

	<u>Date(s) of Evaluation</u> August 04-05, 08, 2011	<u>Test Report Serial No.</u> 071111K95-T1109-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 
	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

DECLARATION OF COMPLIANCE - SAR RF EXPOSURE EVALUATION - FCC/IC

Test Lab Information	Name	CELLTECH LABS INC.				
	Address	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada				
Test Lab Accreditation(s)	A2LA	ISO/IEC 17025:2005 (A2LA Test Lab Certificate No. 2470.01)				
Applicant Information	Name	RELM WIRELESS CORPORATION - BK RADIO				
	Address	7100 Technology Drive, W. 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 (01/01)				
		KDB 447498 D01v04 (Mobile & Portable Device - RF Exposure Procedures)				
		KDB 643646 D01v01r01 (SAR Test Reduction Considerations for Occ. PTT Radios)				
	IC	RSS-102 Issue 4	IEEE	1528-2003	IEC	62209-2:2010
Device Classification(s)	FCC	Licensed Non-Broadcast Transmitter Held to Face (TNF) - FCC Part 90				
	IC	Land Mobile Radio Transmitter/Receiver (27.41-960 MHz) - RSS-119				
Device Identifier(s)	FCC ID:	K95KNGP800C		Application Type	FCC TCB Certification	
	IC	2116A-KNGP800C		Application Type	IC CB Certification	
Date of Sample Receipt	July 11, 2011					
Dates of Evaluation	August 04-05, 08, 2011					
Device Description	Portable 700/800-Band P25 Push-To-Talk (PTT) Radio Transceiver					
Device Model(s)	KNG-P800					
Test Sample Serial No.	11130001 (Pre-production)					
Test Sample Revision No.s	Hardware	RF Assembly: Ver. 8; System Logic: Ver. 6			Firmware	4.1.2
Transmit Frequency Range(s)	FCC/IC	764 - 777 MHz	794 - 805 MHz		806 - 824 MHz	851 - 870 MHz
Manufacturer's Rated Output Power	2.5 W (Conducted) - 700 Band			Upper Tolerance Spec.		+ 0.5 W (700 Band)
	3.0 W (Conducted) - 800 Band					+ 0.5 W (800 Band)
Antenna Type(s) Tested	1/2-wave Whip		Detachable		Length: 195 mm	P/N: KAA0825
Battery Type(s) Tested	Li-ion		10.8 V		1950 mAh	P/N: KAA0100
	Li-ion		10.8 V		3450 mAh	P/N: KAA0101
Body-worn Accessories Tested	Belt-Clip			Contains metal components		P/N: KAA0400
	Carry Case			Contains metal components		P/N: KAA0451B
Audio Accessories Tested	Speaker-Microphone					P/N: KAA0200
Max. SAR Level(s) Evaluated	Face-held	1.28 W/kg	1g	50% PTT duty cycle		Occupational / Controlled Exp.
	Body-worn	3.21 W/kg	1g	50% PTT duty cycle		Occupational / Controlled Exp.
FCC/IC Spatial Peak SAR Limit	Head/Body	8.0 W/kg	1g	50% PTT duty cycle		Occupational / Controlled Exp.


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 Safety Code 6 for the Occupational / Controlled Exposure environment. The device was tested in accordance with the measurement procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 4, IEEE Standard 1528-2003 and IEC International Standard 62209-2:2010. 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.

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

Test Report Approved By		Sean Johnston	Lab Manager	Celltech Labs Inc.
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Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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 Testing and Engineering Services Ltd	Date(s) of Evaluation August 04-05, 08, 2011	Test Report Serial No. 071111K95-T1109-S90P	Test Report Revision No. Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	Test Report Issue Date August 11, 2011	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

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Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800		764-805 / 806-869 MHz	
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Test Lab Certificate No. 2470.01



REVISION HISTORY

REVISION NO.	DESCRIPTION	IMPLEMENTED BY	RELEASE DATE
1.0	Initial Release	Sean Johnston	August 11, 2011

TEST REPORT SIGN-OFF

DEVICE TESTED BY	REPORT PREPARED BY	QA REVIEW BY	REPORT APPROVED BY
Mike Meaker	Cheri Frangiadakis	Jon Hughes	Sean Johnston

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800	764-805 / 806-869 MHz		
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Test Lab Certificate No. 2470.01				

1.0 INTRODUCTION


This measurement report demonstrates that the Relm Wireless Corporation Model: KNG-P800 Portable 700/800-Band P25 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 01-01 (see reference [3]), IC RSS-102 Issue 4 (see reference [4]), IEEE Standard 1528-2003 (see reference [5]) and IEC International Standard 62209-2:2010 (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 various planar phantoms for head and/or body SAR evaluations. 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 a controller with a built in VME-bus computer.

3.0 RF CONDUCTED OUTPUT POWER MEASUREMENTS

MEASURED RF CONDUCTED OUTPUT POWER LEVELS					
Test Freq. (MHz)	Freq. Band	Mode	dBm	Watts	Method
764.0	764-777 MHz	CW	34.8	3.0	Average Conducted
777.0	764-777 MHz	CW	34.9	3.1	Average Conducted
793.0	794-805 MHz	CW	35.1	3.2	Average Conducted
805.0	794-805 MHz	CW	35.2	3.3	Average Conducted
806.0	806-824 MHz	CW	35.8	3.8	Average Conducted
824.0	806-824 MHz	CW	35.8	3.8	Average Conducted
851.0	851-869 MHz	CW	35.8	3.8	Average Conducted
869.0	851-869 MHz	CW	35.8	3.8	Average Conducted
Notes					
1. The test channels were selected in accordance with the procedures specified in FCC KDB 447498 Section 6) c) (see reference [7]).					
2. The RF conducted output power levels of the DUT were measured by Celltech prior to the SAR evaluations using a Gigatronics 8652A Universal Power Meter at the external antenna connector of the radio in accordance with FCC 47 CFR §2.1046 (see reference [13]) and IC RSS-Gen (see reference [14]).					

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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Test Lab Certificate No. 2470.01				

4.0 FCC POWER THRESHOLDS FOR PTT DEVICES ($f \leq 0.5$ GHz)

FCC SAR Evaluation Power Thresholds for PTT Devices, $f \leq 0.5$ GHz*		
Exposure Conditions	P mW (General Population)	P mW (Occupational)
Held to face, $d \geq 2.5$ cm	250	1250
Body-worn, $d \geq 1.5$ cm	200	1000
Body-worn, $d \geq 1.0$ 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. * Per FCC KDB 447498 D01v04 Section 5)b)i) (see reference [7]).		

Note: The thresholds specified in the above table do not apply to the Relm KNG-P800 700 and 800 MHz band radio ($f \geq 0.5$ GHz). The output power threshold of $\geq 60/f_{(\text{GHz})}$ mW specified in FCC KDB 447498 (see reference [7]) was applied.


5.0 SAR PROBE CALIBRATION & MEASUREMENT FREQUENCIES




The following procedures are recommended for measurements at 150 MHz - 3 GHz to minimize probe calibration and tissue dielectric parameter discrepancies. In general, SAR measurements below 300 MHz should be within ± 50 MHz of the probe calibration frequency. At 300 MHz to 3 GHz, measurements should be within ± 100 MHz of the probe calibration frequency. Measurements exceeding 50% of these intervals, ± 25 MHz < 300 MHz and ± 50 MHz ≥ 300 MHz, require additional steps (per FCC KDB 450824 D01 v01r01, SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz - see reference [9]).

Probe Calibration Freq.	Device Measurement Freq.	Frequency Interval	± 50 MHz ≥ 300 MHz
835 MHz	777.0 MHz	58 MHz	> 50 MHz ²
	805.0 MHz	30 MHz	< 50 MHz ¹
	806.0 MHz	29 MHz	< 50 MHz ¹
	851.0 MHz	16 MHz	< 50 MHz ¹
1. The probe calibration and measurement frequency interval is < 50 MHz; therefore the additional steps are not required. 2. The probe calibration and measurement frequency interval is > 50 MHz; therefore the additional steps are required (please refer to Section 11.0 - SAR Sensitivity Adjustment).			

6.0 NO. OF TEST CHANNELS (N_c)

Antenna Part No.	Freq. Range	Test Freq. Range	Band	N_c	Test Frequencies (MHz)
KAA0825	764-870 MHz	764-777 MHz	FCC/IC	2	764, 777
		794-805 MHz	FCC/IC	2	794, 805
		806-824 MHz	FCC/IC	2	806, 824
		851-869 MHz	FCC/IC	2	851, 869
Note: The number of test channels (N_c) were calculated in accordance with the procedures specified in FCC KDB 447498 Section 6) c) (see reference [7]).					


Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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7.0 MANUFACTURER'S DISCLOSED ACCESSORY LISTING

Accessory ID # for Test Report	ACCESSORY CATEGORY:	ANTENNA
	Part Number	Description
1	KAA0825	1/2-wave Whip
Accessory ID # for Test Report	ACCESSORY CATEGORY:	BATTERY
	Part Number	Description
a	KAA0100	Lithium Ion 10.8V, 1950mAh
b	KAA0101	Lithium Ion 10.8V, 3450mAh
Accessory ID # for Test Report	ACCESSORY CATEGORY:	BODY-WORN
	Part Number	Description
1	KAA0451B	Carry Case (contains metal)
2	KAA0400	Belt-clip (contains metal)
Accessory ID # for Test Report	ACCESSORY CATEGORY:	AUDIO
	Part Number	Description
1	KAA0200	Speaker-microphone

Manufacturer's disclosed accessory listing information provided by Relm Wireless Corporation

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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8.0 FLUID DIELECTRIC PARAMETERS

FLUID DIELECTRIC PARAMETERS						
Date: 08/04/2011		Frequency: 835 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	55.18	0.85	55.2	0.97	-0.04%	-12.37%
0.745	54.81	0.86	55.2	0.97	-0.71%	-11.34%
0.755	55.03	0.87	55.2	0.97	-0.31%	-10.31%
0.765	54.53	0.88	55.2	0.97	-1.21%	-9.28%
0.775	54.63	0.9	55.2	0.97	-1.03%	-7.22%
0.785	54.51	0.91	55.2	0.97	-1.25%	-6.19%
0.795	54.61	0.91	55.2	0.97	-1.07%	-6.19%
0.805	54.45	0.95	55.2	0.97	-1.36%	-2.06%
0.806*	54.5	0.95	55.2	0.97	-1.27%	-2.06%
0.815	54.56	0.95	55.2	0.97	-1.16%	-2.06%
0.825	54.37	0.95	55.2	0.97	-1.50%	-2.06%
0.835	54.34	0.97	55.2	0.97	-1.56%	0.00%
0.845	53.98	0.96	55.2	0.97	-2.21%	-1.03%
0.851*	54	0.966	55.2	0.97	-2.17%	-0.41%
0.855	53.98	0.97	55.2	0.97	-2.21%	0.00%
0.865	53.65	0.97	55.2	0.97	-2.81%	0.00%
0.875	53.87	0.98	55.2	0.97	-2.41%	1.03%
0.885	53.9	0.99	55.2	0.97	-2.36%	2.06%
0.895	53.49	1.01	55.2	0.97	-3.10%	4.12%
0.905	53.63	1.04	55.2	0.97	-2.84%	7.22%
0.915	53.35	1.05	55.2	0.97	-3.35%	8.25%
0.925	53.37	1.06	55.2	0.97	-3.32%	9.28%
0.935	53.43	1.07	55.2	0.97	-3.21%	10.31%



*interpolated using DAS4 software

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m ³)
Aug 4	835 Body	23.0 °C	23.5 °C	≥ 15 cm	101.1 kPa	34%	1000

FLUID DIELECTRIC PARAMETERS						
Date: 08/05/2011		Frequency: 835 MHz			Tissue: Body	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	55.75	0.86	55.2	0.97	1.00%	-11.34%
0.745	55.6	0.88	55.2	0.97	0.72%	-9.28%
0.755	55.67	0.87	55.2	0.97	0.85%	-10.31%
0.765	55.24	0.9	55.2	0.97	0.07%	-7.22%
0.775	55.5	0.91	55.2	0.97	0.54%	-6.19%
0.777*	55.5	0.912	55.2	0.97	0.54%	-5.98%
0.785	55.37	0.92	55.2	0.97	0.31%	-5.15%
0.795	55.43	0.93	55.2	0.97	0.42%	-4.12%
0.805	55.3	0.95	55.2	0.97	0.18%	-2.06%
0.815	55.16	0.95	55.2	0.97	-0.07%	-2.06%
0.825	55.16	0.97	55.2	0.97	-0.07%	0.00%
0.835	54.78	0.95	55.2	0.97	-0.76%	-2.06%
0.845	54.87	0.98	55.2	0.97	-0.60%	1.03%
0.851*	54.8	0.98	55.2	0.97	-0.72%	1.03%
0.855	54.67	0.98	55.2	0.97	-0.96%	1.03%
0.865	54.59	0.99	55.2	0.97	-1.11%	2.06%
0.875	54.44	0.99	55.2	0.97	-1.38%	2.06%
0.885	54.42	1	55.2	0.97	-1.41%	3.09%
0.895	54.38	1.02	55.2	0.97	-1.49%	5.15%
0.905	54.35	1.04	55.2	0.97	-1.54%	7.22%
0.915	53.86	1.06	55.2	0.97	-2.43%	9.28%
0.925	54.15	1.06	55.2	0.97	-1.90%	9.28%
0.935	54.08	1.07	55.2	0.97	-2.03%	10.31%

*interpolated using DASY4 software

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m ³)
Aug 5	835 Body	23.0 °C	23.3 °C	≥ 15 cm	101.1 kPa	36%	1000


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Test Lab Certificate No. 2470.01

FLUID DIELECTRIC PARAMETERS						
Date: 8/5/2011		Frequency: 835 MHz			Tissue: Head	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	44.08	0.79	41.5	0.9	6.22%	-12.22%
0.745	43.96	0.8	41.5	0.9	5.93%	-11.11%
0.755	44.11	0.81	41.5	0.9	6.29%	-10.00%
0.765	43.79	0.83	41.5	0.9	5.52%	-7.78%
0.775	43.67	0.83	41.5	0.9	5.23%	-7.78%
0.785	43.84	0.85	41.5	0.9	5.64%	-5.56%
0.795	43.47	0.88	41.5	0.9	4.75%	-2.22%
0.805	43.49	0.87	41.5	0.9	4.80%	-3.33%
0.806*	43.5	0.871	41.5	0.9	4.82%	-3.22%
0.815	43.36	0.88	41.5	0.9	4.48%	-2.22%
0.825	43.33	0.89	41.5	0.9	4.41%	-1.11%
0.835	42.99	0.89	41.5	0.9	3.59%	-1.11%
0.845	43.15	0.92	41.5	0.9	3.98%	2.22%
0.855	42.79	0.91	41.5	0.9	3.11%	1.11%
0.865	42.29	0.92	41.5	0.9	1.90%	2.22%
0.875	42.51	0.93	41.5	0.9	2.43%	3.33%
0.885	42.09	0.95	41.5	0.9	1.42%	5.56%
0.895	42.35	0.95	41.5	0.9	2.05%	5.56%
0.905	42.08	0.96	41.5	0.9	1.40%	6.67%
0.915	41.87	0.99	41.5	0.9	0.89%	10.00%
0.925	42.21	1	41.5	0.9	1.71%	11.11%
0.935	41.87	1	41.5	0.9	0.89%	11.11%

*interpolated using DASY4 software



Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m ³)
Aug 5	835 Head	23.0 °C	23.8 °C	≥ 15 cm	101.1 kPa	36%	1000

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800		764-805 / 806-869 MHz	
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FLUID DIELECTRIC PARAMETERS						
Date: 8/8/2011		Frequency: 835 MHz			Tissue: Head	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
0.735	42.86	0.79	41.5	0.9	3.28%	-12.22%
0.745	42.4	0.8	41.5	0.9	2.17%	-11.11%
0.755	42.33	0.81	41.5	0.9	2.00%	-10.00%
0.765	42.42	0.81	41.5	0.9	2.22%	-10.00%
0.775	42.47	0.83	41.5	0.9	2.34%	-7.78%
0.777*	42.5	0.834	41.5	0.9	2.41%	-7.33%
0.785	42.46	0.85	41.5	0.9	2.31%	-5.56%
0.795	42.01	0.86	41.5	0.9	1.23%	-4.44%
0.805	41.99	0.87	41.5	0.9	1.18%	-3.33%
0.815	42.16	0.88	41.5	0.9	1.59%	-2.22%
0.825	42.03	0.89	41.5	0.9	1.28%	-1.11%
0.835	42.05	0.89	41.5	0.9	1.33%	-1.11%
0.845	41.81	0.9	41.5	0.9	0.75%	0.00%
0.851*	41.6	0.906	41.5	0.9	0.24%	0.67%
0.855	41.5	0.91	41.5	0.9	0.00%	1.11%
0.865	41.25	0.9	41.5	0.9	-0.60%	0.00%
0.875	41.2	0.93	41.5	0.9	-0.72%	3.33%
0.885	41.28	0.94	41.5	0.9	-0.53%	4.44%
0.895	41.12	0.96	41.5	0.9	-0.92%	6.67%
0.905	40.89	0.96	41.5	0.9	-1.47%	6.67%
0.915	41.05	0.97	41.5	0.9	-1.08%	7.78%
0.925	40.83	0.99	41.5	0.9	-1.61%	10.00%
0.935	40.69	1	41.5	0.9	-1.95%	11.11%


*interpolated using DASY4 software



Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m ³)
Aug 8	835 Head	24.0 °C	24.2 °C	≥ 15 cm	101.1 kPa	31%	1000

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	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

9.0 TEST REDUCTION PROCEDURES APPLIED PER FCC KDB 643646

- a. Face-held Configuration - Default Battery Selection - per FCC KDB 643646, Page 2, Section 1) A): *"When multiple standard batteries are supplied with a radio, the battery with the highest capacity is considered the default battery for making head SAR measurements."*
- b. Body-worn Configuration - Default Battery Selection - per FCC KDB 643646, Page 5, Section 1) A): *"Start by testing a PTT radio with the thinnest battery and a standard (default) body-worn accessory that are both supplied with the radio and, if applicable, a default audio accessory....."*
- c. Body-worn Configuration - Default Body-worn Accessory Selection - the carry case (contains metal) was selected as the default body-worn accessory based on the smaller separation distance it provides between the radio and the user in comparison to the belt-clip (contains metal) accessory. Per FCC KDB 643646, Page 5, Section 1) A): *"When multiple default body-worn accessories are supplied with a radio, the standard body-worn accessory expected to result in the highest SAR based on its construction and exposure conditions is considered the default body-worn accessory for making body-worn measurements."*
- d. Body-worn Configuration - Additional Body-worn Accessories - the remaining body-worn accessory was evaluated based on the *"additional body-worn accessory"* guidance provided in FCC KDB 643646, Page 7, Section 4).
- e. Audio Accessories - per FCC KDB 643646, Page 5, Section 1) A): *"Start by testing a PTT radio with the thinnest battery and a standard (default) body-worn accessory that are both supplied with the radio and, if applicable, a default audio accessory, to measure the body SAR..."*

