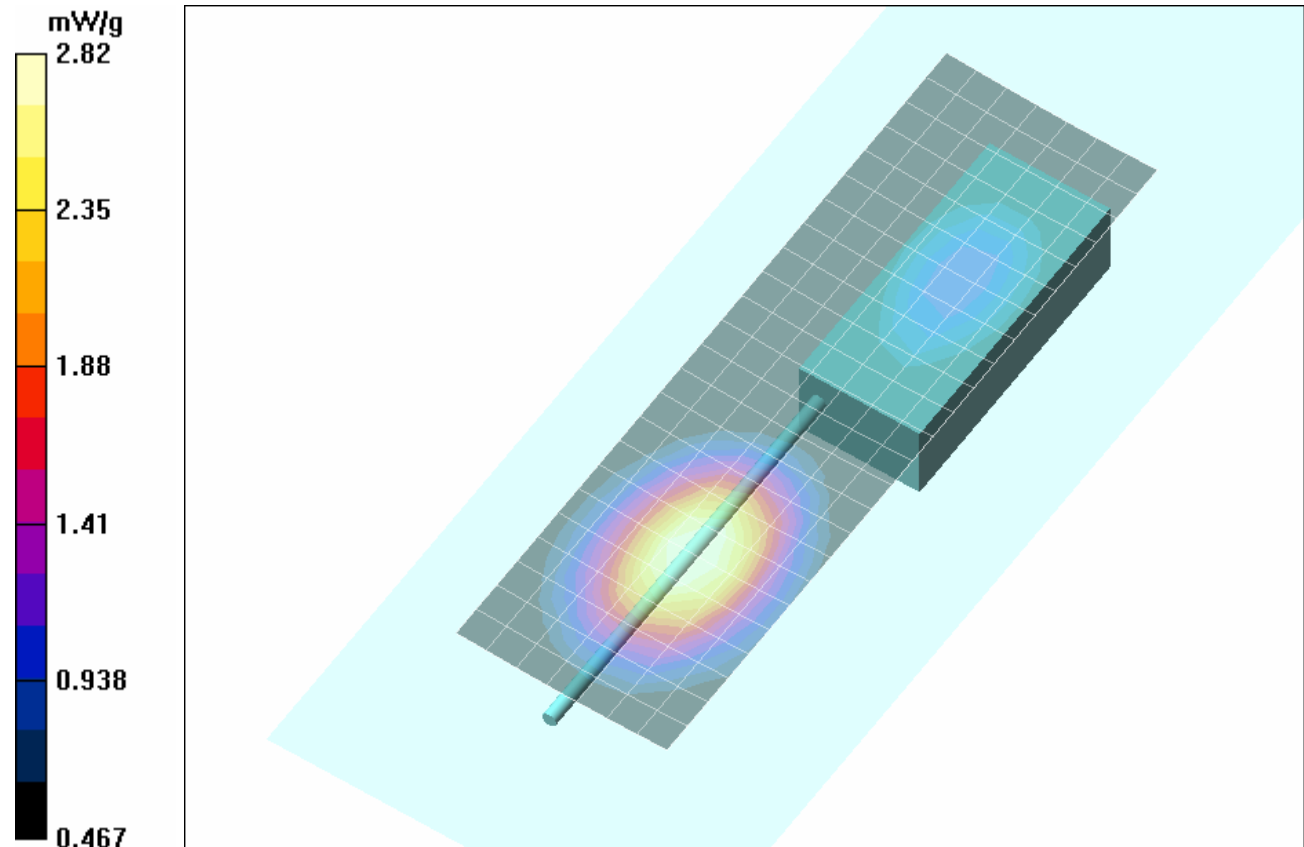
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 17.5 V/m; Power Drift = -1.05 dB



Peak SAR (extrapolated) = 3.11 W/kg

**SAR(1 g) = 2.65 mW/g; SAR(10 g) = 2.03 mW/g**

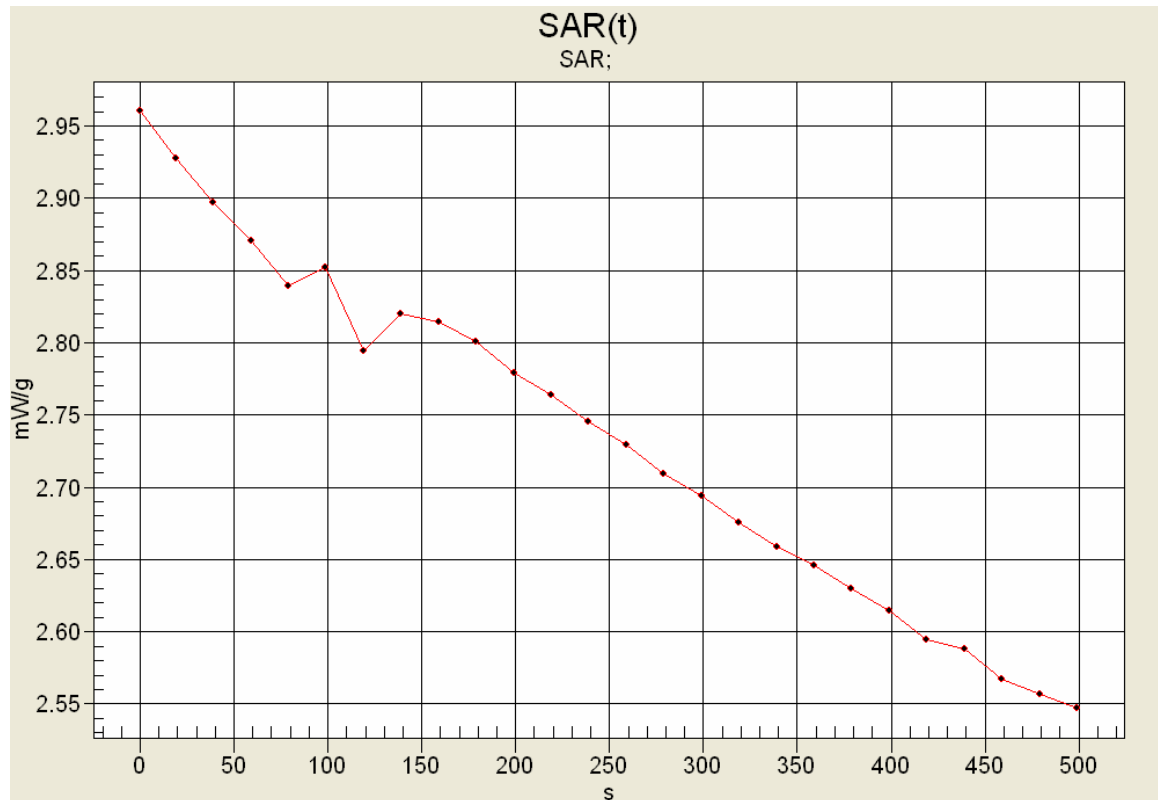
Maximum value of SAR (measured) = 2.82 mW/g




Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver	Freq. Range:	764 - 870 MHz		
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

## SAR-versus-Time Droop Evaluation



Max SAR: 2.96025 mW/g  
 Low SAR: 2.54731 mW/g (-0.652 dB)  
 SAR after 340s: 2.65873 mW/g (-0.467 dB)

<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	
Test Lab Certificate No. 2470.01				

Date Tested: 12/11/2008

## Body-worn SAR - 794-806 MHz Band (2) - Mid Channel - 800 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**  
**Body-worn Accessory: Belt-Clip (P/N: KAA0400); Audio Accessory: Speaker-Microphone (P/N: KAA0200)**

Ambient Temp: 22°C; Fluid Temp: 20.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 800 MHz; Duty Cycle: 1:1

RF Output Power: 2.90 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: M835 Medium parameters used:  $f = 805 \text{ MHz}$ ;  $\sigma = 0.94 \text{ mho/m}$ ;  $\epsilon_r = 57.2$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

## Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Mid Channel - Band 2

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.58 mW/g

## Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Mid Channel - Band 2

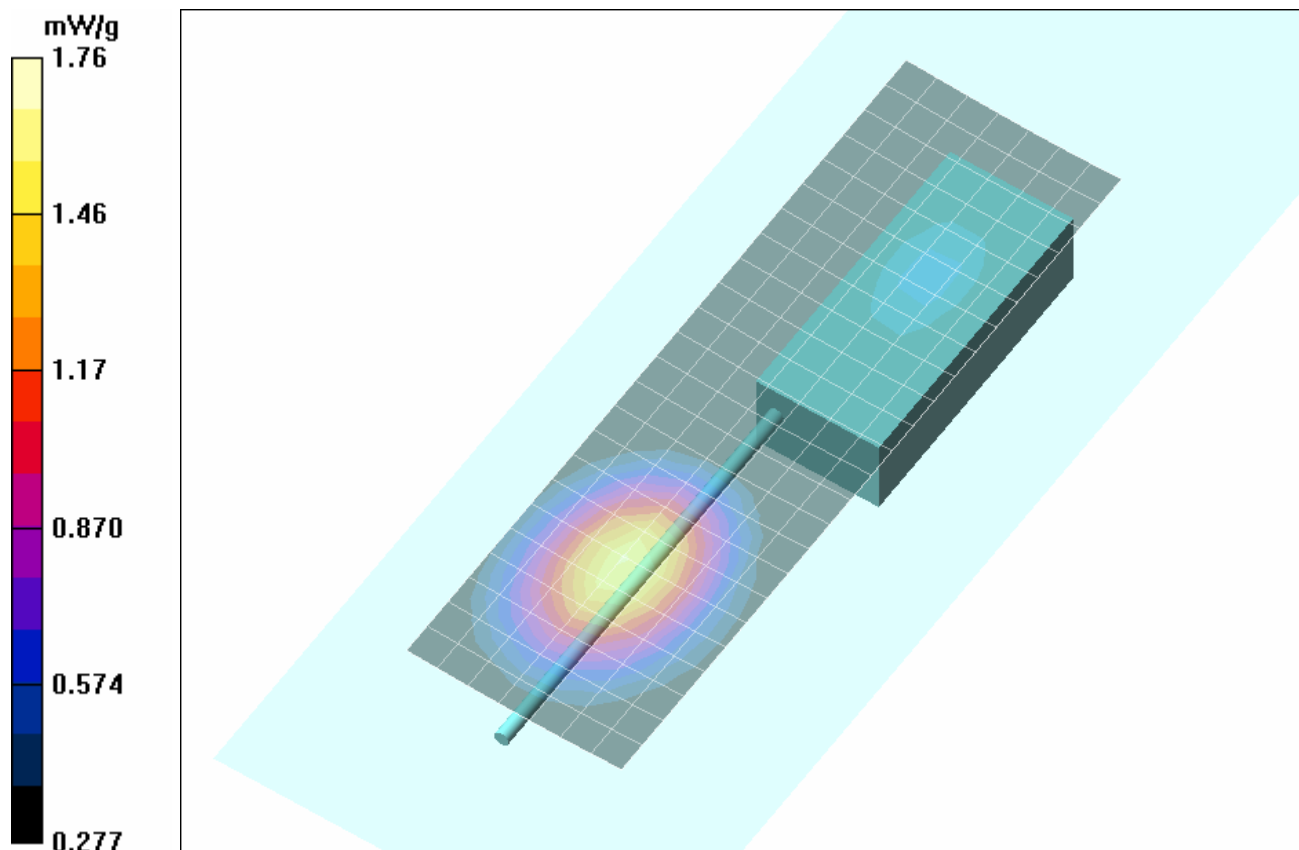
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 11.9 V/m; Power Drift = -0.297 dB

Peak SAR (extrapolated) = 1.94 W/kg



**SAR(1 g) = 1.66 mW/g; SAR(10 g) = 1.26 mW/g**

Maximum value of SAR (measured) = 1.76 mW/g



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	Test Report Issue Date December 19, 2008	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

Date Tested: 12/11/2008

## Body-worn SAR - 764-777 MHz Band (1) - Low Channel - 764 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**

**Body-worn Accessory: Belt-Clip (P/N: KAA0400); Audio Accessory: Speaker-Microphone (P/N: KAA0200)**

Ambient Temp: 22°C; Fluid Temp: 20.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 764 MHz; Duty Cycle: 1:1

RF Output Power: 2.93 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: M835 Medium parameters used:  $f = 775 \text{ MHz}$ ;  $\sigma = 0.93 \text{ mho/m}$ ;  $\epsilon_r = 57.6$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Low Channel - Band 1

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 2.87 mW/g

### Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Low Channel - Band 1

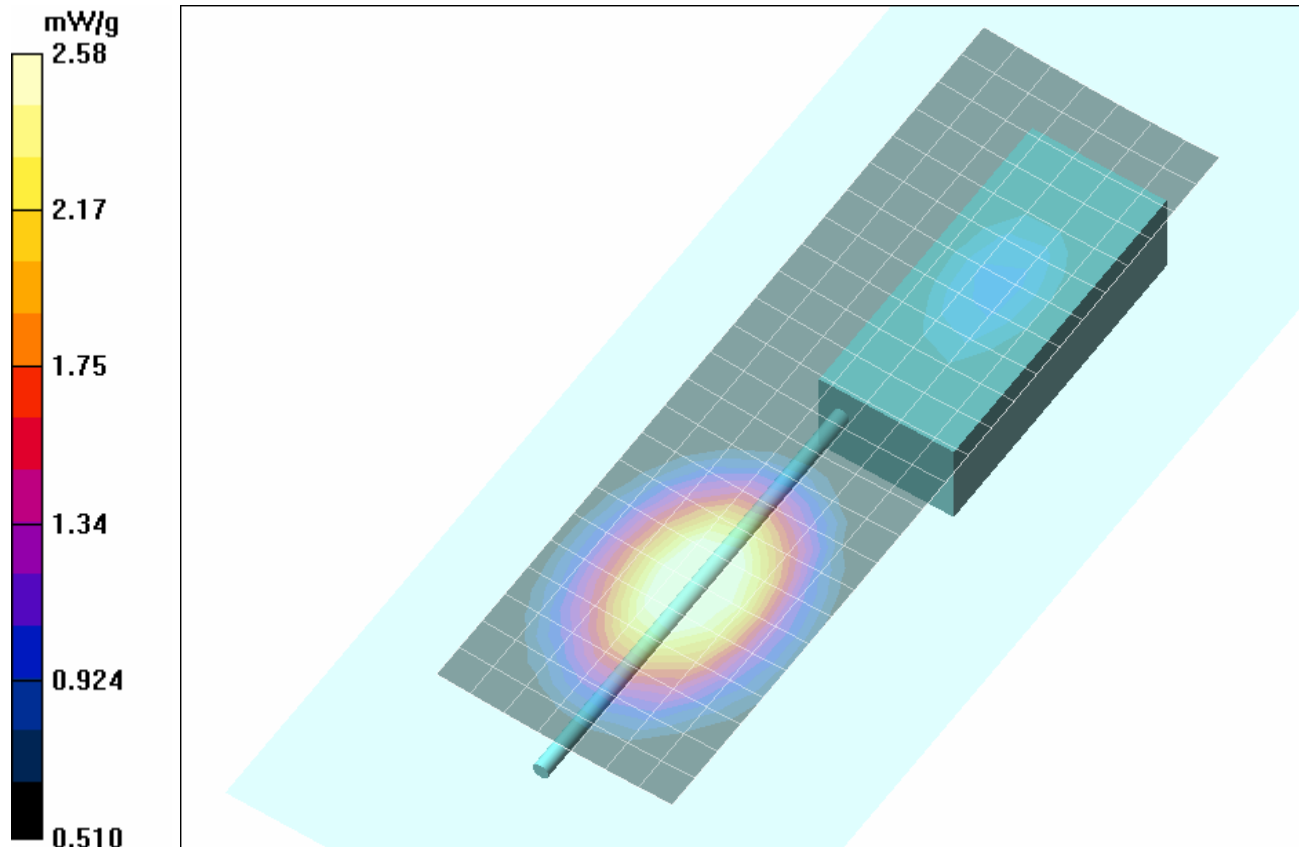
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 19.4 V/m; Power Drift = -1.02 dB



Peak SAR (extrapolated) = 2.82 W/kg

**SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.9 mW/g**

Maximum value of SAR (measured) = 2.58 mW/g



Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver	Freq. Range:	764 - 870 MHz		
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	Test Report Issue Date December 19, 2008	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

Date Tested: 12/11/2008

## Body-worn SAR - 764-777 MHz Band (1) - High Channel - 777 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**  
**Body-worn Accessory: Belt-Clip (P/N: KAA0400); Audio Accessory: Speaker-Microphone (P/N: KAA0200)**

Ambient Temp: 22°C; Fluid Temp: 20.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 777 MHz; Duty Cycle: 1:1

RF Output Power: 2.80 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: M835 Medium parameters used:  $f = 775 \text{ MHz}$ ;  $\sigma = 0.93 \text{ mho/m}$ ;  $\epsilon_r = 57.6$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

## Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - High Channel - Band 1

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 2.36 mW/g

## Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - High Channel - Band 1

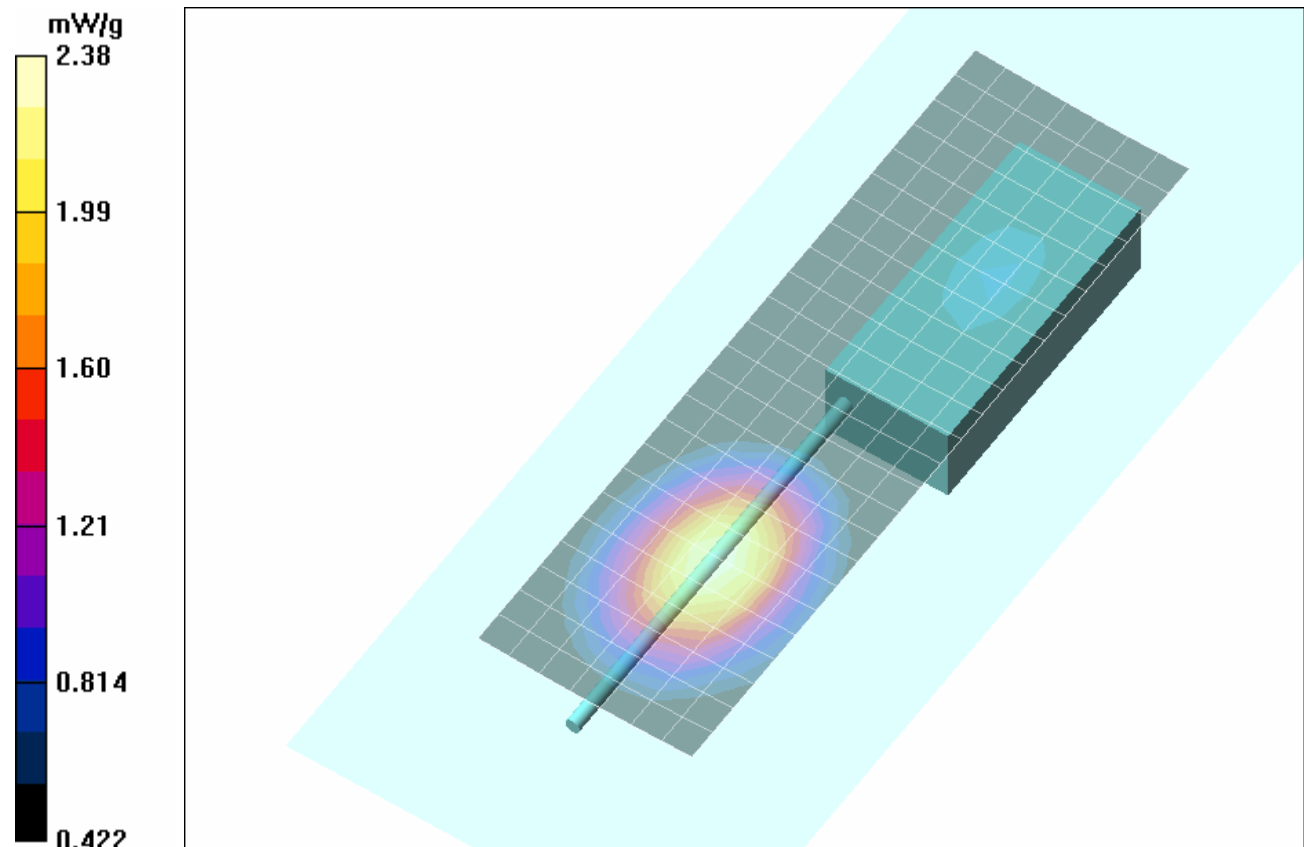
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 13.9 V/m; Power Drift = -1.08 dB



Peak SAR (extrapolated) = 2.61 W/kg

**SAR(1 g) = 2.24 mW/g; SAR(10 g) = 1.71 mW/g**

Maximum value of SAR (measured) = 2.38 mW/g



Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver	Freq. Range:	764 - 870 MHz		
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 12/11/2008

### Body-worn SAR - 806-824 MHz Band (3) - Mid Channel - 815 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**

**Body-worn Accessory: Belt-Clip (P/N: KAA0400); Audio Accessory: Speaker-Microphone (P/N: KAA0200)**

Ambient Temp: 22°C; Fluid Temp: 20.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 815 MHz; Duty Cycle: 1:1

RF Output Power: 2.87 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: M835 Medium parameters used:  $f = 815 \text{ MHz}$ ;  $\sigma = 0.95 \text{ mho/m}$ ;  $\epsilon_r = 57.0$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Mid Channel - Band 3

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 2.72 mW/g

### Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Mid Channel - Band 3

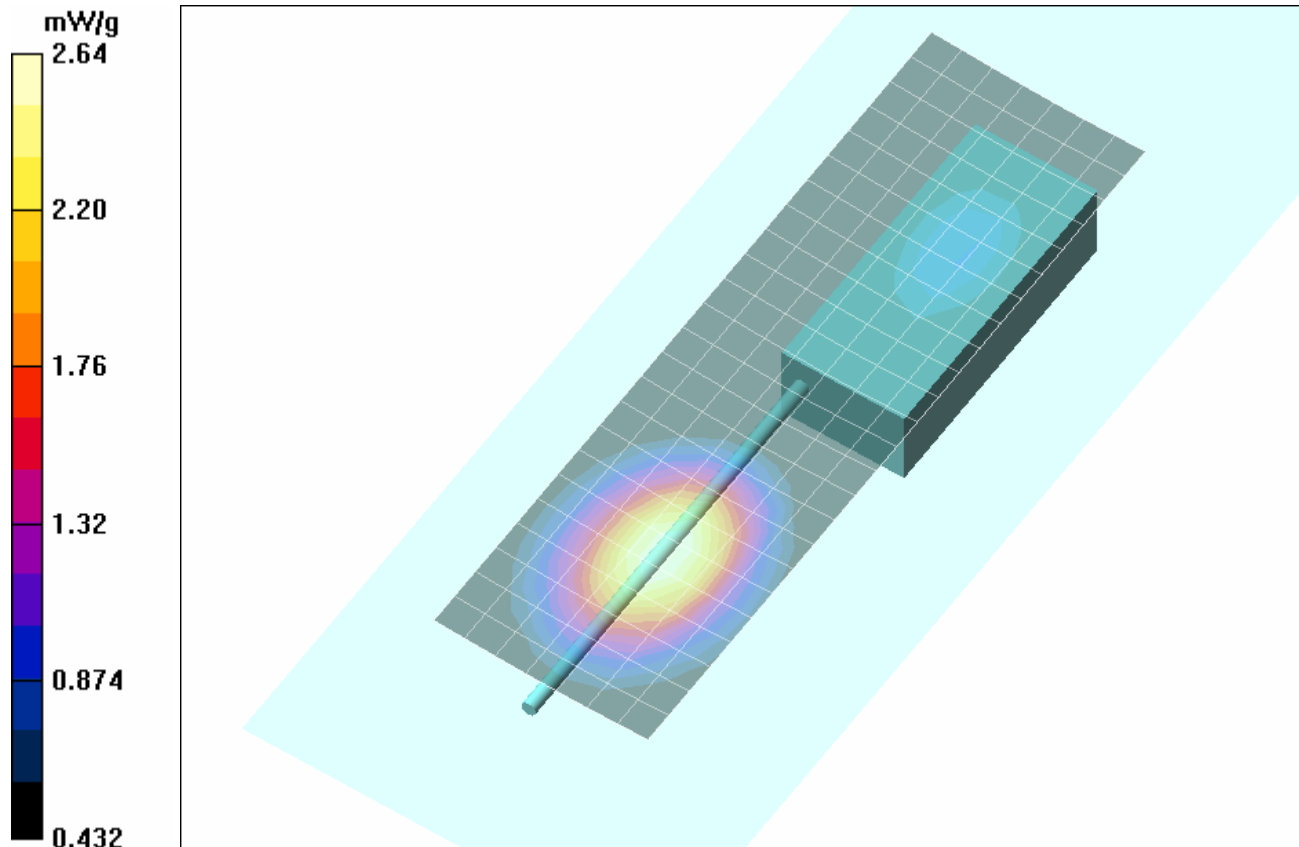
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 14.5 V/m; Power Drift = 0.136 dB



Peak SAR (extrapolated) = 2.93 W/kg

**SAR(1 g) = 2.5 mW/g; SAR(10 g) = 1.9 mW/g**

Maximum value of SAR (measured) = 2.64 mW/g



Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver	Freq. Range:	764 - 870 MHz		
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	Date(s) of Evaluation December 11-12, 2008	Test Report Serial No. 120808K95-T944-S90P	Test Report Revision No. Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	Test Report Issue Date December 19, 2008	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

Date Tested: 12/11/2008

## Body-worn SAR - 851-870 MHz Band (4) - Mid Channel - 860 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**  
**Body-worn Accessory: Belt-Clip (P/N: KAA0400); Audio Accessory: Speaker-Microphone (P/N: KAA0200)**

Ambient Temp: 22°C; Fluid Temp: 20.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 860 MHz; Duty Cycle: 1:1

RF Output Power: 2.90 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: M835 Medium parameters used:  $f = 865 \text{ MHz}$ ;  $\sigma = 1.01 \text{ mho/m}$ ;  $\epsilon_r = 56.8$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

## Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Mid Channel - Band 4

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 2.10 mW/g

## Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Mid Channel - Band 4

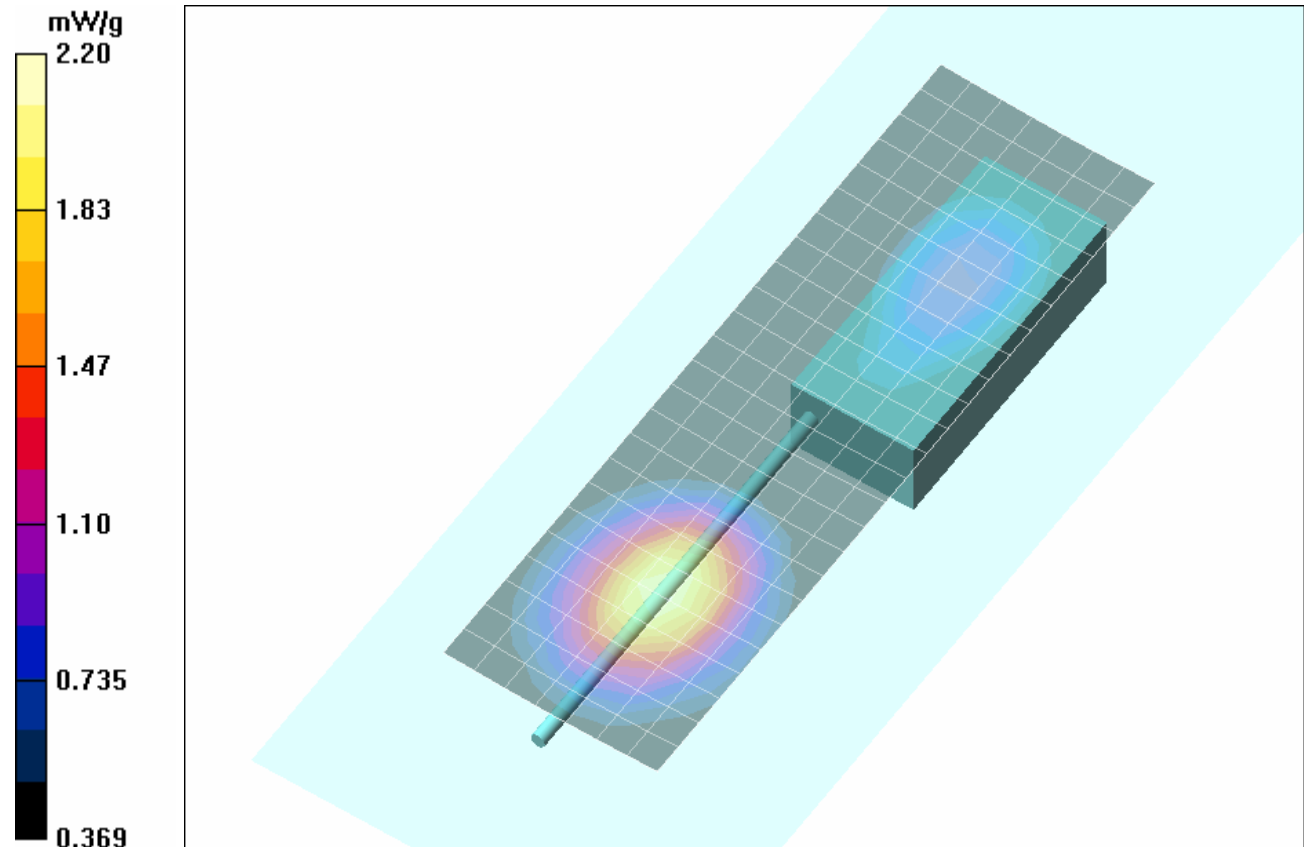
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 22.7 V/m; Power Drift = -1.16 dB



Peak SAR (extrapolated) = 2.43 W/kg

**SAR(1 g) = 2.07 mW/g; SAR(10 g) = 1.57 mW/g**

Maximum value of SAR (measured) = 2.20 mW/g



Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver	Freq. Range:	764 - 870 MHz		
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	
Test Lab Certificate No. 2470.01				

Date Tested: 12/11/2008

### Body-worn SAR - 806-824 MHz Band (3) - Low Channel - 806 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**

**Body-worn Accessory: Belt-Clip (P/N: KAA0400); Audio Accessory: Speaker-Microphone (P/N: KAA0200)**

Ambient Temp: 22°C; Fluid Temp: 20.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 806 MHz; Duty Cycle: 1:1

RF Output Power: 2.90 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: M835 Medium parameters used:  $f = 815 \text{ MHz}$ ;  $\sigma = 0.95 \text{ mho/m}$ ;  $\epsilon_r = 57.0$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Low Channel - Band 3

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.99 mW/g

### Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - Low Channel - Band 3

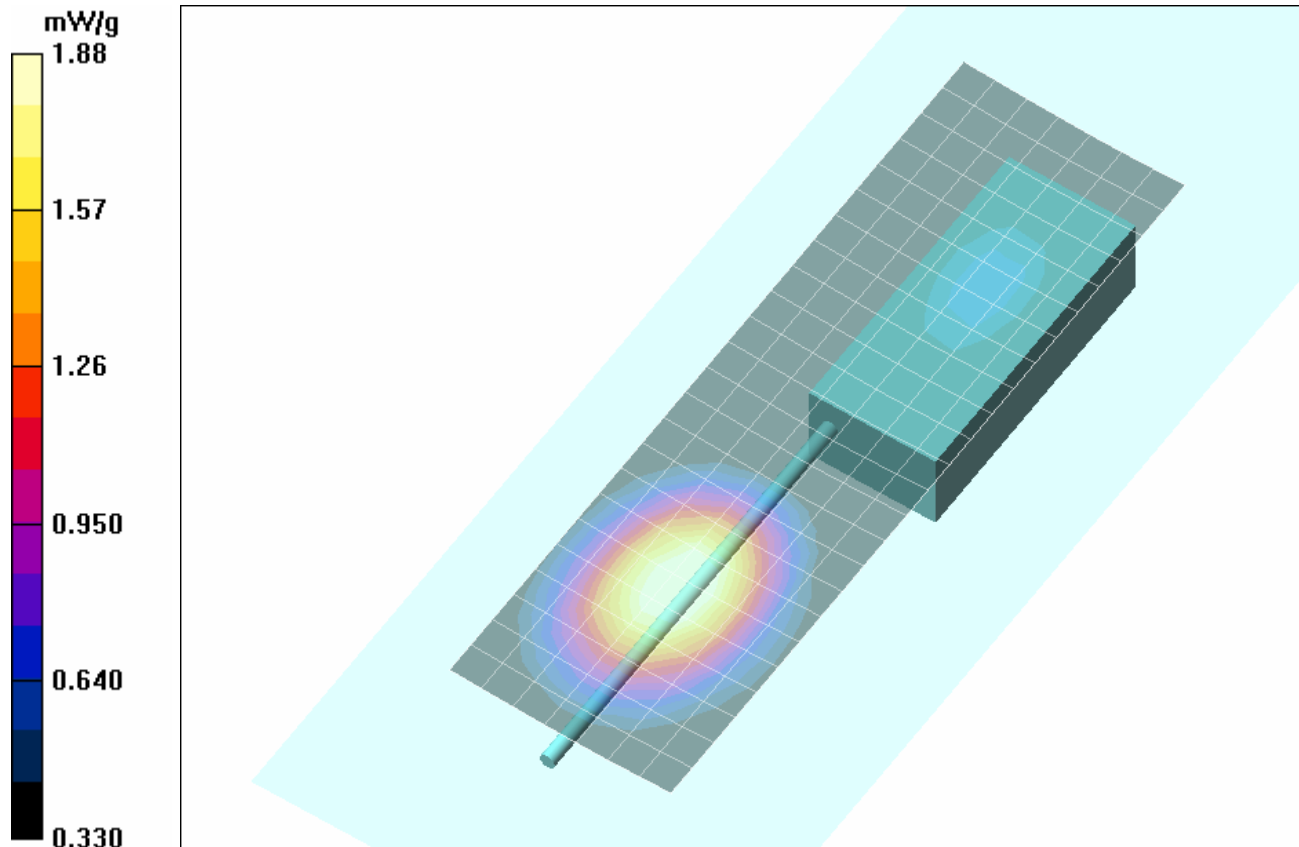
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 12.7 V/m; Power Drift = 0.232 dB

Peak SAR (extrapolated) = 2.09 W/kg



**SAR(1 g) = 1.79 mW/g; SAR(10 g) = 1.37 mW/g**

Maximum value of SAR (measured) = 1.88 mW/g



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	<b>Portable Analog/Digital PTT Radio Transceiver</b>	<b>Freq. Range:</b>	764 - 870 MHz		
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 12/11/2008