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800	764-805 / 806-869 MHz		
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Test Lab Certificate No. 2470.01

10.0 SAR MEASUREMENT SUMMARY

FACE-HELD SAR EVALUATION RESULTS

Device-Under-Test				KNG-P800 PTT Radio Transceiver							
Test Date(s)				Aug. 05, 08, 2011							
C				1		2		3		4	
R	Antenna	Test Freq. (MHz)	Conducted Power Before Test (Watts)	SAR W/kg (1g)		SAR W/kg (1g)		SAR W/kg (1g)		SAR W/kg (1g)	
				Battery (a) - 1950 mAh				Battery (b) -3450 mAh (Default)			
				100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f	
				Drift (dB)		50% +droop		Drift (dB)		50% +droop	
1	1 (KAA0825)	764.0	3.0	N/A				N/A			
2		777.0	3.1	F1	1.02	0.510	F2	0.939	0.470		
-1.79					0.770	0.818		-			
3		794.0	3.2	N/A				N/A			
4		805.0	3.3	F3	1.88	0.940	F4	1.85	0.925		
0.262					-	0.191		-			
5		806.0	3.8	F5	2.55	1.28	F6	2.37	1.19		
-0.035					1.29	0.100		-			
6		824.0	3.8	N/A				N/A			
7	851.0	3.8	F7	1.79	0.895	F8	1.74	0.870			
-0.528				1.01	0.025		-				
8	869.0	3.8	N/A				N/A				
SAR LIMITS				HEAD		SPATIAL PEAK		RF EXPOSURE CATEGORY			
FCC 47 CFR 2.1093				Health Canada Safety Code 6		8.0 W/kg		1 gram average		Occupational / Controlled	

Notes

Test Mode = CW (Unmodulated Continuous Wave)

Phantom = Side Planar Phantom

DUT Distance to Planar Phantom
(see Appendix D)

Antenna Distance to Planar Phantom (see Appendix D)

Base

Center

Tip

2.5 cm

4.3 cm

5.1 cm


5.4 cm



C = Column; R = Row

Fx (F = Face) denotes the corresponding Face SAR Plot # as shown in Appendix A

Test Procedures in accordance with FCC KDB 643646 (see reference [8])

- For face-held configuration, battery "a" was selected as the default battery based on the highest capacity battery.
- When the head SAR of an antenna tested on the highest output power channel using the default battery is ≤ 4.0 W/kg testing of the required immediately adjacent channel(s) is not necessary. When the head SAR of an antenna tested on the highest output power channel using the default battery is ≤ 3.5 W/kg (50% PTT duty factor), testing of all other required channels is not necessary.
- When the SAR for all antennas tested using the default battery is ≤ 4.0 W/kg, test additional batteries using the antenna and channel configuration that resulted in the highest SAR.
- When test reduction applies, the data table entries for such configurations are denoted with N/A (Not Applicable).


Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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SAR MEASUREMENT SUMMARY (CONT.)


BODY-WORN SAR EVALUATION RESULTS											
Device-Under-Test				KNG-P800 PTT Radio Transceiver							
BODY-WORN ACCESSORY 1				Carry Case (P/N: KAA0451B) - Default accessory per KDB 643646							
AUDIO ACCESSORY 1				Speaker-Mic (P/N: KAA0200)							
Test Date(s)				Aug. 04-05, 2011							
C				1		2		3		4	
R	Antenna	Test Freq. (MHz)	Conducted Power Before Test (Watts)	SAR W/kg (1g)		SAR W/kg (1g)		SAR W/kg (1g)		SAR W/kg (1g)	
				Battery (a) - 1950 mAh (Default)				Battery (b) -3450 mAh			
				100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f	
				Drift (dB)		50% +droop		Drift (dB)		50% +droop	
1	1 (KAA0825)	764.0	3.0	N/A				N/A			
2		777.0	3.1	B1	2.72	1.36	B2	1.75	0.875		
-0.304					1.46	-0.292		0.936			
3		794.0	3.2	N/A				N/A			
4		805.0	3.3	B3	4.89	2.45	B4	3.33	1.67		
0.011					-	0.050		-			
5		806.0	3.8	B5	6.42	3.21	B6	4.47	2.24		
-0.010					3.22	0.060		-			
6	824.0	3.8	N/A				N/A				
7	851.0	3.8	B7	5.02	2.51	B8	3.36	1.68			
-0.135				2.59	-0.162		1.74				
8	869.0	3.8	N/A				N/A				
SAR LIMITS				BODY		SPATIAL PEAK		RF EXPOSURE CATEGORY			
FCC 47 CFR 2.1093		Health Canada Safety Code 6		8.0 W/kg		1 gram average		Occupational / Controlled			
Notes											
Test Mode = CW (Unmodulated Continuous Wave)					Phantom = Barski Planar Phantom						
Battery		DUT Distance to Planar Phantom (see Appendix D)		Antenna Distance to Planar Phantom (see Appendix D)							
				Base		Mid		Tip			
a		1.5 cm		2.3 cm		3.0 cm		3.6 cm			
b		1.5 cm		3.1 cm		3.6 cm		4.3 cm			
C = Column; R = Row			Bx (B = Body) denotes the corresponding Body SAR Plot # as shown in Appendix A								
Test Procedures applied in accordance with FCC KDB 643646 (see reference [8])											
1. For body-worn configuration, battery “a” was selected as the default battery based on the thinnest battery.											
2. When the body SAR of an antenna is ≤ 3.5 W/kg, testing of all other required channels is not necessary for that antenna.											
3. When the SAR for all antennas tested using the thinnest battery is ≤ 4.0 W/kg, test additional batteries using the antenna and channel configuration that resulted in the highest SAR among all antennas. Testing of additional batteries in combination with the default body-worn and audio accessory and remaining antennas is unnecessary.											
4. When test reduction applies, the data table entries for such configurations are denoted with N/A (Not Applicable).											



Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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SAR MEASUREMENT SUMMARY (CONT.)

BODY-WORN SAR EVALUATION RESULTS											
Device-Under-Test				KNG-P800 PTT Radio Transceiver							
BODY-WORN ACCESSORY 2				Belt-Clip (P/N: KAA0400) - Additional accessory per KDB 643646							
AUDIO ACCESSORY 1				Speaker-Mic (P/N: KAA0200)							
Test Date(s)				Aug. 04-05, 2011							
C				1		2		3		4	
R	Antenna	Test Freq. (MHz)	Conducted Power Before Test (Watts)	SAR W/kg (1g)		SAR W/kg (1g)		SAR W/kg (1g)		SAR W/kg (1g)	
				Battery (a) - 1950 mAh (Default)				Battery (b) -3450 mAh			
				100% ptt d/f		50% ptt d/f		100% ptt d/f		50% ptt d/f	
				Drift (dB)		50% +droop		Drift (dB)		50% +droop	
1	1 (KAA0825)	764.0	3.0	N/A				N/A			
2		B9	2.47	1.24	B10	1.65	0.825				
-0.293			1.32	-0.284		0.881					
3		794.0	3.2	N/A				N/A			
4		B11	4.50	2.25	B12	3.07	1.54				
-0.010			2.26	0.034		-					
5		B13	6.18	3.09	B14	4.27	2.14				
0.069			-	0.226		-					
6	824.0	3.8	N/A				N/A				
7	B15	4.36	2.18	B16	3.11	1.56					
-0.619		2.51	-0.571		1.77						
8	869.0	3.8	N/A				N/A				
SAR LIMITS				BODY		SPATIAL PEAK		RF EXPOSURE CATEGORY			
FCC 47 CFR 2.1093		Health Canada Safety Code 6		8.0 W/kg		1 gram average		Occupational / Controlled			
Notes											
Test Mode = CW (Unmodulated Continuous Wave)					Phantom = Barski Planar Phantom						
Battery		DUT Distance to Planar Phantom (see Appendix D)		Antenna Distance to Planar Phantom (see Appendix D)							
				Base		Mid		Tip			
a		1.6 cm		2.3 cm		3.1 cm		3.9 cm			
b		1.6 cm		3.0 cm		3.6 cm		4.4 cm			
C = Column; R = Row			Bx (B = Body) denotes the corresponding Body SAR Plot # as shown in Appendix A								
Test Procedures applied in accordance with FCC KDB 643646 (see reference [8])											
1. For body-worn configuration, battery “a” was selected as the default battery based on the thinnest battery.											
2. When the body SAR of an antenna is ≤ 3.5 W/kg, testing of all other required channels is not necessary for that antenna.											
3. When the SAR for all antennas tested using the thinnest battery is ≤ 4.0 W/kg, test additional batteries using the antenna and channel configuration that resulted in the highest SAR among all antennas. Testing of additional batteries in combination with the default body-worn and audio accessory and remaining antennas is unnecessary.											
4. When test reduction applies, the data table entries for such configurations are denoted with N/A (Not Applicable).											


Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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11.0 SAR SCALING (MANUFACTURER TOLERANCE)

SAR scaling is not required based on the output power measured prior to the SAR evaluations is \geq the manufacturer's rated output power and tolerance specification.

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800	764-805 / 806-869 MHz		
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12.0 SAR SENSITIVITY ADJUSTMENT

For tests F1, F2, B1, B2, B9 and B10 the probe calibration and measurement frequency interval is > 50 MHz; therefore the following additional steps were implemented (per FCC KDB 450824 D01v01r01 - see reference [9]): The measured 1-g SAR may be compensated with respect to +5% tolerances in e and -5% tolerances in s, computed according to valid SAR sensitivity data, to reduce SAR underestimation and maintain conservativeness. SAR sensitivity data is per SPEAG DASY4 Manual (see reference [12]).

$$\% \text{ Change in SAR} = \text{Sensitivity} * \% \text{ Change in Value}$$

Measured Fluid Parameters:

Test Plot #	Freq	Test e	Test s	Target e	Target s	Deviation Permittivity	Deviation Conductivity
F1	777 MHz	42.5	0.834	41.5	0.9	2.41%	-7.33%
F2	777 MHz	42.5	0.834	41.5	0.9	2.41%	-7.33%
B1	777 MHz	55.5	0.912	55.2	0.97	0.54%	-5.98%
B2	777 MHz	55.5	0.912	55.2	0.97	0.54%	-5.98%
B9	777 MHz	55.5	0.912	55.2	0.97	0.54%	-5.98%
B10	777 MHz	55.5	0.912	55.2	0.97	0.54%	-5.98%

In all cases permittivity is higher than the target and conductivity is lower than the target, therefore, both will be considered

The Sensitivity for permittivity at 800MHz is -0.57

The Sensitivity for conductivity at 800MHz is +0.59

For tests F1 and F2:

$$\% \text{ Change in SAR} = (-0.57 * -2.41\%) + (0.59 * 7.33\%) = 1.37\% + 4.32\% = 5.69\%$$

$$\text{F1 SAR adjusted for Sensitivity:} = 0.770 * 5.69\% = \mathbf{0.814 \text{ W/kg}}$$

$$\text{F2 SAR adjusted for Sensitivity:} = 0.470 * 5.69\% = \mathbf{0.497 \text{ W/kg}}$$

For tests B1, B2, B9 and B10:


$$\% \text{ Change in SAR} = (-0.57 * -0.54\%) + (0.59 * 5.98\%) = 0.31\% + 3.53\% = 3.84\%$$




$$\text{B1 SAR adjusted for Sensitivity:} = 1.46 * 3.84\% = \mathbf{1.52 \text{ W/kg}}$$

$$\text{B2 SAR adjusted for Sensitivity:} = 0.936 * 3.84\% = \mathbf{0.972 \text{ W/kg}}$$

$$\text{B9 SAR adjusted for Sensitivity:} = 1.32 * 3.84\% = \mathbf{1.37 \text{ W/kg}}$$

$$\text{B10 SAR adjusted for Sensitivity:} = 0.881 * 3.84\% = \mathbf{0.915 \text{ W/kg}}$$

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800	764-805 / 806-869 MHz		
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13.0 DETAILS OF SAR EVALUATION

1. The number of test frequencies and the test channels evaluated for SAR were selected in accordance with the procedures described in FCC KDB 447498 Section 6) c) (see reference [7]).
2. The DUT was evaluated for SAR in accordance with the procedures described in FCC KDB 643646 (see reference [8]).
3. The SAR evaluations were performed with a fully charged battery.
4. The SAR drop of the DUT was measured by the DASY4 system for the duration of the SAR evaluations. The measured SAR drop was added to the measured SAR levels to report scaled SAR levels as shown in the SAR test data tables. A SAR-versus-Time power drop evaluation was performed (see Appendix A).
5. The fluid temperature was measured prior to and after the SAR evaluations. The fluid temperature remained within $\pm 2^{\circ}\text{C}$ during the SAR evaluations.
6. The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).
7. The DUT was tested at the maximum conducted output power level preset by the manufacturer in unmodulated continuous transmit operation (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.

14.0 SAR EVALUATION PROCEDURES

- (i) 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.
(ii) 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 ≥ 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.

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800	764-805 / 806-869 MHz		
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15.0 SYSTEM PERFORMANCE CHECK

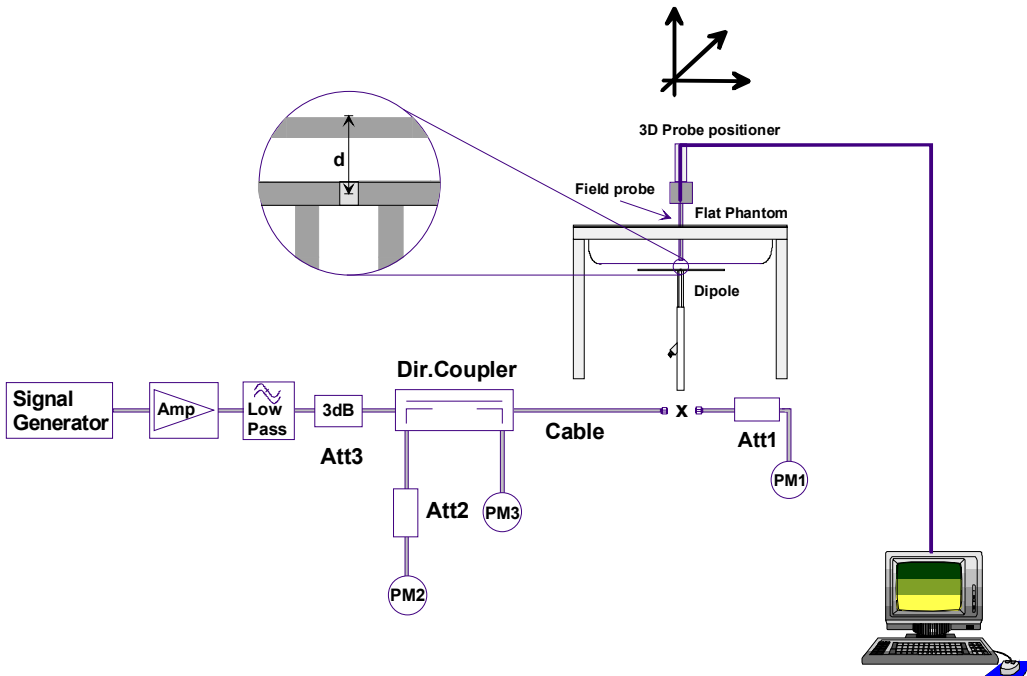
Prior to the SAR evaluations, system checks were performed with a planar phantom and 835 MHz SPEAG validation dipole (see Appendix B for system performance check test plots) in accordance with the procedures described in IEEE Standard 1528-2003 (see reference [5]). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C 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 manufacturer's dipole calibration target SAR value (see Appendix E for system manufacturer's dipole calibration procedures).


SYSTEM PERFORMANCE CHECK EVALUATIONS

Test Date	Equiv. Tissue Freq. (MHz)	SAR 1g (W/kg)			Dielectric Constant ϵ_r			Conductivity σ (mho/m)			ρ (Kg/m ³)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		Target	Meas.	Dev.	Target	Meas.	Dev.	Target	Meas.	Dev.						
Aug 4	Body 835	2.49 $\pm 10\%$	2.48	-0.4%	55.2 $\pm 5\%$	54.3	-1.6%	0.97 $\pm 5\%$	0.97	0.0%	1000	23.0	23.5	≥ 15	34	101.1
Aug 8	Head 835	2.35 $\pm 10\%$	2.33	-0.9%	41.5 $\pm 5\%$	42.1	+1.4%	0.90 $\pm 5\%$	0.89	-1.1%	1000	24.0	24.2	≥ 15	31	101.1

Notes


- The target SAR values are the measured values from the dipole calibration performed by SPEAG (see Appendix E).
- The target dielectric parameters are the nominal values from the dipole calibration performed by SPEAG (see Appendix E).
- The fluid temperature was measured prior to and after the system performance check. The temperature remained within $\pm 2^\circ\text{C}$.
- 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).
- The SAR evaluations were performed within 24 hours of the system performance check.







System Performance Check Measurement Setup Diagram (IEEE 1528-2003)

835 MHz SPEAG Validation Dipole Setup

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DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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16.0 SIMULATED EQUIVALENT TISSUES



The simulated equivalent tissue recipes in the table below are derived from the SAR system manufacturer's suggested recipes in the DASY4 manual (see references [10] and [11]) in accordance with the procedures and requirements specified in IEEE Standard 1528-2003 (see reference [5]). The ingredient percentage may have been adjusted minimally in order to achieve the appropriate target dielectric parameters within the specified tolerance.

SIMULATED TISSUE MIXTURES					
INGREDIENT	Water	835 MHz Head Tissue Mixture	40.71 %	835 MHz Body Tissue Mixture	53.79 %
	Sugar		56.63 %		45.13 %
	Salt		1.48 %		0.98 %
	HEC		0.99 %		--
	Bactericide		0.19 %		0.10 %

17.0 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.			


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18.0 ROBOT SYSTEM SPECIFICATIONS

<u>Specifications</u>	
Positioner	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability	0.02 mm
No. of axis	6
<u>Data Acquisition Electronic (DAE) System</u>	
<u>Cell Controller</u>	
Processor	AMD Athlon XP 2400+
Clock Speed	2.0 GHz
Operating System	Windows XP Professional
<u>Data Converter</u>	
Features	Signal Amplifier, multiplexer, A/D converter, and control logic
Software	Measurement Software: DASY4, V4.7 Build 44
	Postprocessing Software: SEMCAD, V1.8 Build 171
Connecting Lines	Optical downlink for data and status info., Optical uplink for commands and clock
<u>DASY4 Measurement Server</u>	
Function	Real-time data evaluation for field measurements and surface detection
Hardware	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
Connections	COM1, COM2, DAE, Robot, Ethernet, Service Interface
<u>E-Field Probe</u>	
Model	ET3DV6
Serial No.	1590
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 GHz)
<u>Phantom</u>	
Type	SAM V4.0C
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 25 liters
<u>Phantom</u>	
Type	Side Planar Phantom
Shell Material	Plexiglass
Bottom Thickness	2.0 mm ± 0.1 mm
Inner Dimensions	72.6 cm (L) x 20.3 cm (W) x 20.3 cm (H)
<u>Phantom</u>	
Type	Barski Planar Phantom
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 70 liters