## Body-worn SAR - 806-824 MHz Band (3) - High Channel - 824 MHz

**DUT: BK Radio Model: KNG-P800; Type: Portable Analog/Digital PTT Radio Transceiver; Serial: 08410001**

**Body-worn Accessory: Belt-Clip (P/N: KAA0400); Audio Accessory: Speaker-Microphone (P/N: KAA0200)**

Ambient Temp: 22°C; Fluid Temp: 20.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 824 MHz; Duty Cycle: 1:1

RF Output Power: 2.85 Watts (Conducted)

10.8V 1950mAh Lithium-ion Battery (P/N: KAA0100)

Medium: M835 Medium parameters used:  $f = 815 \text{ MHz}$ ;  $\sigma = 0.95 \text{ mho/m}$ ;  $\epsilon_r = 57.0$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

- Phantom: Side Planar; Type: Plexiglas; Serial: 161

- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

## Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - High Channel - Band 3

**Area Scan (8x25x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) = 2.87 mW/g

## Body-worn SAR - 1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom - High Channel - Band 3

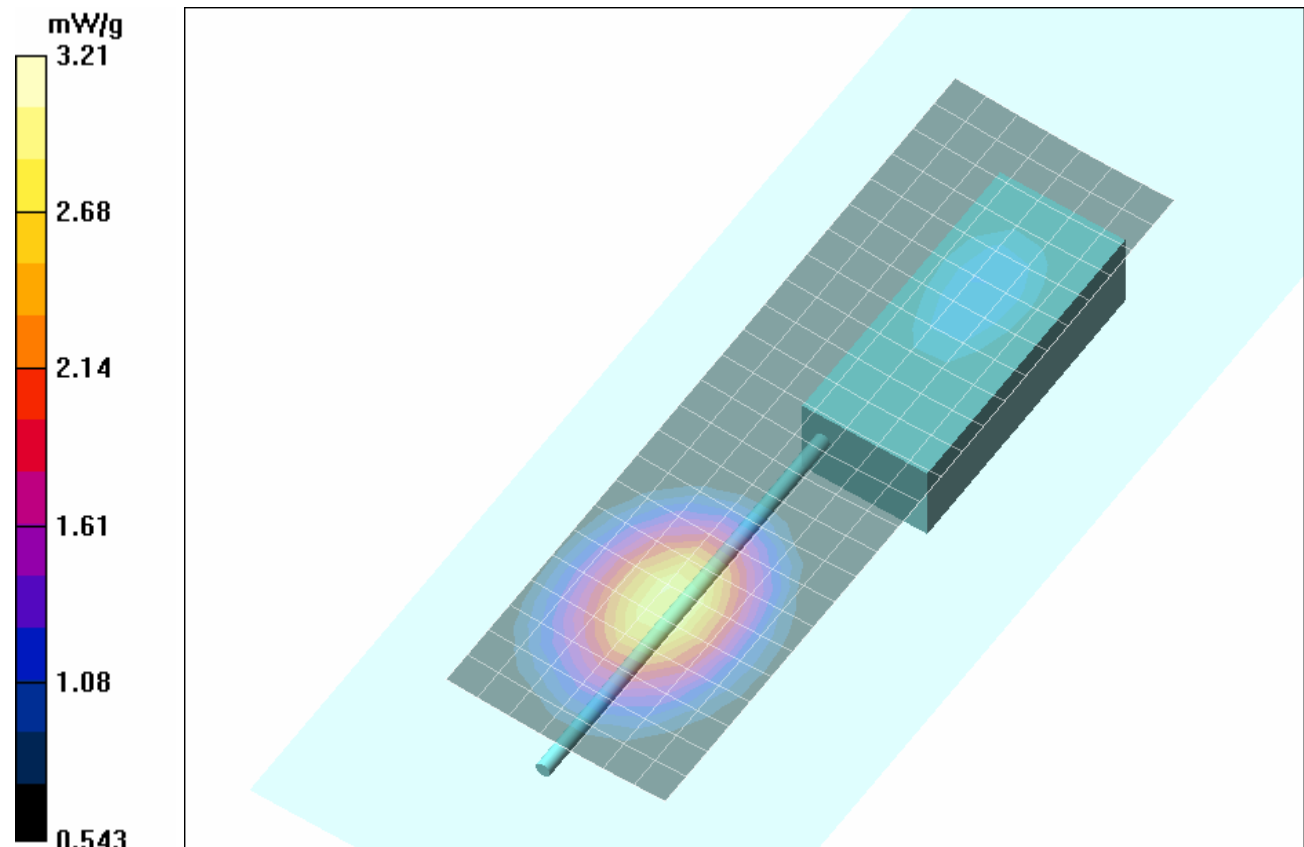
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 19.3 V/m; Power Drift = 0.220 dB



Peak SAR (extrapolated) = 3.55 W/kg

**SAR(1 g) = 3.03 mW/g; SAR(10 g) = 2.29 mW/g**

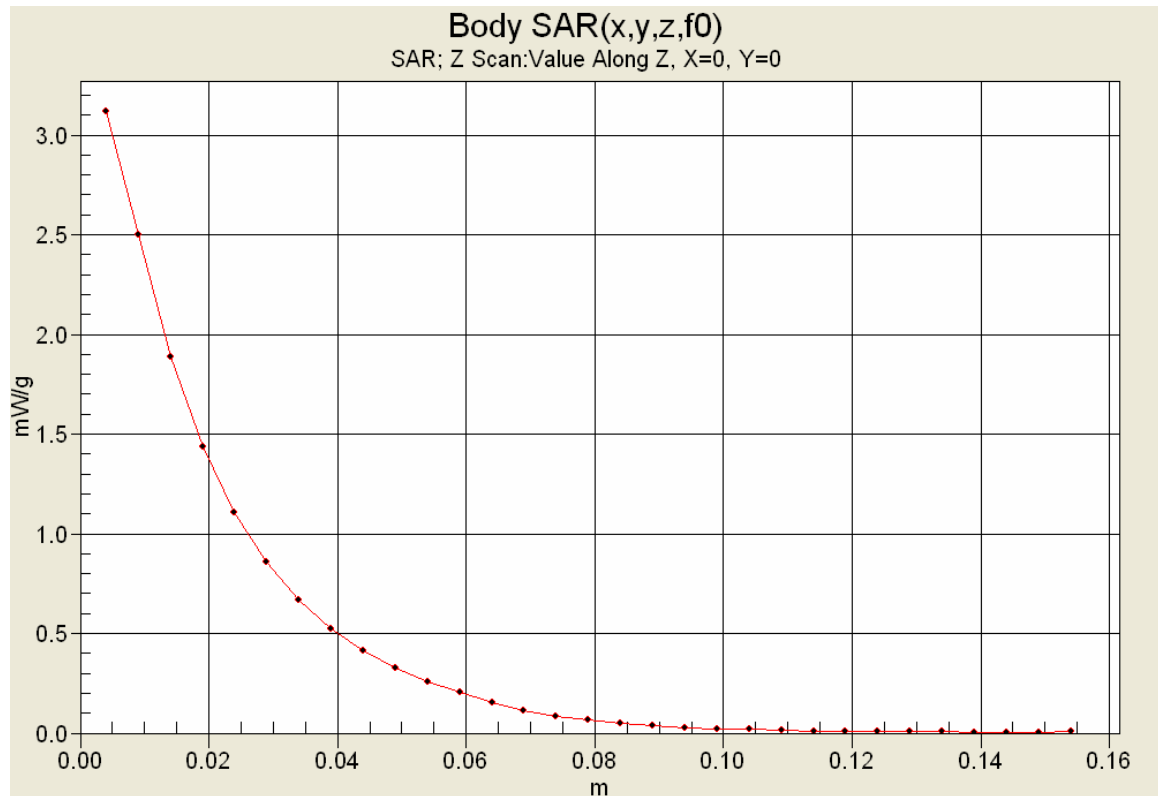
Maximum value of SAR (measured) = 3.21 mW/g






<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	<b>Portable Analog/Digital PTT Radio Transceiver</b>	<b>Freq. Range:</b>	764 - 870 MHz		
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	


## Z-Axis Scan





<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

## APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

<b>Applicant:</b>	<b>BK Radio Inc. c/o RELM Communications</b>	<b>FCC ID:</b>	<b>K95KNGP800</b>	<b>IC:</b>	<b>2116A-KNGP400</b>	
<b>Model(s):</b>	<b>KNG-P800</b>	<b>Portable Analog/Digital PTT Radio Transceiver</b>	<b>Freq. Range:</b>	<b>764 - 870 MHz</b>		
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 12/11/2008

## System Performance Check - 835 MHz Dipole - MSL

**DUT: Dipole 835 MHz; Asset: 00022; Serial: 411; Validation: 08/28/2008**

Ambient Temp: 22°C; Fluid Temp: 20.4°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: M835 Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.98 \text{ mho/m}$ ;  $\epsilon_r = 56.9$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### System Performance Check - 835 MHz Dipole

**Area Scan (6x10x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (measured) = 2.41 mW/g

### System Performance Check - 835 MHz Dipole

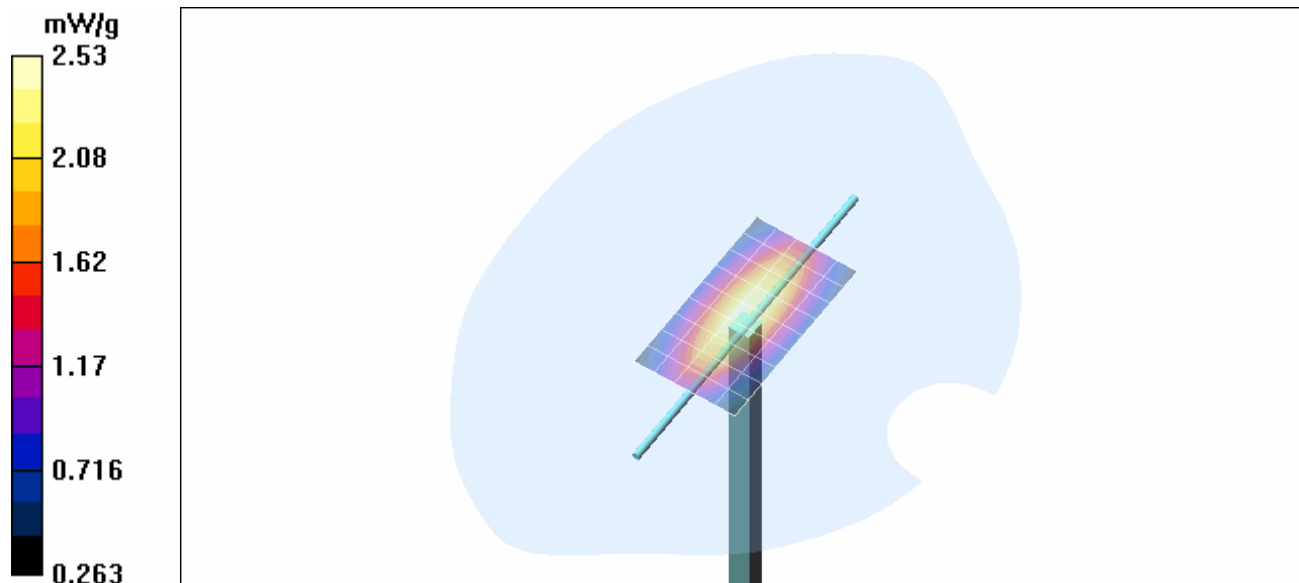
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 54.8 V/m; Power Drift = -0.057 dB



Peak SAR (extrapolated) = 3.11 W/kg

**SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.58 mW/g**

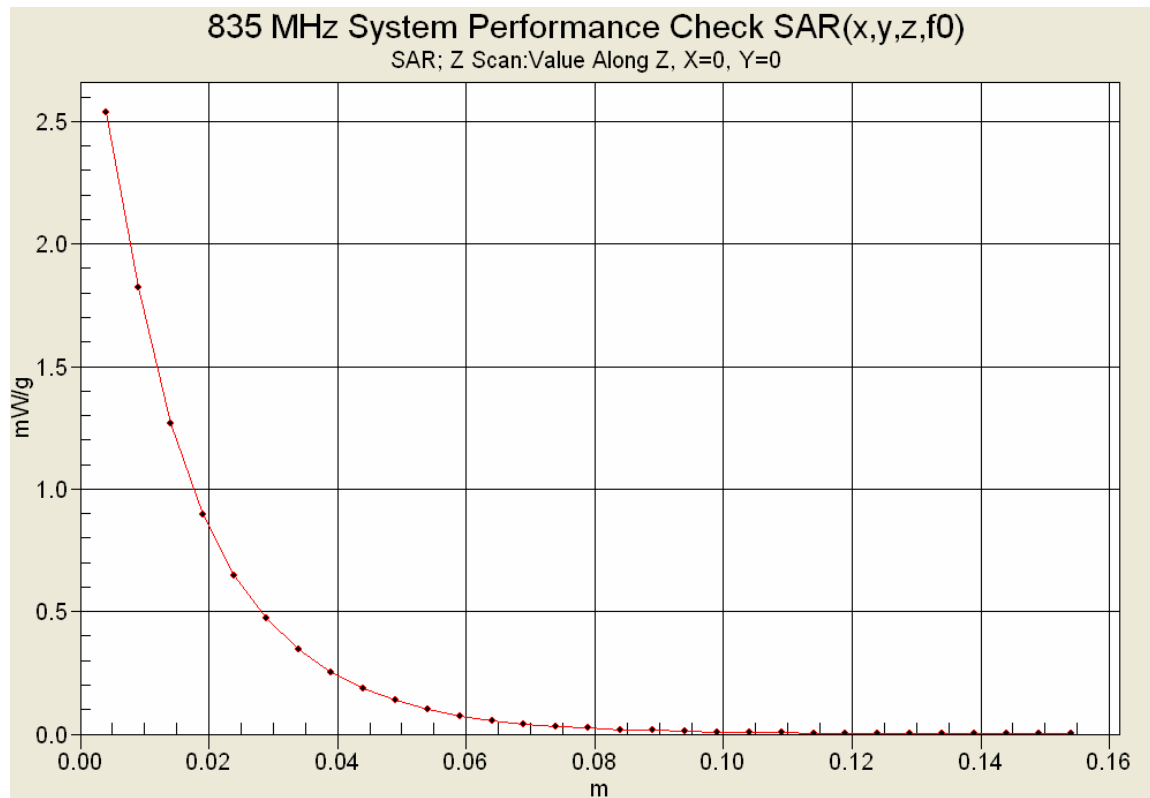
Maximum value of SAR (measured) = 2.53 mW/g






<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

## Z-Axis Scan



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 12/12/2008

## System Performance Check - 835 MHz Dipole - HSL

**DUT: Dipole 835 MHz; Asset: 00022; Serial: 411; Validation: 12/10/2008**

Ambient Temp: 22°C; Fluid Temp: 20.3°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL835 Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.93 \text{ mho/m}$ ;  $\epsilon_r = 41.5$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.54, 6.54, 6.54); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### System Performance Check - 835 MHz Dipole

**Area Scan (6x10x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (measured) = 2.48 mW/g

### System Performance Check - 835 MHz Dipole

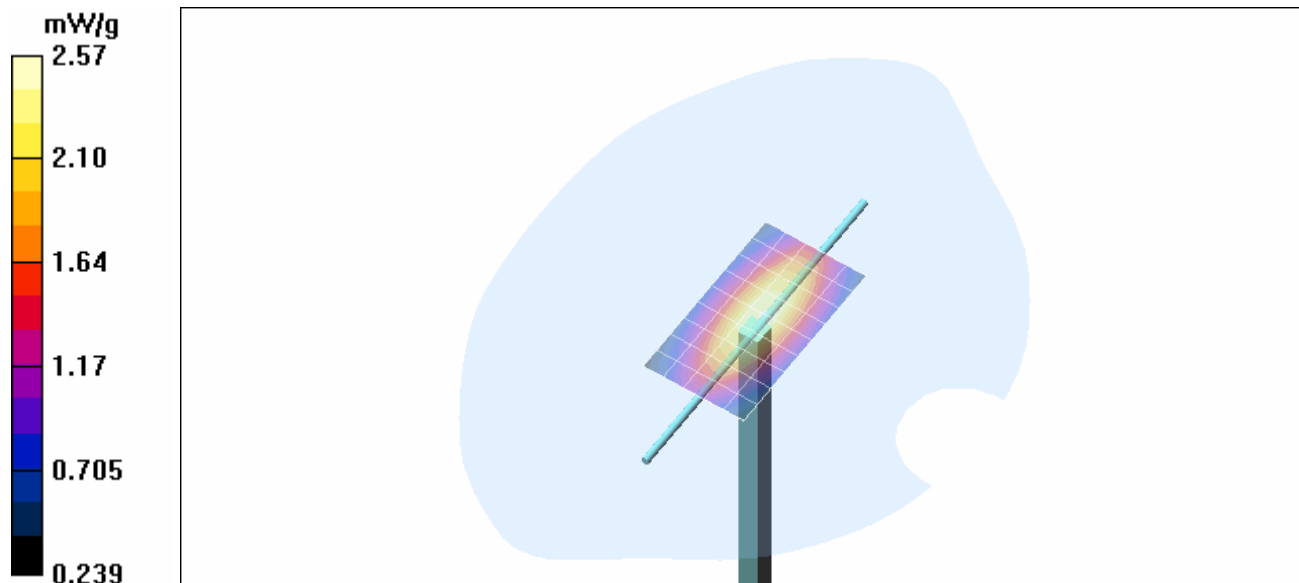
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$