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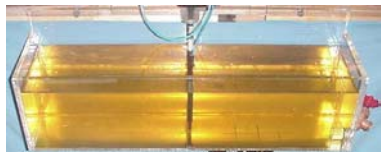
19.0 PROBE SPECIFICATION (ET3DV6)

<p>Construction: Symmetrical design with triangular core; Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, glycol)</p> <p>Calibration: In air from 10 MHz to 2.5 GHz In head simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm 8\%$)</p> <p>Frequency: 10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)</p> <p>Directivity: ± 0.2 dB in head tissue (rotation around probe axis) ± 0.4 dB in head tissue (rotation normal to probe axis)</p> <p>Dynamic Range: 5 μW/g to > 100 mW/g; Linearity: ± 0.2 dB</p> <p>Surface Detect: ± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces</p> <p>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</p> <p>Application: General dosimetry up to 3 GHz; Compliance tests of mobile phone</p>	
ET3DV6 E-Field Probe	


20.0 SAM TWIN PHANTOM V4.0C


<p>The SAM Twin Phantom V4.0C is a fiberglass shell phantom with a 2.0 mm (+/-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 H for specifications of the SAM Twin Phantom V4.0C).</p>	
SAM Twin Phantom V4.0C	




21.0 SIDE PLANAR PHANTOM

<p>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.</p>	
Plexiglas Side Planar Phantom	

22.0 BARSKI PLANAR PHANTOM

<p>The Barski Planar Phantom is a fiberglass shell phantom with a 2.0 mm (+/-0.2mm) thick device measurement area at the center of the phantom for SAR evaluations of devices with a larger surface area than the planar section of the SAM phantom. The planar phantom is integrated in a wooden table. The planar phantom is used for DUT SAR evaluations and system performance check evaluations. See Appendix G for dimensions and specifications of the Barski Planar Phantom.</p>	
Barski Planar Phantom	

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23.0 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°. 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.





Device Holder

24.0 TEST EQUIPMENT LIST

TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED	CALIBRATION INTERVAL
USED	DESCRIPTION				
x	Schmid & Partner DASY4 System	-	-	-	-
x	-DASY4 Measurement Server	00158	1078	CNR	CNR
x	-Robot	00046	599396-01	CNR	CNR
x	-DAE4	00019	353	27Apr10	Biennial
x	-ET3DV6 E-Field Probe	00017	1590	22Jun11	Annual
x	-D835V2 Validation Dipole	00217	4d075	20Apr09	Triennial
x	Side Planar Phantom	00156	161	CNR	CNR
x	Barski Planar Phantom	00155	03-01	CNR	CNR
x	SPEAG SAM Twin Phantom V4.0C	00154	1033	CNR	CNR
x	HP 85070C Dielectric Probe Kit	00033	none	CNR	CNR
x	Gigatronics 8652A Power Meter	00007	1835272	04May10	Biennial
x	Gigatronics 80701A Power Sensor	00014	1833699	04May10	Biennial
x	HP 8753ET Network Analyzer	00134	US39170292	04May10	Biennial
x	Rohde & Schwarz SMR20 Signal Generator	00006	100104	CNR	CNR
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR
Abbr.	CNR = Calibration Not Required				


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25.0 JUSTIFICATION FOR EXTENDED SAR DIPOLE CALIBRATION

SAR dipoles calibrated less than two years ago but more than one year ago were confirmed by maintaining return loss (< -20 dB, within 20% of prior calibration) and impedance (within 5 Ω from prior calibration) requirements per extended calibrations in FCC KDB 450824 (see reference [9]).

SPEAG D835V3 SN: 4d075						
Date of Measurement	Frequency	Fluid Type	Return Loss (dB)	Δ %	Impedance (Ω)	Δ Ω
Apr. 20, 2009	835 MHz	Head	-29.1	-	51.8	-
Jun. 29, 2011			-27.3	-6.2%	48.6	-3.2
Apr. 20, 2009	835 MHz	Body	-26.7	-	48.0	-
Apr. 20, 2011			-24.0	10.1%	51.3	3.3

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26.0 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}
Measurement System									
Probe Calibration (835 MHz)	E.2.1	6.0	Normal	1	1	1	6.0	6.0	∞
Axial Isotropy	E.2.2	4.7	Rectangular	1.732050808	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	Rectangular	1.732050808	0.7	0.7	3.9	3.9	∞
Boundary Effect	E.2.3	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	Rectangular	1.732050808	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	Rectangular	1.732050808	1	1	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	∞
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	∞
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Test Sample Related									
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	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measured)	E.3.3	7.33	Normal	1	0.64	0.43	4.7	3.2	∞
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measured)	E.3.3	4.82	Normal	1	0.6	0.49	2.9	2.4	∞
Combined Standard Uncertainty			RSS				11.97	11.20	
Expanded Uncertainty (95% Confidence Interval)			k=2				23.94	22.41	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2


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27.0 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 (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 4: March 2010.
- [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] International Standard IEC 62209-2 Edition 1.0 2010-03 - "Human exposure to radio frequency fields from hand-held & body-mounted wireless communication devices - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)".
- [7] Federal Communications Commission, Office of Engineering and Technology - "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies"; KDB 447498 D01v04: November 2009.
- [8] Federal Communications Commission, Office of Engineering and Technology - "SAR Test Reduction Considerations for Occupational PTT Radios", KDB 643646 D01v01r01: April 2011.
- [9] Federal Communications Commission, Office of Engineering and Technology - "Application Note: SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz"; KDB 450824 D01 v01r01: January 2007.
- [10] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 16 Application Note, Head Tissue Recipe: Sept. 2005.
- [11] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 17 Application Note, Body Tissue Recipe: Sept. 2005.
- [12] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 22 Application Note, SAR Sensitivities: Sept. 2005.
- [13] Federal Communications Commission - "Measurements Required: RF Power Output"; Rule Part 47 CFR §2.1046.
- [14] Industry Canada - "General Requirements and Information for the Certification of Radiocommunication Equipment", Radio Standards Specification RSS-Gen Issue 3: December 2010.
- [15] ISO/IEC 17025 - "General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)."



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APPENDIX B - SYSTEM PERFORMANCE CHECK

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
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Date Tested: 08/04/2011

System Performance Check - 835 MHz Dipole - Body

DUT: Dipole D835V2; Asset: 00217; Serial: 411; Calibration: 04/20/2009

Ambient Temp: 23°C; Fluid Temp: 23.5°C; Barometric Pressure: 101.1 kPa; Humidity: 34%

Communication System: CW

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: M835 Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.97 \text{ mho/m}$; $\epsilon_r = 54.3$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.37, 6.37, 6.37); Calibrated: 22/06/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 835 MHz Dipole

Body d=15mm Pin=250mW/Area Scan (6x10x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (measured) = 2.71 mW/g

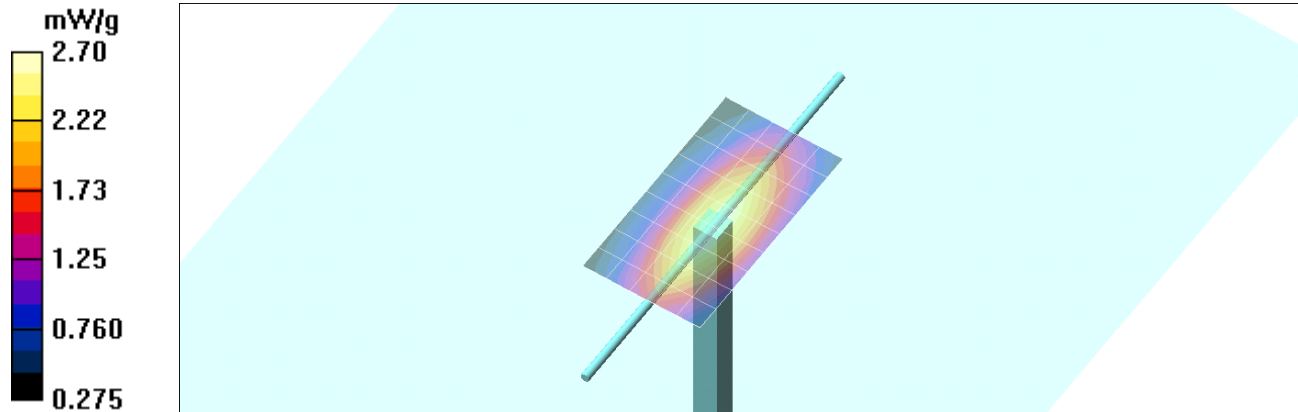
Body d=15mm Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$


Reference Value = 52.4 V/m; Power Drift = 0.080 dB



Peak SAR (extrapolated) = 3.50 W/kg

SAR(1 g) = 2.48 mW/g; SAR(10 g) = 1.65 mW/g

Maximum value of SAR (measured) = 2.70 mW/g

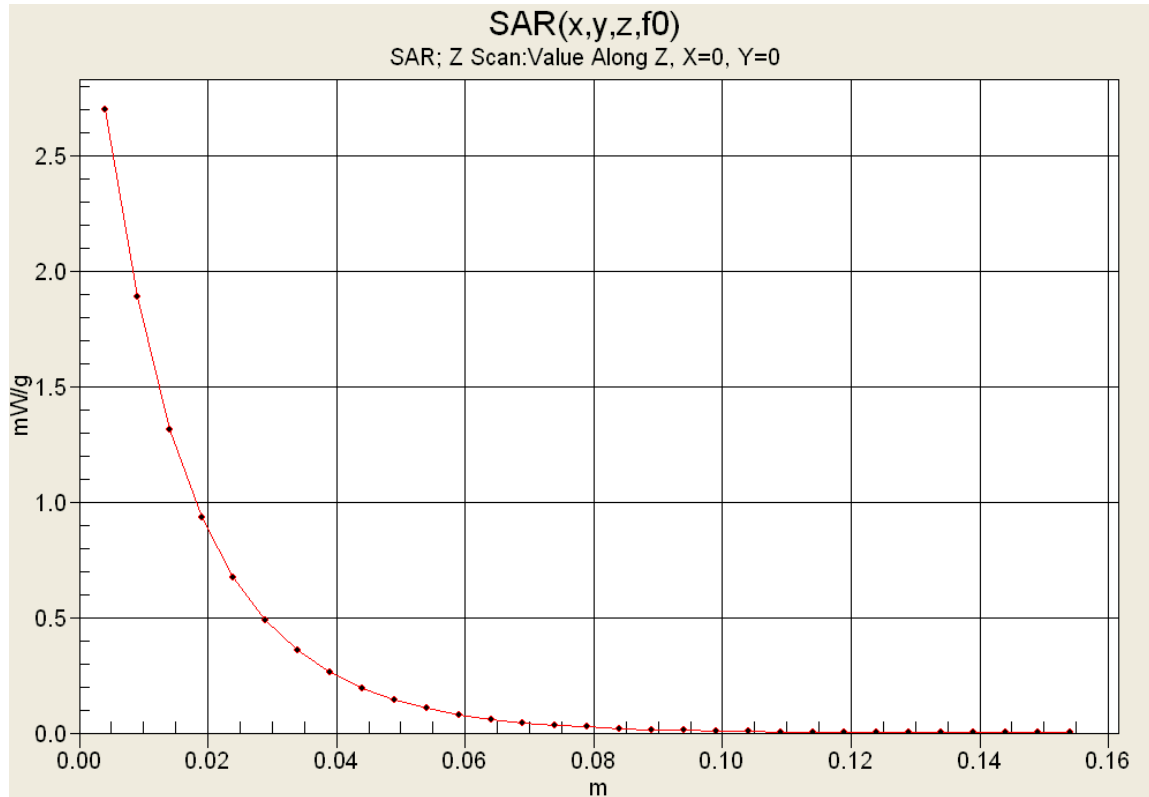



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Z-Axis Scan



Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800	764-805 / 806-869 MHz		
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	<u>Date(s) of Evaluation</u> August 04-05, 08, 2011	<u>Test Report Serial No.</u> 071111K95-T1109-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 08/08/2011

System Performance Check - 835 MHz Dipole - Head

DUT: Dipole D835V2; Asset: 00217; Serial: 411; Calibration: 04/20/2009

Ambient Temp: 24.0°C; Fluid Temp: 24.2°C; Barometric Pressure: 101.1 kPa; Humidity: 31%

Communication System: CW

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL835 Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.89 \text{ mho/m}$; $\epsilon_r = 42.1$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(6.5, 6.5, 6.5); Calibrated: 22/06/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 27/04/2010
- 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

Head d=15mm Pin=250mW/Area Scan (6x10x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Maximum value of SAR (measured) = 2.40 mW/g

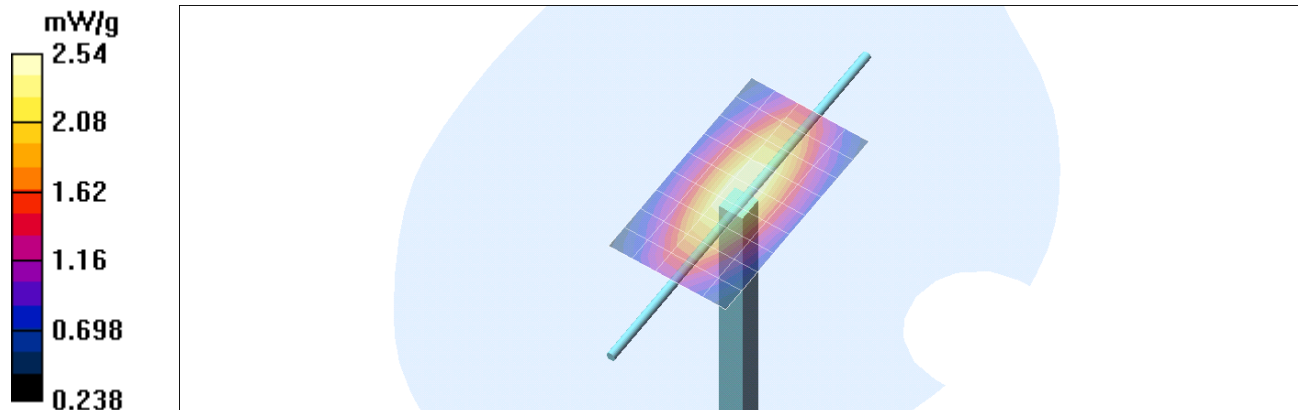
Head d=15mm Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$


Reference Value = 55.6 V/m; Power Drift = -0.009 dB



Peak SAR (extrapolated) = 3.30 W/kg

SAR(1 g) = 2.33 mW/g; SAR(10 g) = 1.54 mW/g

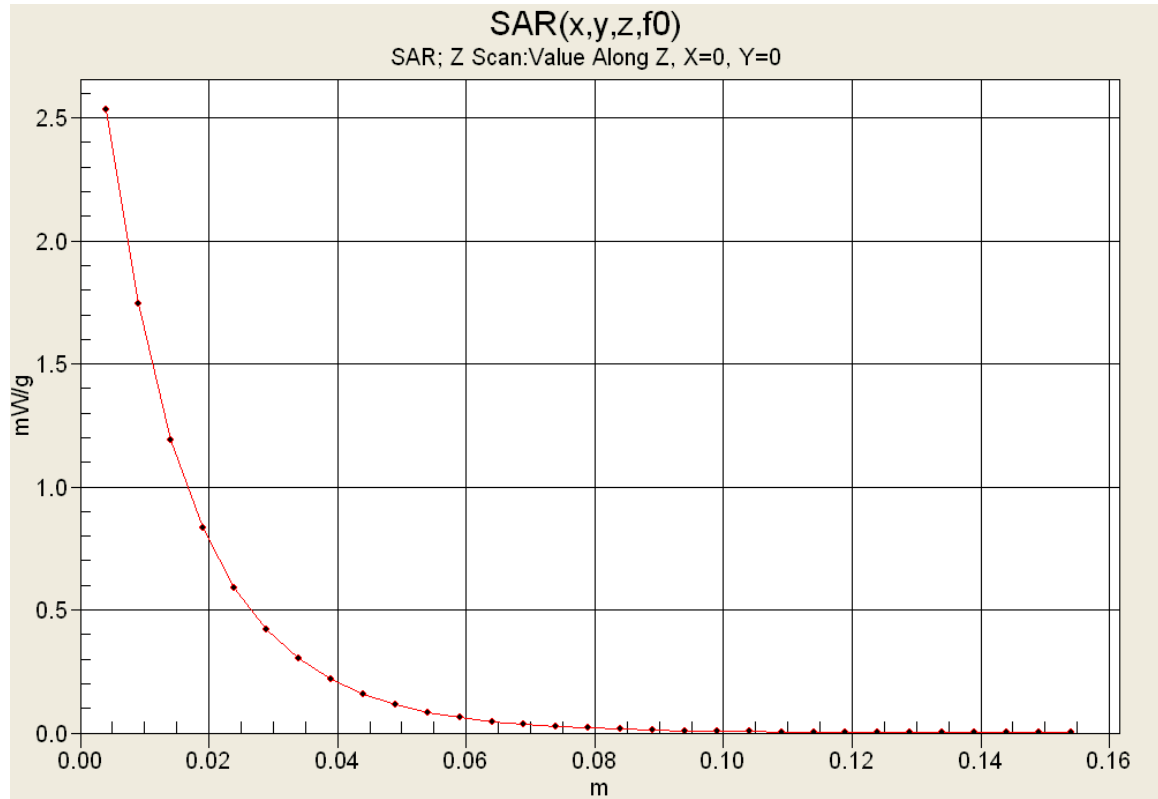
Maximum value of SAR (measured) = 2.54 mW/g






Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan






Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800		764-805 / 806-869 MHz	
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	<u>Date(s) of Evaluation</u> August 04-05, 08, 2011	<u>Test Report Serial No.</u> 071111K95-T1109-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800	764-805 / 806-869 MHz		
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	<u>Date(s) of Evaluation</u> August 04-05, 08, 2011	<u>Test Report Serial No.</u> 071111K95-T1109-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	



Test Lab Certificate No. 2470.01

835 MHz Body

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
04/Aug/2011
Frequency (GHz)
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	55.18	0.85
0.7450	55.55	0.96	54.81	0.86
0.7550	55.51	0.96	55.03	0.87
0.7650	55.47	0.96	54.53	0.88
0.7750	55.43	0.97	54.63	0.90
0.7850	55.39	0.97	54.51	0.91
0.7950	55.36	0.97	54.61	0.91
0.8050	55.32	0.97	54.45	0.95
0.8150	55.28	0.97	54.56	0.95
0.8250	55.24	0.97	54.37	0.95
0.8350	55.20	0.97	54.34	0.97
0.8450	55.17	0.98	53.98	0.96
0.8550	55.14	0.99	53.98	0.97
0.8650	55.11	1.01	53.65	0.97
0.8750	55.08	1.02	53.87	0.98
0.8850	55.05	1.03	53.90	0.99
0.8950	55.02	1.04	53.49	1.01
0.9050	55.00	1.05	53.63	1.04
0.9150	55.00	1.06	53.35	1.05
0.9250	54.98	1.06	53.37	1.06
0.9350	54.96	1.07	53.43	1.07


Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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	<u>Date(s) of Evaluation</u> August 04-05, 08, 2011	<u>Test Report Serial No.</u> 071111K95-T1109-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