Reference Value = 56.2 V/m; Power Drift = 0.004 dB

Peak SAR (extrapolated) = 3.22 W/kg



**SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.57 mW/g**

Maximum value of SAR (measured) = 2.57 mW/g

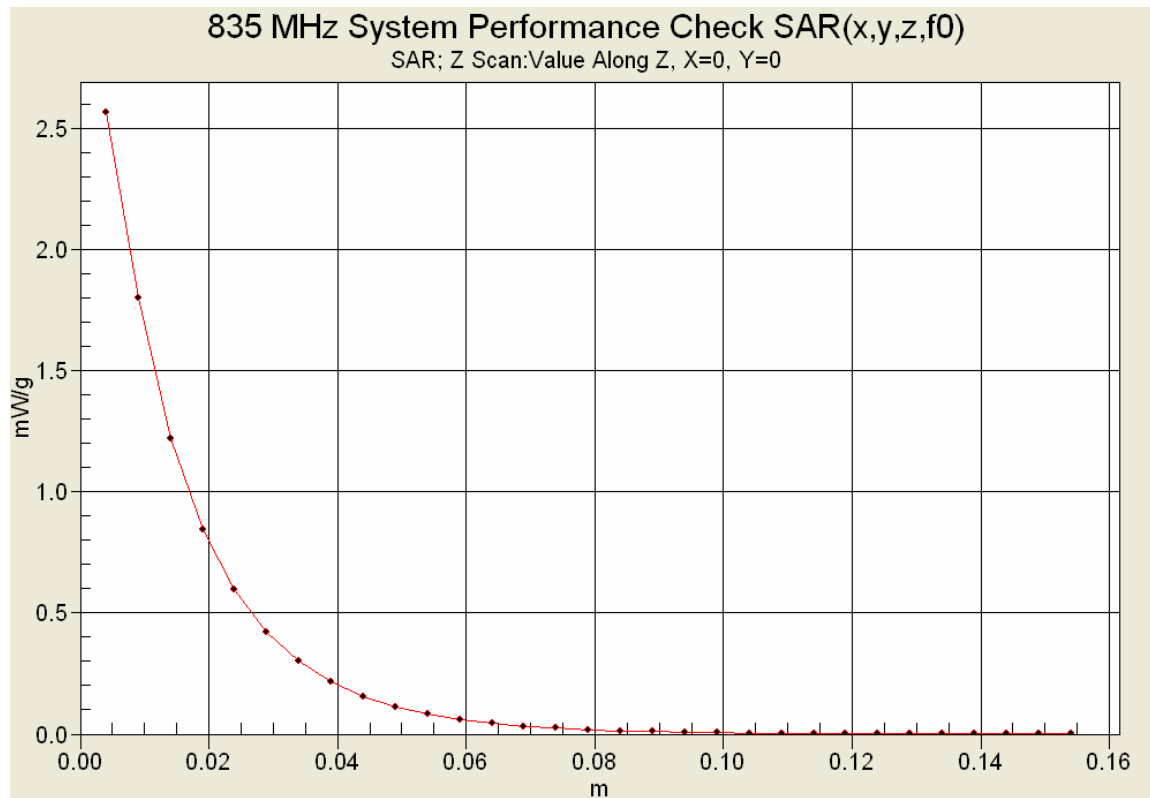



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	


## Z-Axis Scan





<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

## APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

<b>Applicant:</b>	<b>BK Radio Inc. c/o RELM Communications</b>	<b>FCC ID:</b>	<b>K95KNGP800</b>	<b>IC:</b>	<b>2116A-KNGP400</b>	
<b>Model(s):</b>	<b>KNG-P800</b>	<b>Portable Analog/Digital PTT Radio Transceiver</b>	<b>Freq. Range:</b>	<b>764 - 870 MHz</b>		
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	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01


## 835 MHz System Performance Check & 775/805/815/865 DUT Evaluation (Body)



\*\*\*\*\*

Celltech Labs Inc.  
Test Result for UIM Dielectric Parameter  
11/Dec/2008  
Frequency (GHz)  
FCC\_eHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon  
FCC\_sHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma  
FCC\_eB FCC Limits for Body Epsilon  
FCC\_sB FCC Limits for Body Sigma  
Test\_e Epsilon of UIM  
Test\_s Sigma of UIM

\*\*\*\*\*

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.7350	55.59	0.96	57.78	0.89
0.7450	55.55	0.96	57.83	0.90
0.7550	55.51	0.96	57.68	0.91
0.7650	55.47	0.96	57.58	0.93
0.7750	55.43	0.97	57.60	0.93
0.7850	55.39	0.97	57.23	0.92
0.7950	55.36	0.97	56.97	0.95
0.8050	55.32	0.97	57.23	0.94
0.8150	55.28	0.97	56.98	0.95
0.8250	55.24	0.97	56.98	0.97
0.8350	55.20	0.97	56.91	0.98
0.8450	55.17	0.98	56.87	0.99
0.8550	55.14	0.99	56.78	1.00
0.8650	55.11	1.01	56.79	1.01
0.8750	55.08	1.02	56.68	1.03
0.8850	55.05	1.03	56.50	1.04
0.8950	55.02	1.04	56.56	1.03
0.9050	55.00	1.05	56.27	1.03
0.9150	55.00	1.06	56.19	1.05
0.9250	54.98	1.06	56.17	1.06
0.9350	54.96	1.07	55.97	1.06

<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

## 835 MHz System Performance Check & 775/805/815/865 MHz DUT Evaluation (Brain)

\*\*\*\*\*

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

12/Dec/2008

Frequency (GHz)

FCC\_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon


FCC\_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma



Test\_e Epsilon of UIM

Test\_s Sigma of UIM


\*\*\*\*\*



Freq	FCC_eHF	FCC_sH	Test_e	Test_s
0.7350	42.02	0.89	42.49	0.82
0.7450	41.97	0.89	42.46	0.83
0.7550	41.92	0.89	42.48	0.85
0.7650	41.86	0.89	42.09	0.85
0.7750	41.81	0.90	42.07	0.86
0.7850	41.76	0.90	41.57	0.88
0.7950	41.71	0.90	42.19	0.88
0.8050	41.66	0.90	41.76	0.89
0.8150	41.60	0.90	41.52	0.91
0.8250	41.55	0.90	41.44	0.92
0.8350	41.50	0.90	41.50	0.93
0.8450	41.50	0.91	41.12	0.93
0.8550	41.50	0.92	41.09	0.94
0.8650	41.50	0.93	40.97	0.96
0.8750	41.50	0.94	40.66	0.96
0.8850	41.50	0.95	40.36	0.96
0.8950	41.50	0.96	40.65	0.98
0.9050	41.50	0.97	40.56	0.99
0.9150	41.50	0.98	40.32	1.02
0.9250	41.48	0.98	40.12	1.01
0.9350	41.46	0.99	40.04	1.03

<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

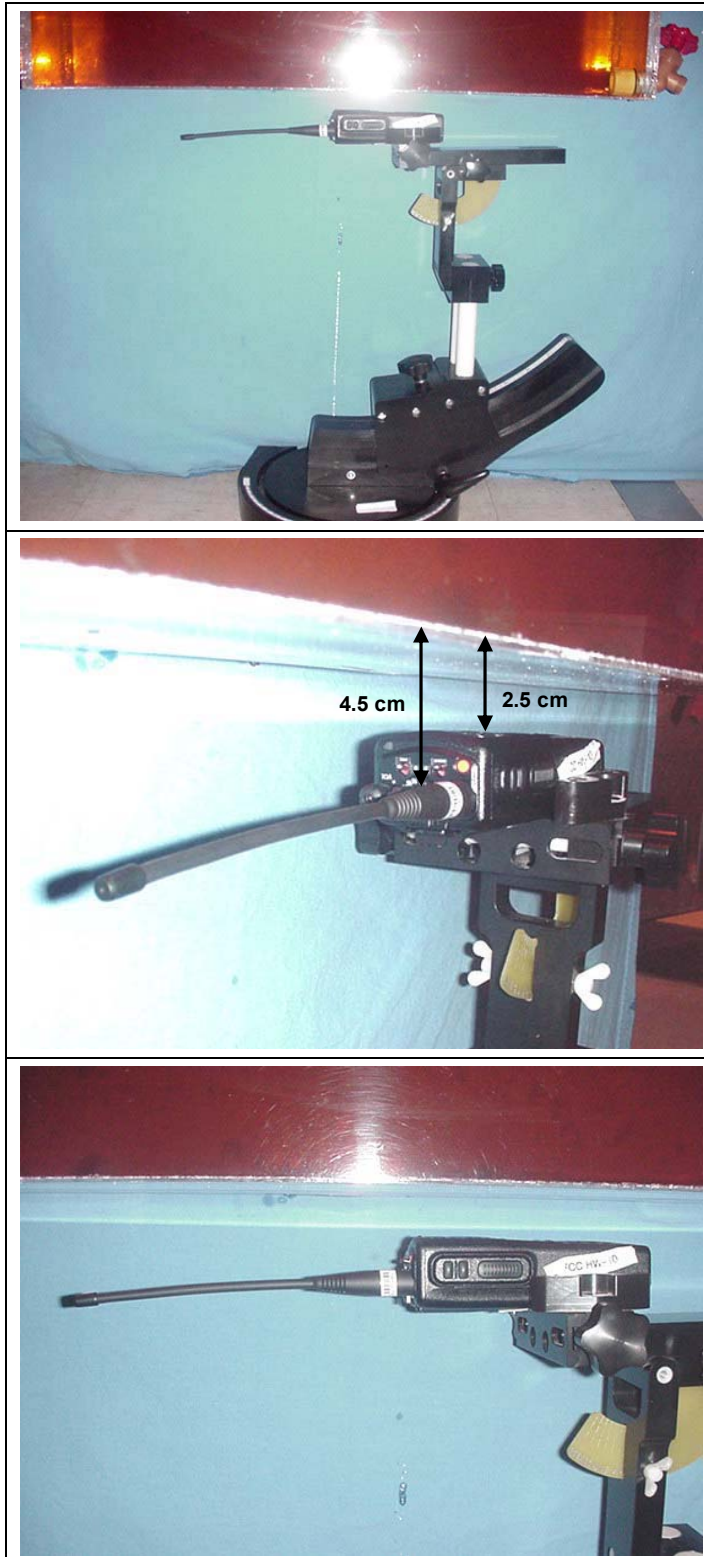
## APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS


<b>Applicant:</b>	<b>BK Radio Inc. c/o RELM Communications</b>	<b>FCC ID:</b>	<b>K95KNGP800</b>	<b>IC:</b>	<b>2116A-KNGP400</b>	
<b>Model(s):</b>	<b>KNG-P800</b>	<b>Portable Analog/Digital PTT Radio Transceiver</b>	<b>Freq. Range:</b>	<b>764 - 870 MHz</b>		
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	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	



## FACE-HELD SAR TEST SETUP PHOTOGRAPHS

### 2.5 cm Spacing from Front Side of DUT to Planar Phantom

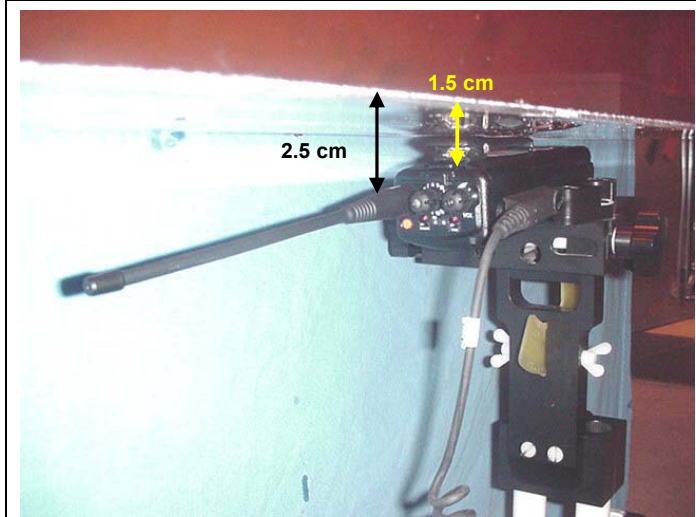



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

**BODY-WORN SAR TEST SETUP PHOTOGRAPHS**  
**1.5 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom**  
**DUT with Speaker-Microphone Audio Accessory**



<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	Date(s) of Evaluation December 11-12, 2008	Test Report Serial No. 120808K95-T944-S90P	Test Report Revision No. Rev. 1.0 (Initial Release)	
	Test Report Issue Date December 19, 2008	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

Test Lab Certificate No. 2470.01




## DUT PHOTOGRAPHS



Detachable Half-wave Whip Antenna (P/N: KAA0825)


Applicant:	BK Radio Inc. c/o RELM Communications	FCC ID:	K95KNGP800	IC:	2116A-KNGP400	
Model(s):	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		Freq. Range:	764 - 870 MHz	
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	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	  Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

## DUT PHOTOGRAPHS

			
Left Side of DUT with Belt-Clip Accessory (P/N: 7011-31003-300)			
			
Right Side of DUT with Belt-Clip Accessory (P/N: 7011-31003-300)			Belt-Clip Accessory
			
Top End of DUT with Belt-Clip	Bottom End of DUT with Belt-Clip	Belt-Clip Accessory (P/N: 7011-31003-300)	

<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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 Testing and Engineering Services Lab	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	



## DUT PHOTOGRAPHS




Back of DUT with Battery Removed


Lithium-ion Rechargeable Battery (P/N: KAA0100)

<b>Applicant:</b>	BK Radio Inc. c/o RELM Communications	<b>FCC ID:</b>	K95KNGP800	<b>IC:</b>	2116A-KNGP400	
<b>Model(s):</b>	KNG-P800	Portable Analog/Digital PTT Radio Transceiver		<b>Freq. Range:</b>	764 - 870 MHz	
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	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

## APPENDIX E - SYSTEM VALIDATION

<b>Applicant:</b>	<b>BK Radio Inc. c/o RELM Communications</b>	<b>FCC ID:</b>	<b>K95KNGP800</b>	<b>IC:</b>	<b>2116A-KNGP400</b>	
<b>Model(s):</b>	<b>KNG-P800</b>	<b>Portable Analog/Digital PTT Radio Transceiver</b>	<b>Freq. Range:</b>	<b>764 - 870 MHz</b>		
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	Date of Evaluation:	December 10, 2008	Validation Document Serial No.:	SV835B-121008-R1.0		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Brain

## 835 MHz SYSTEM VALIDATION

Dipole Type:

**835 MHz Validation Dipole**

Dipole Manufacturer:

**Celltech Labs Inc.**

Dipole Asset Number:

**00022**

Dipole Serial Number:

**411**

Probe Serial Number:

**1590**

Phantom Type:

**SAM Twin Phantom V4.0C**

Place of Validation:

**Celltech Labs Inc.**

Date of Validation:

**December 10, 2008**

**Celltech Labs Inc. certifies that the 835 MHz System Validation was performed on the date indicated above.**

Performed by:

**Sean Johnston**

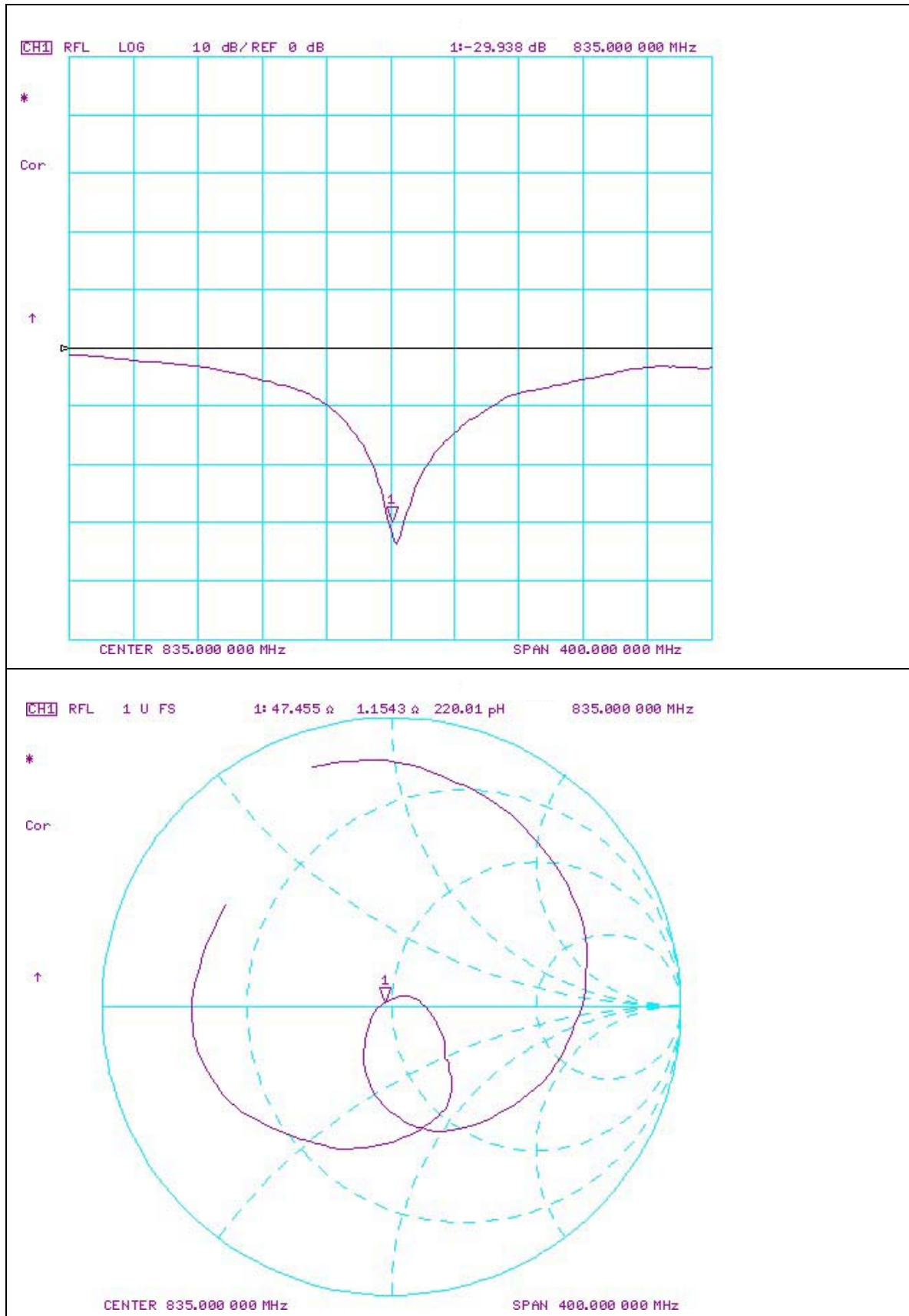
Signature:








## 2. Validation Dipole VSWR Data



	Date of Evaluation:	December 10, 2008	Validation Document Serial No.:		SV835B-121008-R1.0	
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Brain

### 3. Validation Dipole Dimensions

Frequency (MHz)	L (mm)	h (mm)	d (mm)
300	396.0	250.0	6.0
450	270.0	167.0	6.0
<b>835</b>	<b>161.0</b>	<b>89.8</b>	<b>3.6</b>
900	149.0	83.3	3.6
1450	89.1	51.7	3.6
1800	72.0	41.7	3.6
1900	68.0	39.5	3.6
2000	64.5	37.5	3.6
2450	51.5	30.4	3.6
3000	41.5	25.0	3.6


### 4. Validation Phantom

The validation phantom is the SAM (Specific Anthropomorphic Mannequin) Twin Phantom V4.0C manufactured by Schmid & Partner Engineering AG. The SAM phantom is a Fiberglass shell integrated in a wooden table. The shape of the shell corresponds to the phantom defined by SCC34-SC2. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

**Shell Thickness:** 2.0 ± 0.1 mm  
**Filling Volume:** Approx. 25 liters  
**Dimensions:** 50 cm (W) x 100 cm (L)


### 5. Test Equipment List

TEST EQUIPMENT	ASSET NO.	SERIAL NO.	DATE OF CAL.	CAL. DUE DATE
SPEAG DASY4 Measurement Server	00158	1078	N/A	N/A
SPEAG Robot	00046	599396-01	N/A	N/A
SPEAG DAE4	00019	353	22Apr08	22Apr09
SPEAG ET3DV6 E-Field Probe	00017	1590	21Jul08	21Jul09
Celltech 835 MHz Validation Dipole	00022	411	10Dec08	10Dec09
SPEAG SAM Phantom V4.0C	00154	1033	N/A	N/A
ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A	N/A
Gigatronics 8652A Power Meter	00007	1835272	23Apr08	23Apr09
Gigatronics 80701A Power Sensor	00014	1833699	23Apr08	23Apr09
HP 8753ET Network Analyzer	00134	US39170292	28Apr08	28Apr09
HP 8648D Signal Generator	00005	3847A00611	NCR	NCR
Amplifier Research 5S1G4 Power Amplifier	00106	26235	NCR	NCR

	Date of Evaluation:	December 10, 2008	Validation Document Serial No.:	SV835B-121008-R1.0		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Brain

## 6. 835 MHz Validation Dipole & SAM Phantom

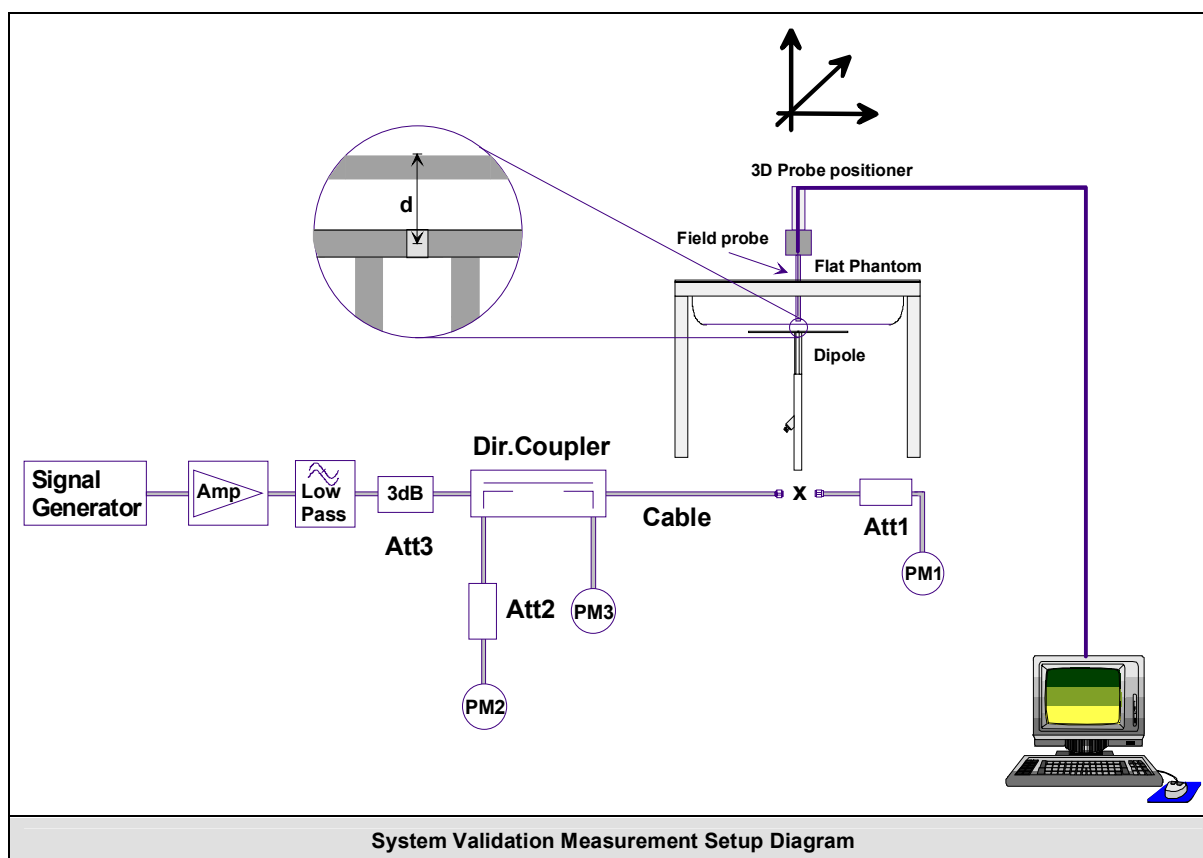



	Date of Evaluation:	December 10, 2008	Validation Document Serial No.:	SV835B-121008-R1.0
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz
			Fluid Type:	Brain

## 7. SAR Measurement

Measurements were made using a dosimetric E-field probe ET3DV6 (S/N: 1590, Conversion Factor 6.54). The SAR measurement was performed with the E-field probe in mechanical and optical surface detection mode. The setup and determination of the forward power into the dipole was performed using the following procedures.

First the power meter PM1 (including attenuator Att1) is connected to the cable to measure the forward power at the location of the dipole connector (X). The signal generator is adjusted for the desired forward power at the dipole connector (taking into account the attenuation of Att1) as read by power meter PM2. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2. If the signal generator does not allow adjustment in 0.01dB steps, the remaining difference at PM2 must be taken into consideration. PM3 records the reflected power from the dipole to ensure that the value is not changed from the previous value. The reflected power should be 20dB below the forward power.



	Date of Evaluation:	December 10, 2008	Validation Document Serial No.:	SV835B-121008-R1.0		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Brain

## 8. Measurement Conditions

The planar phantom was filled with 835 MHz Brain tissue simulant.

Relative Permittivity: 41.7 (+0.5% deviation from target)  
Conductivity: 0.89 mho/m (-1.0% deviation from target)  
Fluid Temperature: 20.5 °C (Start of Test) / 21.0 °C (End of Test)  
Fluid Depth:  $\geq 15.0$  cm

Environmental Conditions:

Ambient Temperature: 22.2 °C  
Barometric Pressure: 101.1 kPa  
Humidity: 35%


The 835 MHz Brain tissue simulant consisted of the following ingredients:

Ingredient	Percentage by weight
Water	40.71%
Sugar	56.63%
Salt	1.48%
Dowicil 75	0.19%
HEC	0.99%
IEEE/IEC Target Dielectric Parameters (835 MHz):	$\epsilon_r = 41.5$ (+/- 5%) $\sigma = 0.90$ S/m (+/- 5%)

## 9. System Validation SAR Results

SAR @ 0.25W Input averaged over 1g (W/kg)				SAR @ 1W Input averaged over 1g (W/kg)																																																										
IEEE/IEC Target		Measured	Deviation	IEEE/IEC Target		Measured	Deviation																																																							
2.38	+/- 10%	2.41	+1.3%	9.5	+/- 10%	9.64	+1.5%																																																							
SAR @ 0.25W Input averaged over 10g (W/kg)				SAR @ 1W Input averaged over 10g (W/kg)																																																										
IEEE/IEC Target		Measured	Deviation	IEEE/IEC Target		Measured	Deviation																																																							
1.55	+/- 10%	1.60	+3.2%	6.2	+/- 10%	6.4	+3.2%																																																							
<table><tr><th>Frequency (MHz)</th><th>1 g SAR</th><th>10 g SAR</th><th>Local SAR at surface (above feed-point)</th><th>Local SAR at surface (y = 2 cm offset from feed-point)<sup>a</sup></th></tr><tr><td>300</td><td>3.0</td><td>2.0</td><td>4.4</td><td>2.1</td></tr><tr><td>450</td><td>4.9</td><td>3.3</td><td>7.2</td><td>3.2</td></tr><tr><td>835</td><td>9.5</td><td>6.2</td><td>4.1</td><td>4.9</td></tr><tr><td>900</td><td>10.8</td><td>6.9</td><td>16.4</td><td>5.4</td></tr><tr><td>1450</td><td>29.0</td><td>16.0</td><td>50.2</td><td>6.5</td></tr><tr><td>1800</td><td>38.1</td><td>19.8</td><td>69.5</td><td>6.8</td></tr><tr><td>1900</td><td>39.7</td><td>20.5</td><td>72.1</td><td>6.6</td></tr><tr><td>2000</td><td>41.1</td><td>21.1</td><td>74.6</td><td>6.5</td></tr><tr><td>2450</td><td>52.4</td><td>24.0</td><td>104.2</td><td>7.7</td></tr><tr><td>3000</td><td>63.8</td><td>25.7</td><td>140.2</td><td>9.5</td></tr></table>								Frequency (MHz)	1 g SAR	10 g SAR	Local SAR at surface (above feed-point)	Local SAR at surface (y = 2 cm offset from feed-point) <sup>a</sup>	300	3.0	2.0	4.4	2.1	450	4.9	3.3	7.2	3.2	835	9.5	6.2	4.1	4.9	900	10.8	6.9	16.4	5.4	1450	29.0	16.0	50.2	6.5	1800	38.1	19.8	69.5	6.8	1900	39.7	20.5	72.1	6.6	2000	41.1	21.1	74.6	6.5	2450	52.4	24.0	104.2	7.7	3000	63.8	25.7	140.2	9.5
Frequency (MHz)	1 g SAR	10 g SAR	Local SAR at surface (above feed-point)	Local SAR at surface (y = 2 cm offset from feed-point) <sup>a</sup>																																																										
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3000	63.8	25.7	140.2	9.5																																																										
Numerical reference SAR values for reference dipole and flat phantom normalized to 1 W (IEEE 1528-2003; IEC 62209-1:2005)																																																														



	Date of Evaluation:	December 10, 2008	Validation Document Serial No.:	SV835B-121008-R1.0		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Brain

Date Tested: 12/10/2008

## System Validation - 835 MHz Dipole - HSL

**DUT: Dipole 835 MHz; Asset: 00022; Serial: 411; Validation: 12/10/2008**

Ambient Temp: 22.2°C; Fluid Temp: 20.5°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL835 Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.89 \text{ mho/m}$ ;  $\epsilon_r = 41.7$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.54, 6.54, 6.54); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### System Validation - 835 MHz Dipole

**Area Scan (6x10x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (measured) = 2.53 mW/g

### System Validation - 835 MHz Dipole

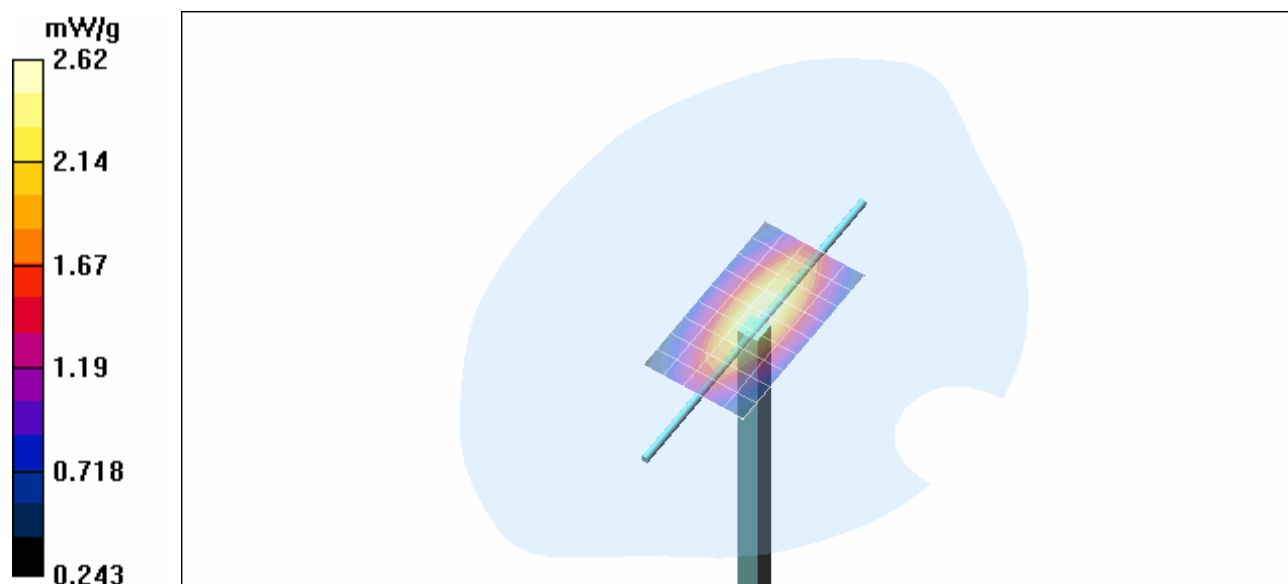
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 56.8 V/m; Power Drift = -0.027 dB

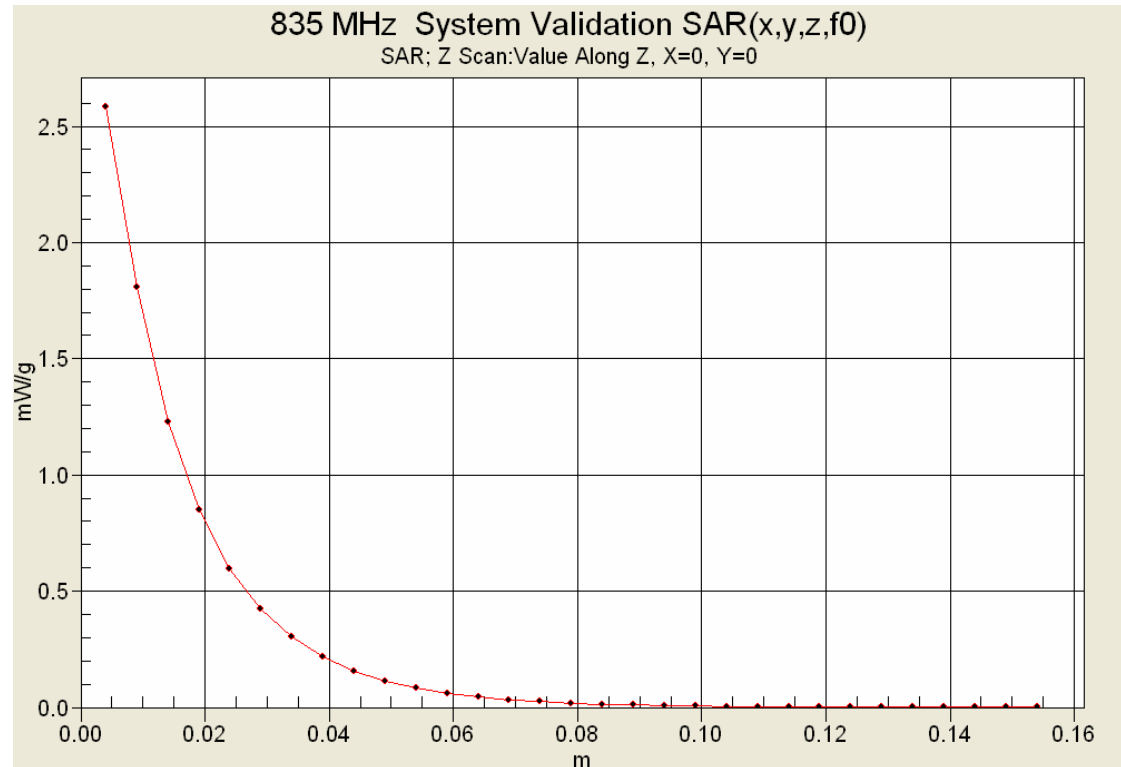
Peak SAR (extrapolated) = 3.30 W/kg

**SAR(1 g) = 2.41 mW/g; SAR(10 g) = 1.6 mW/g**

Maximum value of SAR (measured) = 2.62 mW/g



## Z-Axis Scan



## 10. Measured Fluid Dielectric Parameters

### System Validation - 835 MHz (Brain)

\*\*\*\*\*

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

10/Dec/2008

Frequency (GHz)