835 MHz Body

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
05/Aug/2011
Frequency (GHz)
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	55.75	0.86
0.7450	55.55	0.96	55.60	0.88
0.7550	55.51	0.96	55.67	0.87
0.7650	55.47	0.96	55.24	0.90
0.7750	55.43	0.97	55.50	0.91
0.7850	55.39	0.97	55.37	0.92
0.7950	55.36	0.97	55.43	0.93
0.8050	55.32	0.97	55.30	0.95
0.8150	55.28	0.97	55.16	0.95
0.8250	55.24	0.97	55.16	0.97
0.8350	55.20	0.97	54.78	0.95
0.8450	55.17	0.98	54.87	0.98
0.8550	55.14	0.99	54.67	0.98
0.8650	55.11	1.01	54.59	0.99
0.8750	55.08	1.02	54.44	0.99
0.8850	55.05	1.03	54.42	1.00
0.8950	55.02	1.04	54.38	1.02
0.9050	55.00	1.05	54.35	1.04
0.9150	55.00	1.06	53.86	1.06
0.9250	54.98	1.06	54.15	1.06
0.9350	54.96	1.07	54.08	1.07


Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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	<u>Date(s) of Evaluation</u> August 04-05, 08, 2011	<u>Test Report Serial No.</u> 071111K95-T1109-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

835 MHz Head

Celltech Labs Inc.
 Test Result for UIM Dielectric Parameter
 05/Aug/2011
 Frequency (GHz)
 FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
 FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
 Test_e Epsilon of UIM
 Test_s Sigma of UIM

Freq	FCC_eH	FCC_sH	Test_e	Test_s
0.7350	42.02	0.89	44.08	0.79
0.7450	41.97	0.89	43.96	0.80
0.7550	41.92	0.89	44.11	0.81
0.7650	41.86	0.89	43.79	0.83
0.7750	41.81	0.90	43.67	0.83
0.7850	41.76	0.90	43.84	0.85
0.7950	41.71	0.90	43.47	0.88
0.8050	41.66	0.90	43.49	0.87
0.8150	41.60	0.90	43.36	0.88
0.8250	41.55	0.90	43.33	0.89
0.8350	41.50	0.90	42.99	0.89
0.8450	41.50	0.91	43.15	0.92
0.8550	41.50	0.92	42.79	0.91
0.8650	41.50	0.93	42.29	0.92
0.8750	41.50	0.94	42.51	0.93
0.8850	41.50	0.95	42.09	0.95
0.8950	41.50	0.96	42.35	0.95
0.9050	41.50	0.97	42.08	0.96
0.9150	41.50	0.98	41.87	0.99
0.9250	41.48	0.98	42.21	1.00
0.9350	41.46	0.99	41.87	1.00

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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	<u>Date(s) of Evaluation</u> August 04-05, 08, 2011	<u>Test Report Serial No.</u> 071111K95-T1109-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

835 MHz Head

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

08/Aug/2011

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	42.86	0.79
0.7450	41.97	0.89	42.40	0.80
0.7550	41.92	0.89	42.33	0.81
0.7650	41.86	0.89	42.42	0.81
0.7750	41.81	0.90	42.47	0.83
0.7850	41.76	0.90	42.46	0.85
0.7950	41.71	0.90	42.01	0.86
0.8050	41.66	0.90	41.99	0.87
0.8150	41.60	0.90	42.16	0.88
0.8250	41.55	0.90	42.03	0.89
0.8350	41.50	0.90	42.05	0.89
0.8450	41.50	0.91	41.81	0.90
0.8550	41.50	0.92	41.50	0.91
0.8650	41.50	0.93	41.25	0.90
0.8750	41.50	0.94	41.20	0.93
0.8850	41.50	0.95	41.28	0.94
0.8950	41.50	0.96	41.12	0.96
0.9050	41.50	0.97	40.89	0.96
0.9150	41.50	0.98	41.05	0.97
0.9250	41.48	0.98	40.83	0.99
0.9350	41.46	0.99	40.69	1.00

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver		Model:	KNG-P800	764-805 / 806-869 MHz	
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	<u>Date(s) of Evaluation</u> August 04-05, 08, 2011	<u>Test Report Serial No.</u> 071111K95-T1109-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX E - DIPOLE CALIBRATION

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800	764-805 / 806-869 MHz		
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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: **D835V2-4d075_Apr09**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d075**

Calibration procedure(s) **QA CAL-05.v7**
Calibration procedure for dipole validation kits

Calibration date: **April 20, 2009**

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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	28-Apr-08 (No. ES3-3025_Apr08)	Apr-09
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

Calibrated by: **Jeton Kastrati** **Laboratory Technician**

Approved by: **Katja Pokovic** **Technical Manager**

Signature

Issued: April 22, 2009

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Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) 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
- b) 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
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

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

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	41.1 \pm 6 %	0.89 mho/m \pm 6 %
Head TSL temperature during test	(22.1 \pm 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.35 mW / g
SAR normalized	normalized to 1W	9.40 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	9.46 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 mW / g
SAR normalized	normalized to 1W	6.16 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	6.19 mW / g \pm 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.9 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature during test	(22.1 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.49 mW / g
SAR normalized	normalized to 1W	9.96 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	9.61 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.64 mW / g
SAR normalized	normalized to 1W	6.56 mW / g
SAR for nominal Body TSL parameters ²	normalized to 1W	6.39 mW / g ± 16.5 % (k=2)

² Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8 Ω - 3.1 j Ω
Return Loss	- 29.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.0 Ω - 4.1 j Ω
Return Loss	- 26.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.401 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 09, 2007

DASY5 Validation Report for Head TSL

Date/Time: 14.04.2009 11:20:38

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d075

Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL 900 MHz

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.89 \text{ mho/m}$; $\epsilon_r = 41.1$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.97, 5.97, 5.97); Calibrated: 28.04.2008
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

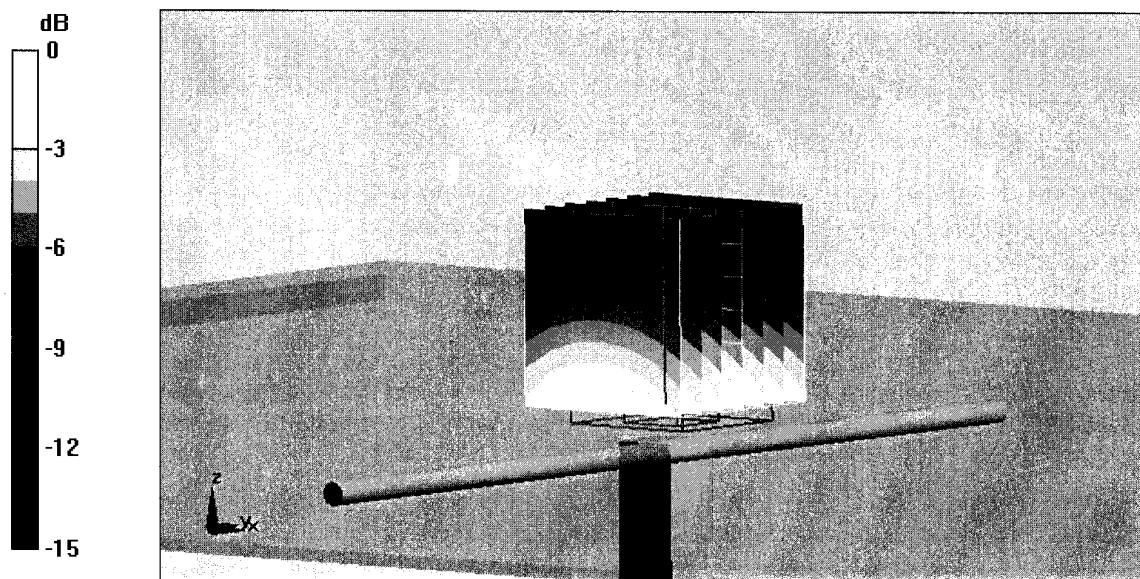
Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 57 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 3.47 W/kg

SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.54 mW/g

Maximum value of SAR (measured) = 2.74 mW/g

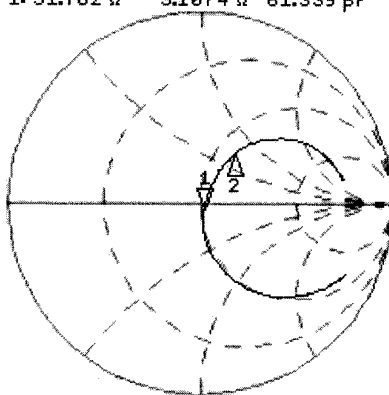


0 dB = 2.74mW/g

Impedance Measurement Plot for Head TSL

14 Apr 2009 09:17:58
 CH1 S11 1 U FS 1: 51.762 Ω -3.1074 Ω 61.339 pF 835.000 000 MHz

*
 Del
 Cor



CH1 Markers
 2: 60.352 Ω
 33.270 Ω
 900.000 MHz

Avg
 16

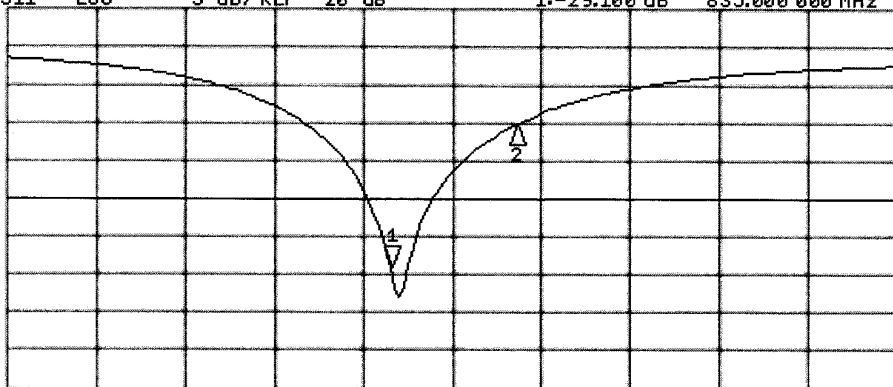
↑

CH2 S11 LOG 5 dB/REF -20 dB 1:-29.100 dB 835.000 000 MHz

Cor

Avg
 16

↑



CH2 Markers
 2:-10.391 dB
 900.000 MHz

DASY5 Validation Report for Body TSL

Date/Time: 20.04.2009 09:57:39

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d075

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL900

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1.01 \text{ mho/m}$; $\epsilon_r = 53.9$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.9, 5.9, 5.9); Calibrated: 28.04.2008
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