IEEE 1528-2003 Limits for Brain Epsilon


IEEE 1528-2003 Limits for Brain Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM


\*\*\*\*\*

Freq	IEEE_eB	IEEE_sB	Test_e	Test_s
0.7350	42.02	0.89	43.00	0.79
0.7450	41.97	0.89	42.48	0.80
0.7550	41.92	0.89	42.72	0.82
0.7650	41.86	0.89	41.87	0.82
0.7750	41.81	0.90	42.22	0.83
0.7850	41.76	0.90	41.45	0.84
0.7950	41.71	0.90	42.08	0.86
0.8050	41.66	0.90	41.82	0.86
0.8150	41.60	0.90	41.70	0.87
0.8250	41.55	0.90	41.55	0.88
0.8350	41.50	0.90	41.67	0.89
0.8450	41.50	0.91	41.15	0.91
0.8550	41.50	0.92	41.45	0.92
0.8650	41.50	0.93	41.32	0.92
0.8750	41.50	0.94	40.81	0.93
0.8850	41.50	0.95	40.78	0.95
0.8950	41.50	0.96	40.81	0.96
0.9050	41.50	0.97	40.82	0.97
0.9150	41.50	0.98	40.42	0.98
0.9250	41.48	0.98	40.54	0.98
0.9350	41.46	0.99	40.09	0.99

	Date of Evaluation:	December 10, 2008	Validation Document Serial No.:		SV835B-121008-R1.0		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Brain	

## 11. Measurement Uncertainties

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION									
Uncertainty Component	IEEE 1528 Section	Uncertainty Value $\pm\%$	Probability Distribution	Divisor	ci 1g	ci 10g	Uncertainty Value $\pm\%$ (1g)	Uncertainty Value $\pm\%$ (10g)	$V_i$ or $V_{eff}$
<b>Measurement System</b>									
Probe Calibration (835 MHz)	E.2.1	5.5	Normal	1	1	1	6	5.5	$\infty$
Axial Isotropy	E.2.2	4.7	Rectangular	1.732050808	1	1	2.7	2.7	$\infty$
Hemispherical Isotropy	E.2.2	0	Rectangular	1.732050808	1	1	0.0	0.0	$\infty$
Boundary Effect	E.2.3	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	$\infty$
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	$\infty$
Response Time	E.2.7	0	Rectangular	1.732050808	1	1	0.0	0.0	$\infty$
Integration Time	E.2.8	0	Rectangular	1.732050808	1	1	0.0	0.0	$\infty$
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	$\infty$
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	$\infty$
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	$\infty$
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
<b>Dipole</b>									
Dipole Positioning	E.4.2	2	Normal	1.732050808	1	1	1.2	1.2	$\infty$
SAR Drift Measurement	6.6.2	4.7	Normal	1.732050808	1	1	2.7	1.2	$\infty$
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	$\infty$
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	$\infty$
Liquid Conductivity (measured)	E.3.3	1	Normal	1	0.64	0.43	0.6	0.4	$\infty$
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	$\infty$
Liquid Permittivity (measured)	E.3.3	0.5	Normal	1	0.6	0.49	0.3	0.2	$\infty$
<b>Combined Standard Uncertainty</b>			<b>RSS</b>				<b>8.54</b>	<b>8.00</b>	
<b>Expanded Uncertainty (95% Confidence Interval)</b>			<b>k=2</b>				<b>17.07</b>	<b>15.99</b>	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005									

	Date of Evaluation:	August 28, 2008	Validation Document Serial No.:	SV835M-082808-R1.1		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## 835 MHz SYSTEM VALIDATION

Dipole Type:

**835 MHz Validation Dipole**

Dipole Manufacturer:

**Celltech Labs Inc.**

Dipole Asset Number:

**00022**

Dipole Serial Number:

**411**

Probe Serial Number:

**1590**

Phantom Type:

**SAM Twin Phantom V4.0C**

Place of Validation:

**Celltech Labs Inc.**

Date of Validation:

**August 28, 2008**


**Celltech Labs Inc. certifies that the 835 MHz System Validation was performed on the date indicated above.**

Performed by:

**Sean Johnston**

Signature:



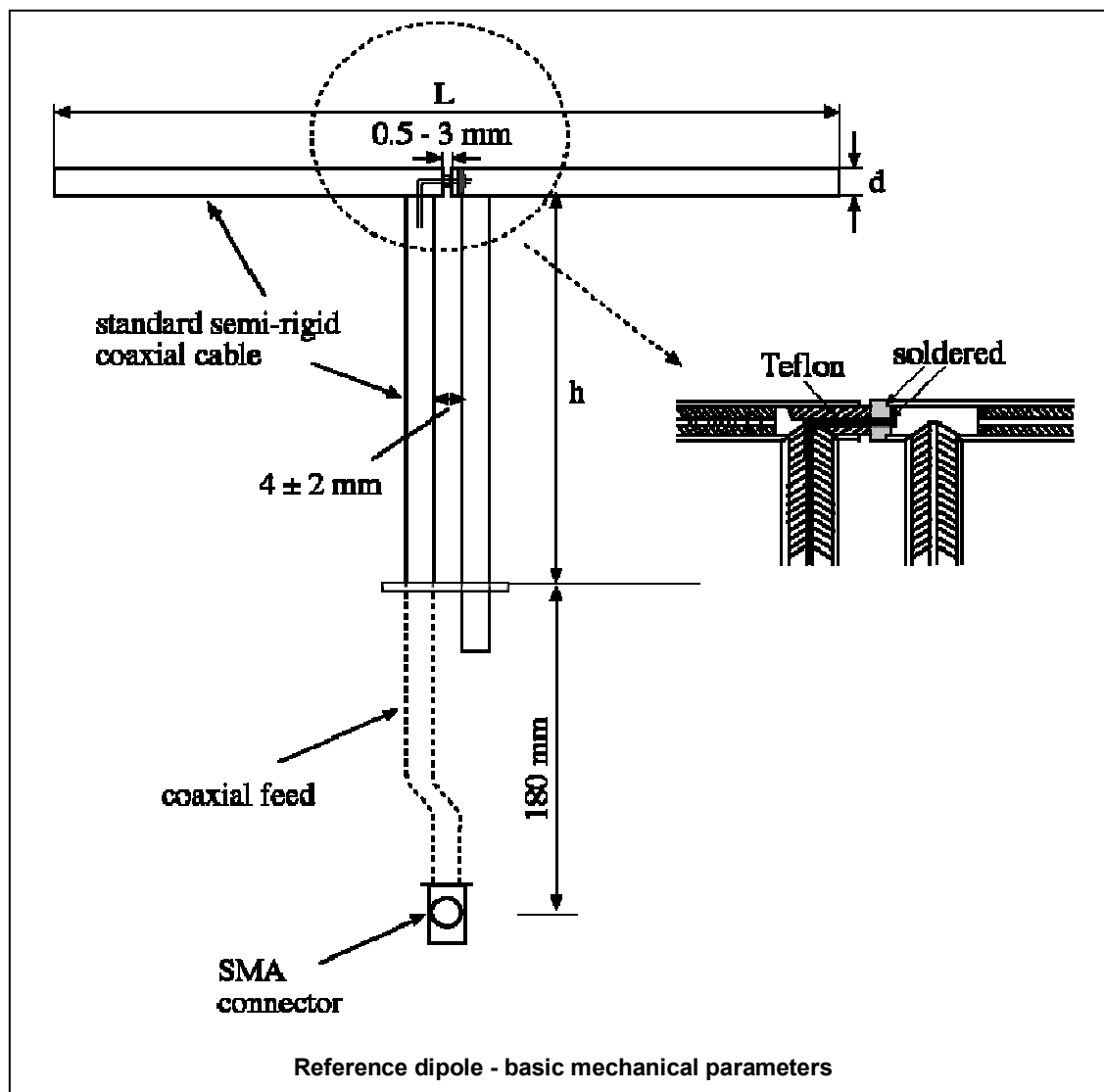
	Date of Evaluation:	August 28, 2008	Validation Document Serial No.:	SV835M-082808-R1.1		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## 1. Dipole Construction & Electrical Characteristics

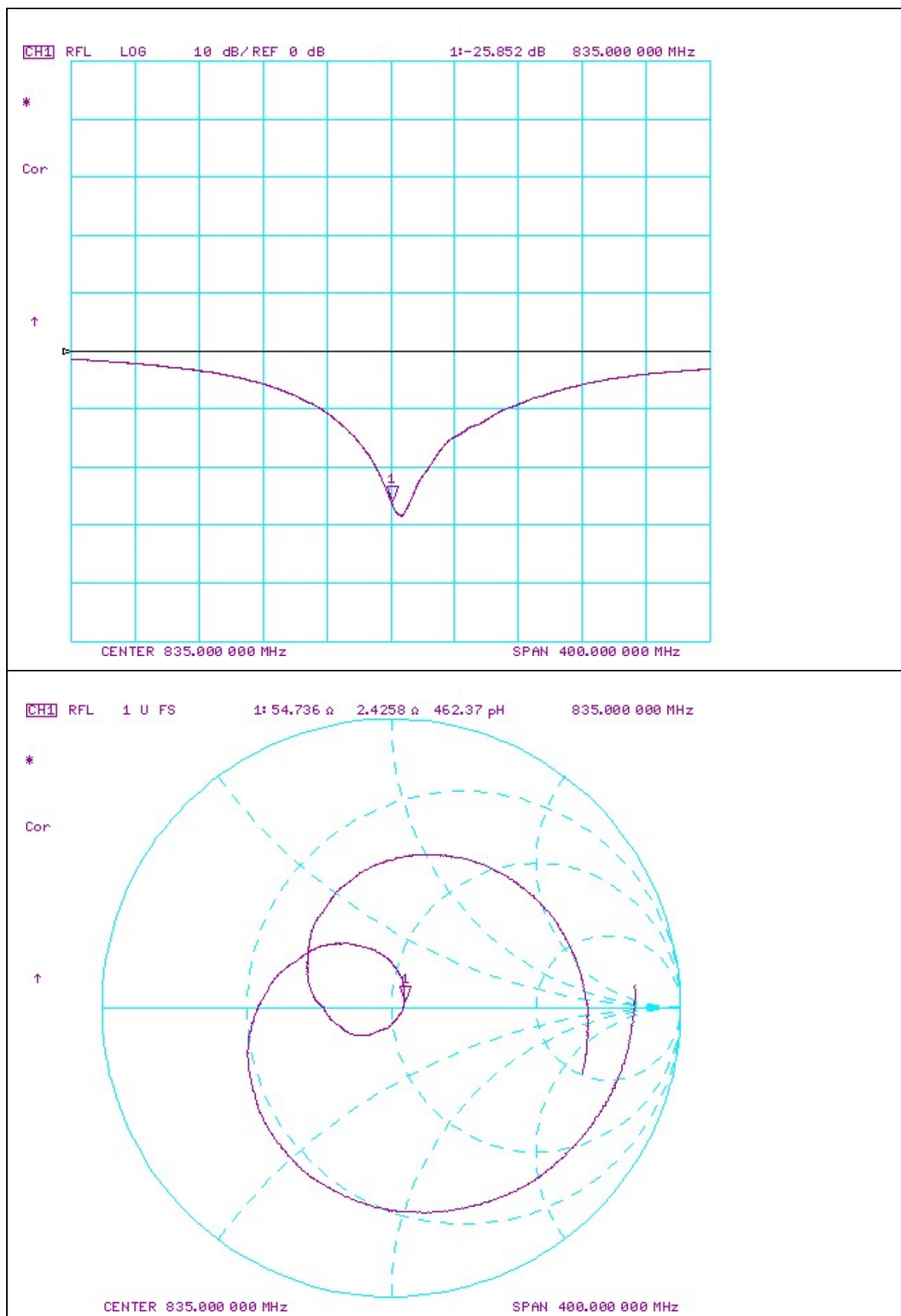
The validation dipole was constructed in accordance with the requirements specified in IEEE Standard 1528-2003 and International Standard IEC 62209-1:2005. The electrical properties were measured using an HP 8753ET Network Analyzer. The network analyzer was calibrated to the validation dipole N-type connector feed point using an HP85032E Type N calibration kit. The dipole was placed parallel to a planar phantom at a separation distance of 15.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:


Feed point impedance at 835 MHz       $\text{Re}\{Z\} = 54.736\Omega$   
 $\text{Im}\{Z\} = 2.4258\Omega$

Return Loss at 835 MHz                      -25.852dB



## 2. Validation Dipole VSWR Data



	Date of Evaluation:	August 28, 2008	Validation Document Serial No.:	SV835M-082808-R1.1		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

### 3. Validation Dipole Dimensions

Frequency (MHz)	L (mm)	h (mm)	d (mm)
300	396.0	250.0	6.0
450	270.0	167.0	6.0
<b>835</b>	<b>161.0</b>	<b>89.8</b>	<b>3.6</b>
900	149.0	83.3	3.6
1450	89.1	51.7	3.6
1800	72.0	41.7	3.6
1900	68.0	39.5	3.6
2000	64.5	37.5	3.6
2450	51.5	30.4	3.6
3000	41.5	25.0	3.6

### 4. Validation Phantom


The validation phantom is the SAM (Specific Anthropomorphic Mannequin) phantom manufactured by Schmid & Partner Engineering AG. The SAM phantom is a Fiberglass shell integrated in a wooden table. The shape of the shell corresponds to the phantom defined by SCC34-SC2. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

**Shell Thickness:** 2.0 ± 0.1 mm  
**Filling Volume:** Approx. 25 liters  
**Dimensions:** 50 cm (W) x 100 cm (L)

### 5. Test Equipment List


TEST EQUIPMENT	ASSET NO.	SERIAL NO.	DATE OF CAL.	CAL. DUE DATE
SPEAG DASY4 Measurement Server	00158	1078	N/A	N/A
SPEAG Robot	00046	599396-01	N/A	N/A
SPEAG DAE4	00019	353	22Apr08	22Apr09
SPEAG ET3DV6 E-Field Probe	00017	1590	21Jul08	21Jul09
Celltech 835 MHz Validation Dipole	00022	411	28Aug08	28Aug09
SPEAG SAM Phantom V4.0C	00154	1033	N/A	N/A
ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A	N/A
Gigatronics 8652A Power Meter	00007	1835272	23Apr08	23Apr09
Gigatronics 80701A Power Sensor	00014	1833699	23Apr08	23Apr09
HP 8753ET Network Analyzer	00134	US39170292	28Apr08	28Apr09
HP 8648D Signal Generator	00005	3847A00611	NCR	NCR
Amplifier Research 5S1G4 Power Amplifier	00106	26235	NCR	NCR



	Date of Evaluation:	August 28, 2008	Validation Document Serial No.:	SV835M-082808-R1.1		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## 6. 835 MHz Validation Dipole & SAM Phantom

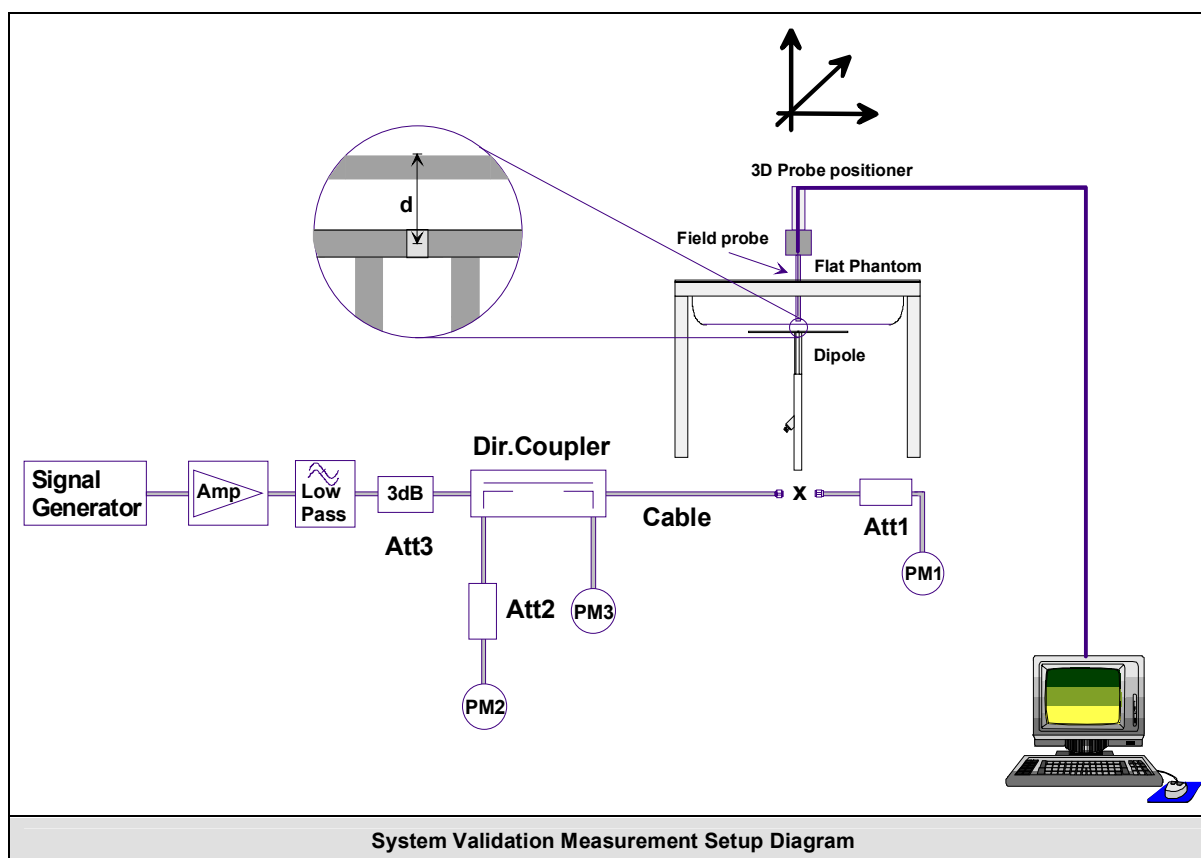


	Date of Evaluation:	August 28, 2008	Validation Document Serial No.:	SV835M-082808-R1.1		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## 7. SAR Measurement

Measurements were made using a dosimetric E-field probe ET3DV6 (S/N: 1590, Conversion Factor 6.39). The SAR measurement was performed with the E-field probe in mechanical and optical surface detection mode. The setup and determination of the forward power into the dipole was performed using the following procedures.

First the power meter PM1 (including attenuator Att1) is connected to the cable to measure the forward power at the location of the dipole connector (X). The signal generator is adjusted for the desired forward power at the dipole connector (taking into account the attenuation of Att1) as read by power meter PM2. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2. If the signal generator does not allow adjustment in 0.01dB steps, the remaining difference at PM2 must be taken into consideration. PM3 records the reflected power from the dipole to ensure that the value is not changed from the previous value. The reflected power should be 20dB below the forward power.



## 8. Measurement Conditions

The planar phantom was filled with 835 MHz Body tissue simulant.

Relative Permittivity: 54.6 (-1.1% deviation from target)  
 Conductivity: 0.95 mho/m (-2.1% deviation from target)  
 Fluid Temperature: 23.5 °C (Start of Test) / 23.4 °C (End of Test)  
 Fluid Depth:  $\geq 15.0$  cm

Environmental Conditions:

Ambient Temperature: 24.1°C  
 Barometric Pressure: 101.1 kPa  
 Humidity: 35%

The 835 MHz Body tissue simulant consisted of the following ingredients:


Ingredient	Percentage by weight
Water	53.79%
Sugar	45.13%
Salt	0.98%
Dowicil 75	0.10%
IEEE/IEC Target Dielectric Parameters (835 MHz):	$\epsilon_r = 55.2 (+/- 5\%)$ $\sigma = 0.97 \text{ S/m } (+/- 5\%)$

## 9. System Validation SAR Results

SAR @ 0.25W Input averaged over 1g (W/kg)				SAR @ 1W Input averaged over 1g (W/kg)			
SPEAG Target	Measured	Deviation		SPEAG Target	Measured	Deviation	
2.43	+/- 10%	2.41	-0.8%	9.71	+/- 10%	9.64	-0.7%
SAR @ 0.25W Input averaged over 10g (W/kg)				SAR @ 1W Input averaged over 10g (W/kg)			
SPEAG Target	Measured	Deviation		SPEAG Target	Measured	Deviation	
1.60	+/- 10%	1.59	-0.6%	6.38	+/- 10%	6.36	-0.3%

Dipole Type	Distance [mm]	Frequency [MHz]	SAR (1g) [W/kg]	SAR (10g) [W/kg]	SAR (peak) [W/kg]
D300V2	15	300	3.02	2.06	4.36
D450V2	15	450	5.01	3.36	7.22
D835V2	15	835	9.71	6.38	14.1
D900V2	15	900	11.1	7.17	16.3
D1450V2	10	1450	29.6	16.6	49.8
D1500V2	10	1500	30.8	17.1	52.1
D1640V2	10	1640	34.4	18.7	59.4
D1800V2	10	1800	38.5	20.3	67.5
D1900V2	10	1900	39.8	20.8	69.6
D2000V2	10	2000	40.9	21.2	71.5
D2450V2	10	2450	51.2	23.7	97.6
D3000V2	10	3000	61.9	24.8	136.7

Table 32.1: Numerical reference SAR values for SPEAG dipoles and flat phantom filled with body-tissue simulating liquid. Note: All SAR values normalized to 1 W forward power.

	Date of Evaluation:	August 28, 2008	Validation Document Serial No.:	SV835M-082808-R1.1		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

Date Tested: 08/28/2008

## System Validation - 835 MHz Dipole - MSL

**DUT: Dipole 835 MHz; Asset: 00022; Serial: 411; Validation: 08/28/2008**

Ambient Temp: 24.1°C; Fluid Temp: 23.5°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: M835 Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.95 \text{ mho/m}$ ;  $\epsilon_r = 54.6$ ;  $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.39, 6.39, 6.39); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

### System Validation - 835 MHz Dipole

**Area Scan (6x10x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (measured) = 2.47 mW/g

### System Validation - 835 MHz Dipole

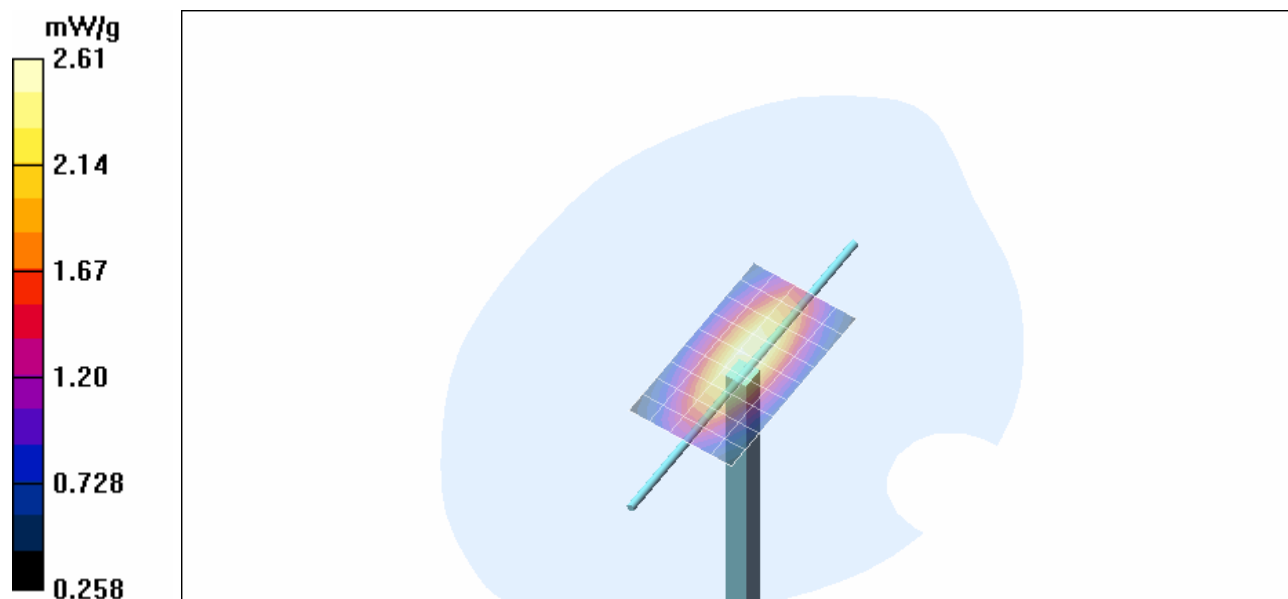
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 54.1 V/m; Power Drift = 0.022 dB

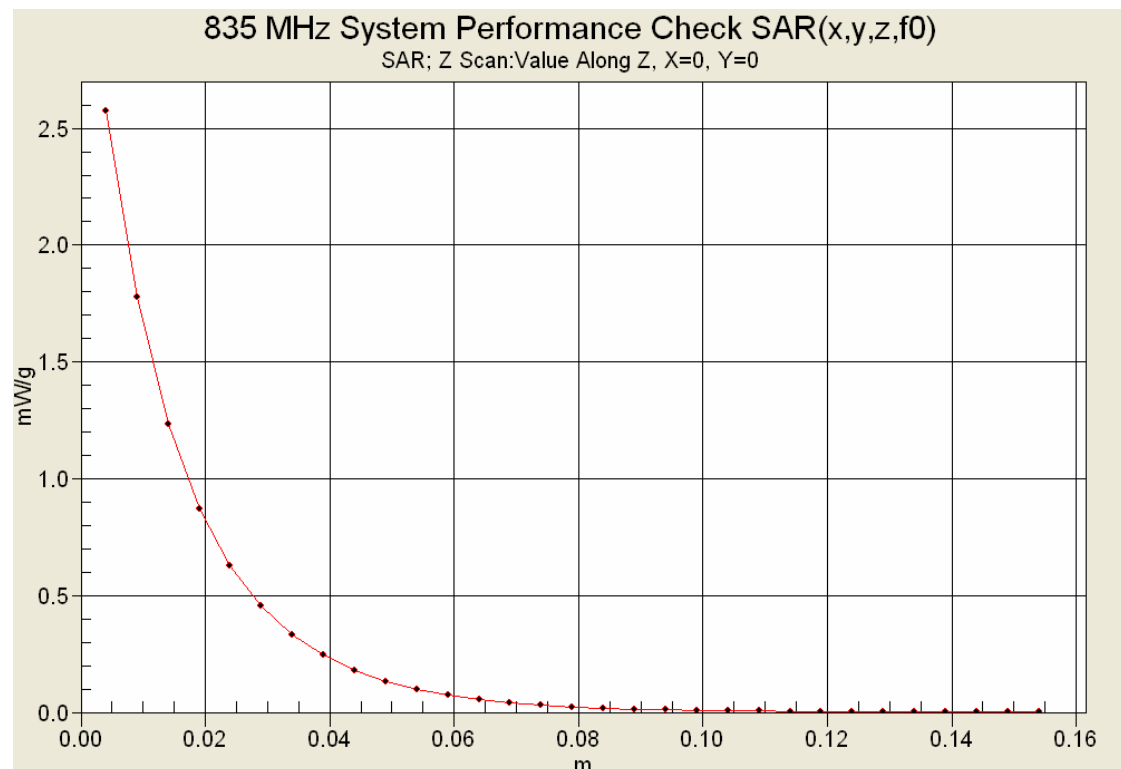
Peak SAR (extrapolated) = 3.47 W/kg

**SAR(1 g) = 2.41 mW/g; SAR(10 g) = 1.59 mW/g**

Maximum value of SAR (measured) = 2.61 mW/g



## Z-Axis Scan



## 10. Measured Fluid Dielectric Parameters

### System Validation - 835 MHz (Body)

\*\*\*\*\*

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

28/Aug/2008

Frequency (GHz)

IEEE 1528-2003 Limits for Body Epsilon


IEEE 1528-2003 Limits for Body Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM



\*\*\*\*\*

Freq	IEEE_eB	IEEE_sB	Test_e	Test_s
0.7350	55.59	0.96	55.62	0.86
0.7450	55.55	0.96	55.71	0.87
0.7550	55.51	0.96	55.20	0.87
0.7650	55.47	0.96	54.94	0.89
0.7750	55.43	0.97	55.38	0.89
0.7850	55.39	0.97	55.04	0.91
0.7950	55.36	0.97	54.94	0.91
0.8050	55.32	0.97	54.98	0.92
0.8150	55.28	0.97	55.24	0.93
0.8250	55.24	0.97	54.76	0.93
0.8350	55.20	0.97	54.60	0.95
0.8450	55.17	0.98	54.51	0.97
0.8550	55.14	0.99	54.42	0.97
0.8650	55.11	1.01	54.44	0.99
0.8750	55.08	1.02	54.45	0.98
0.8850	55.05	1.03	54.15	1.01
0.8950	55.02	1.04	54.15	1.01
0.9050	55.00	1.05	54.16	1.02
0.9150	55.00	1.06	54.00	1.03
0.9250	54.98	1.06	53.84	1.04
0.9350	54.96	1.07	53.73	1.06


	Date of Evaluation:	August 28, 2008	Validation Document Serial No.:	SV835M-082808-R1.1		
	Evaluation Type:	System Validation	Validation Dipole:	835 MHz	Fluid Type:	Body

## 11. Measurement Uncertainties

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION									
Uncertainty Component	IEEE 1528 Section	Uncertainty Value $\pm\%$	Probability Distribution	Divisor	ci 1g	ci 10g	Uncertainty Value $\pm\%$ (1g)	Uncertainty Value $\pm\%$ (10g)	$V_i$ or $V_{eff}$
<b>Measurement System</b>									
Probe Calibration (835 MHz)	E.2.1	5.5	Normal	1	1	1	6	5.5	$\infty$
Axial Isotropy	E.2.2	4.7	Rectangular	1.732050808	1	1	2.7	2.7	$\infty$
Hemispherical Isotropy	E.2.2	0	Rectangular	1.732050808	1	1	0.0	0.0	$\infty$
Boundary Effect	E.2.3	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	$\infty$
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	$\infty$
Response Time	E.2.7	0	Rectangular	1.732050808	1	1	0.0	0.0	$\infty$
Integration Time	E.2.8	0	Rectangular	1.732050808	1	1	0.0	0.0	$\infty$
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	$\infty$
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	$\infty$
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	$\infty$
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	$\infty$
<b>Dipole</b>									
Dipole Positioning	E.4.2	2	Normal	1.732050808	1	1	1.2	1.2	$\infty$
SAR Drift Measurement	6.6.2	4.7	Normal	1.732050808	1	1	2.7	1.2	$\infty$
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	$\infty$
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	$\infty$
Liquid Conductivity (measured)	E.3.3	2.1	Normal	1	0.64	0.43	1.3	0.9	$\infty$
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	$\infty$
Liquid Permittivity (measured)	E.3.3	1.1	Normal	1	0.6	0.49	0.7	0.5	$\infty$
<b>Combined Standard Uncertainty</b>			<b>RSS</b>				<b>8.64</b>	<b>8.05</b>	
<b>Expanded Uncertainty (95% Confidence Interval)</b>			<b>k=2</b>				<b>17.28</b>	<b>16.10</b>	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005									

	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

## APPENDIX F - PROBE CALIBRATION

<b>Applicant:</b>	<b>BK Radio Inc. c/o RELM Communications</b>	<b>FCC ID:</b>	<b>K95KNGP800</b>	<b>IC:</b>	<b>2116A-KNGP400</b>	
<b>Model(s):</b>	<b>KNG-P800</b>	<b>Portable Analog/Digital PTT Radio Transceiver</b>	<b>Freq. Range:</b>	<b>764 - 870 MHz</b>		
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Accredited by the Swiss Accreditation Service (SAS)  
 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Celltech**

Certificate No: **ET3-1590\_Jul08**

## CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1590**

Calibration procedure(s) **QA CAL-01.v6, QA CAL-12.v5 and QA CAL-23.v3  
 Calibration procedure for dosimetric E-field probes**

Calibration date: **July 21, 2008**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)^\circ\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	1-Jul-08 (No. 217-00865)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00866)	Jul-09
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 660	3-Sep-07 (No. DAE4-660_Sep07)	Sep-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	<b>Katja Pokovic</b>	<b>Technical Manager</b>	
Approved by:	<b>Niels Kuster</b>	<b>Quality Manager</b>	

Issued: July 21, 2008

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



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Accreditation No.: **SCS 108**

### Glossary:

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
Polarization $\phi$	$\phi$ rotation around probe axis
Polarization $\vartheta$	$\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

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

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not effect the  $E^2$ -field uncertainty inside TSL (see below *ConvF*).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* ConvF whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

# Probe ET3DV6

## SN:1590

Manufactured:	March 19, 2001
Last calibrated:	May 20, 2005
Recalibrated:	July 21, 2008

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

**DASY - Parameters of Probe: ET3DV6 SN:1590****Sensitivity in Free Space<sup>A</sup>****Diode Compression<sup>B</sup>**

NormX	1.81 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	87 mV
NormY	2.00 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	92 mV
NormZ	1.72 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	85 mV

**Sensitivity in Tissue Simulating Liquid (Conversion Factors)**

Please see Page 8.

**Boundary Effect****TSL                      835 MHz      Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		<b>3.7 mm</b>	<b>4.7 mm</b>
SAR <sub>be</sub> [%]	Without Correction Algorithm	10.7	7.2
SAR <sub>be</sub> [%]	With Correction Algorithm	0.8	0.5

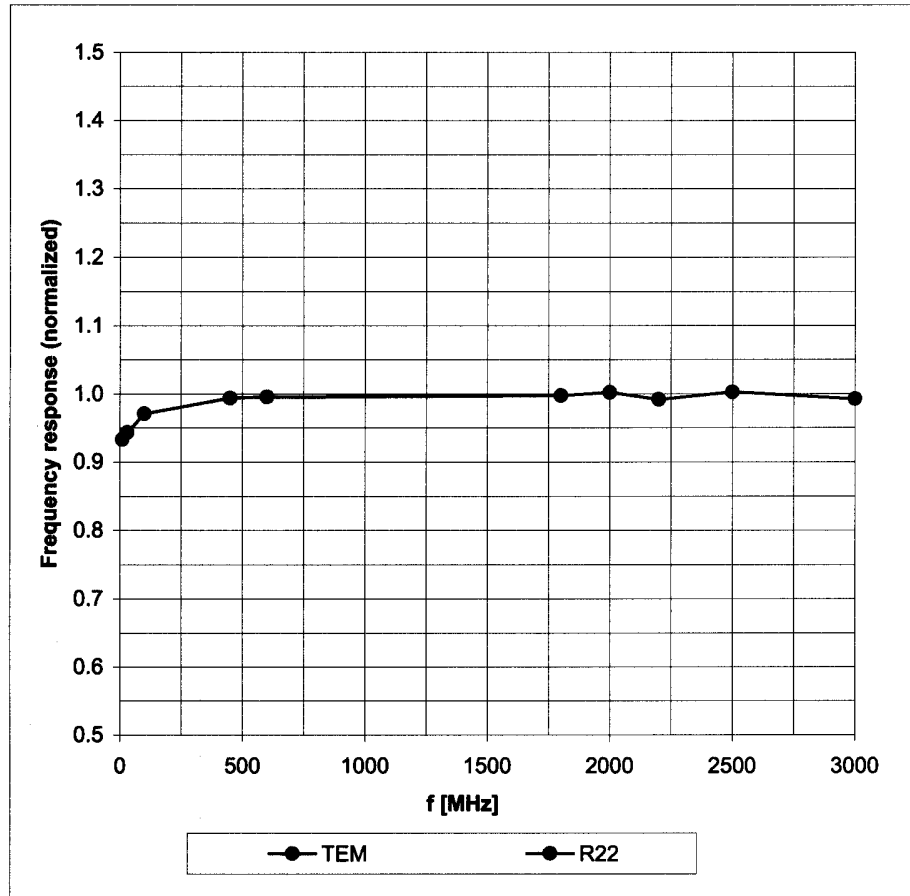
**Sensor Offset**Probe Tip to Sensor Center                      **2.7 mm**

**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%.**

<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Page 8).<sup>B</sup> Numerical linearization parameter: uncertainty not required.

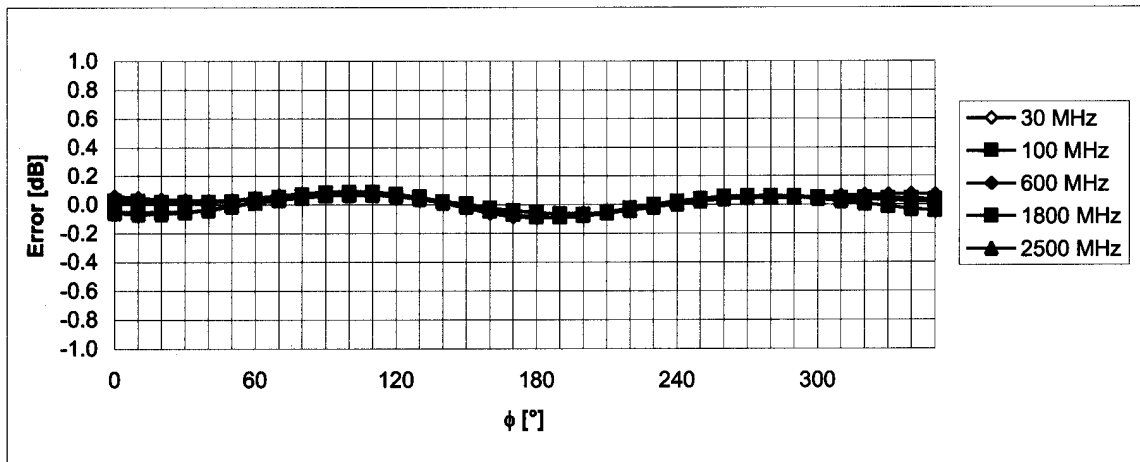
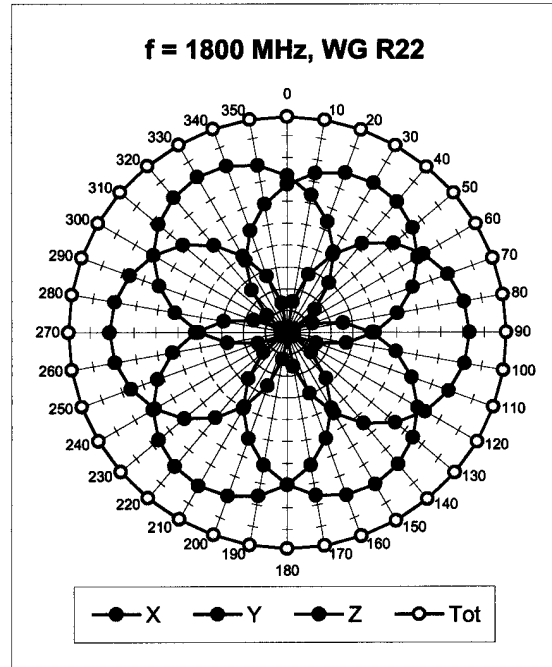
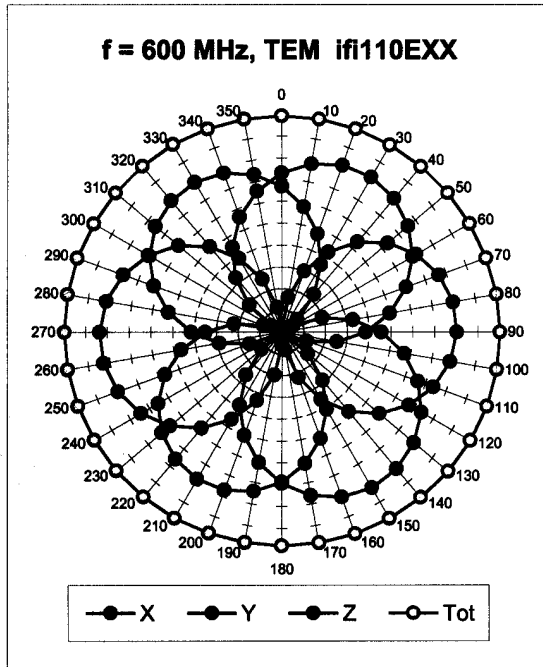
## Frequency Response of E-Field

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



Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

## Receiving Pattern ( $\phi$ ), $\theta = 0^\circ$

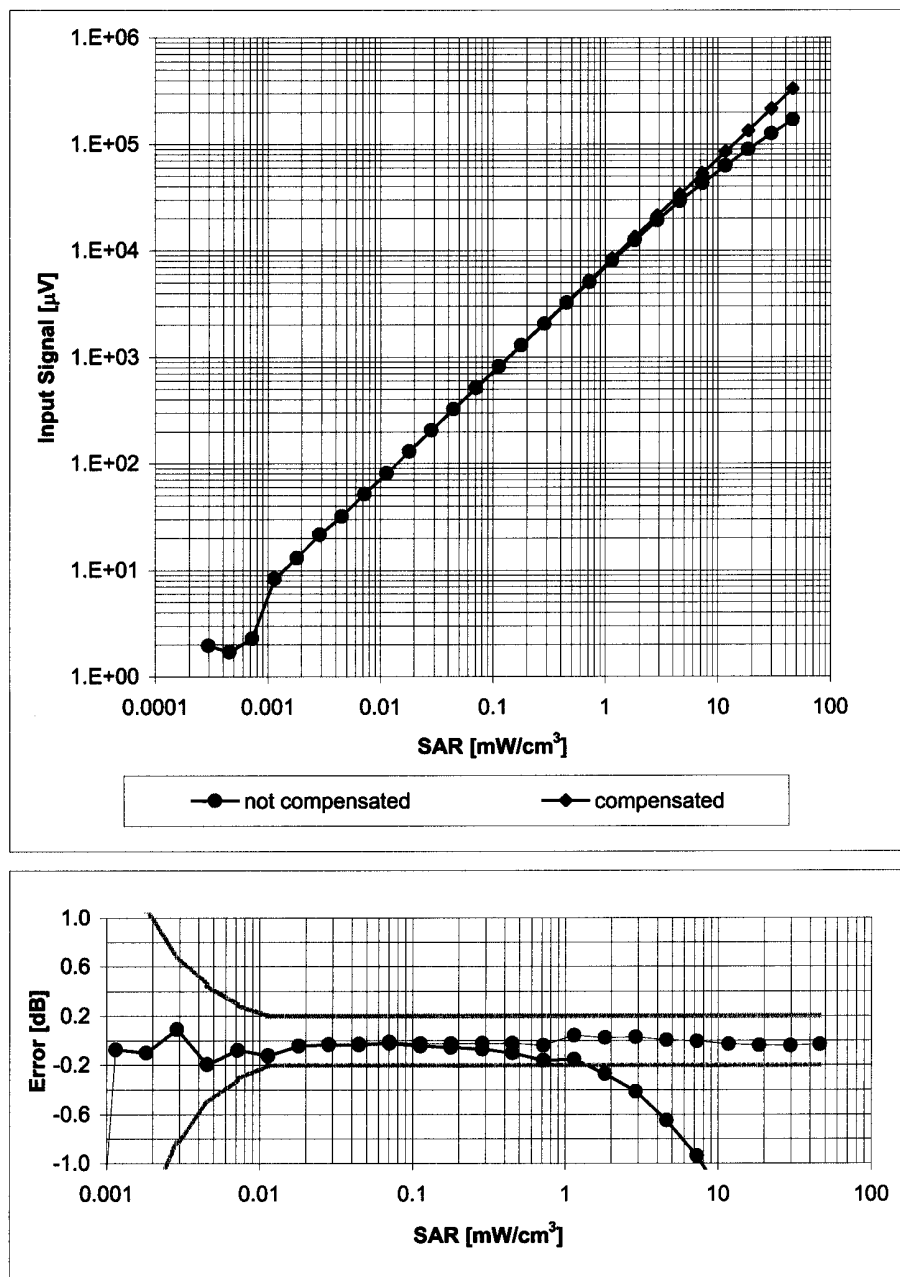


Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )



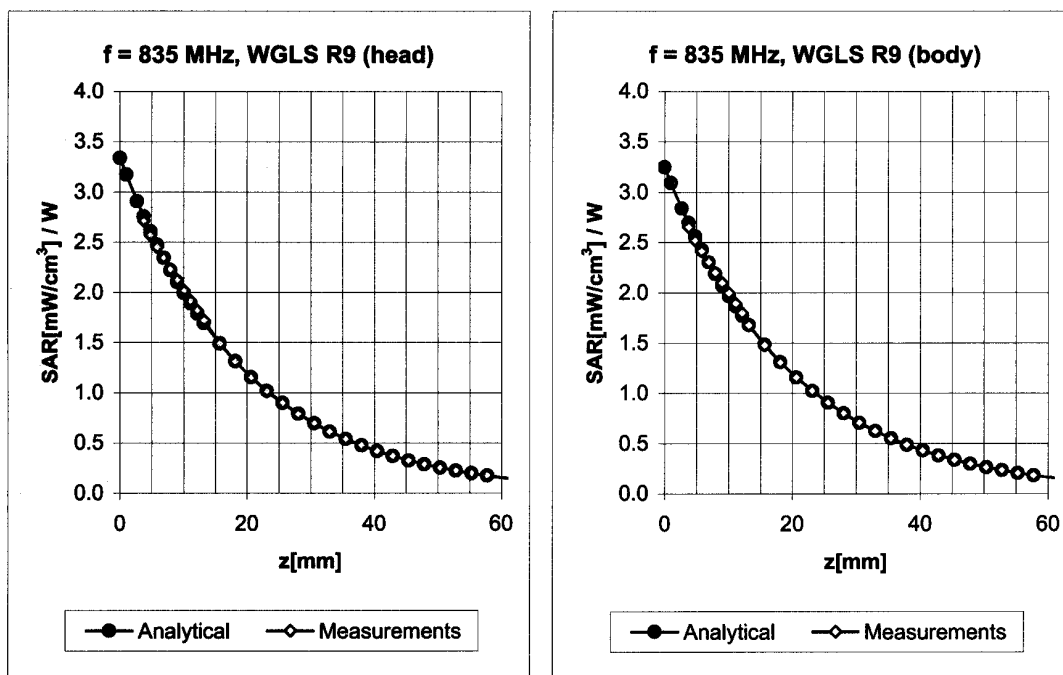
# Dynamic Range f(SAR<sub>head</sub>)

(Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

## Conversion Factor Assessment

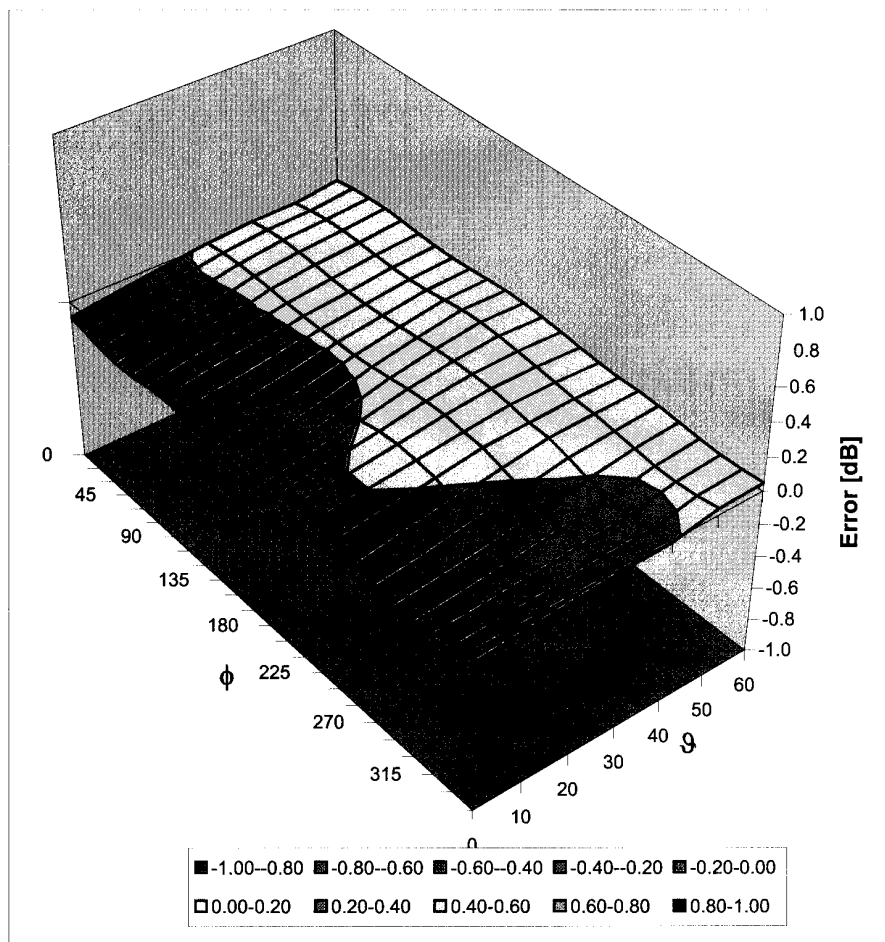


f [MHz]	Validity [MHz] <sup>c</sup>	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
450	± 50 / ± 100	Head	43.5 ± 5%	0.87 ± 5%	0.34	1.75	7.66	± 13.3% (k=2)
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.32	3.52	6.54	± 11.0% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.28	1.77	8.27	± 13.3% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.36	3.31	6.39	± 11.0% (k=2)



<sup>c</sup> The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

## Deviation from Isotropy in HSL


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



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )

	<u>Date(s) of Evaluation</u> December 11-12, 2008	<u>Test Report Serial No.</u> 120808K95-T944-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> December 19, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

## APPENDIX G - SAM PHANTOM CERTIFICATE OF CONFORMITY

<b>Applicant:</b>	<b>BK Radio Inc. c/o RELM Communications</b>	<b>FCC ID:</b>	<b>K95KNGP800</b>	<b>IC:</b>	<b>2116A-KNGP400</b>	
<b>Model(s):</b>	<b>KNG-P800</b>	<b>Portable Analog/Digital PTT Radio Transceiver</b>		<b>Freq. Range:</b>	<b>764 - 870 MHz</b>	
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# Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

## Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 BA
Series No	TP-1002 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

### Tests

The series production process used allows the limitation to test of first articles.  
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

### Standards

- [1] CENELEC EN 50361
- [2] IEEE P1528-200x draft 6.5
- [3] IEC PT 62209 draft 0.9

(\*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

### Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date

18.11.2001

Signature / Stamp



**Schmid & Partner  
Engineering AG**



Zeughausstrasse 43, CH-8004 Zurich  
Tel. +41 1 245 97 00, Fax +41 1 245 97 79