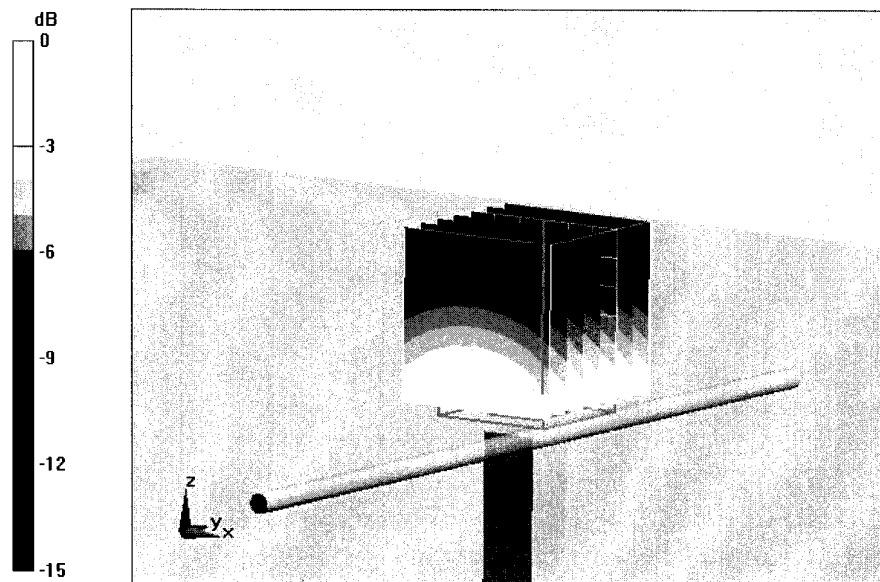
Pin = 250mW, d = 15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 55.4 V/m; Power Drift = -0.00173 dB

Peak SAR (extrapolated) = 3.61 W/kg

SAR(1 g) = 2.49 mW/g; SAR(10 g) = 1.64 mW/g

Maximum value of SAR (measured) = 2.9 mW/g



0 dB = 2.9mW/g

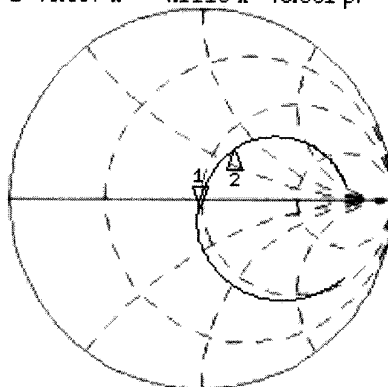
Impedance Measurement Plot for Body TSL

20 Apr 2009 08:13:09
 [CH1] S11 1 U FS 1: 48.037 Ω -4.1113 Ω 46.361 pF 835.000 000 MHz

*
 Del
 Cor

Avg
 16

↑



CH1 Markers

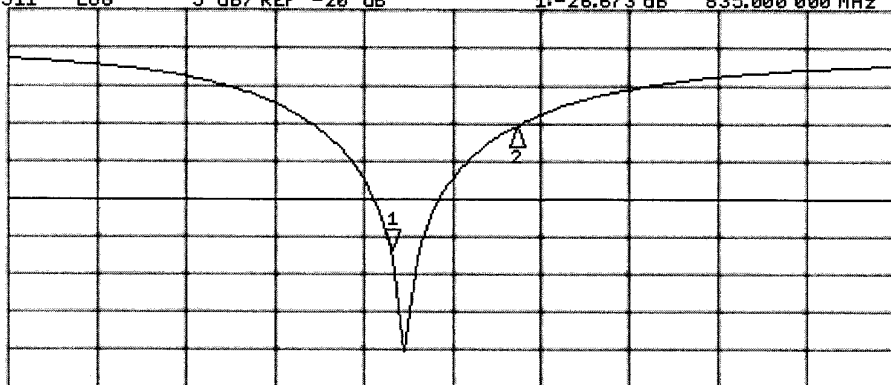
2: 59.180 Ω
 32.740 Ω
 900.000 MHz

CH2 S11 LOG 5 dB/REF -20 dB 1: -26.673 dB 835.000 000 MHz

Cor

Avg
 16

↑





CH2 Markers


2: -10.507 dB
 900.000 MHz

START 635.000 000 MHz

STOP 1 100.000 000 MHz

	<u>Date(s) of Evaluation</u> August 04-05, 08, 2011	<u>Test Report Serial No.</u> 071111K95-T1109-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX F - PROBE CALIBRATION

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800	764-805 / 806-869 MHz		
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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_Jun11**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1590**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4**
Calibration procedure for dosimetric E-field probes

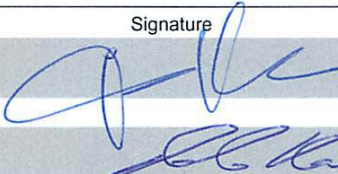
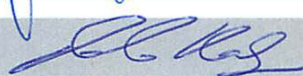
Calibration date: **June 22, 2011**

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 ± 3)°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	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	
Issued: June 23, 2011			
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization ϕ	ϕ rotation around probe axis
Polarization ϑ	ϑ 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_{x,y,z}:** Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E^2 -field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,y,z} * 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_{x,y,z}:** DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR:** PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,y,z}:** A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- 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_{x,y,z} * 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 ± 50 MHz to ± 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
Calibrated: June 22, 2011

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

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1590

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	1.93	2.00	1.66	$\pm 10.1 \%$
DCP (mV) ^B	96.0	98.7	88.6	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	104.2	$\pm 2.7 \%$
			Y	0.00	0.00	1.00	117.7	
			Z	0.00	0.00	1.00	129.9	

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

^A The uncertainties of NormX,Y,Z do not affect the E^2 -field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1590

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	43.5	0.87	7.30	7.30	7.30	0.18	2.10	± 13.4 %
835	41.5	0.90	6.50	6.50	6.50	0.38	2.55	± 12.0 %
900	41.5	0.97	6.39	6.39	6.39	0.39	2.47	± 12.0 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: ET3DV6- SN:1590

Calibration Parameter Determined in Body Tissue Simulating Media

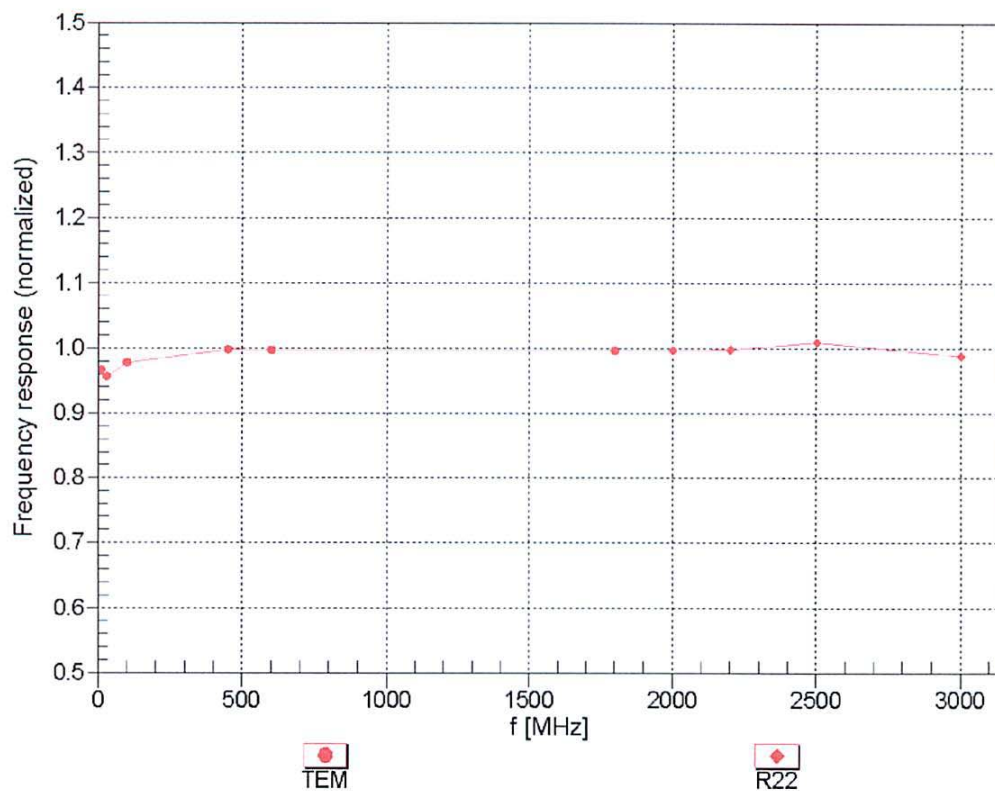
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	7.82	7.82	7.82	0.12	2.04	± 13.4 %
835	55.2	0.97	6.37	6.37	6.37	0.42	2.33	± 12.0 %
900	55.0	1.05	6.27	6.27	6.27	0.40	2.45	± 12.0 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

Frequency Response of E-Field

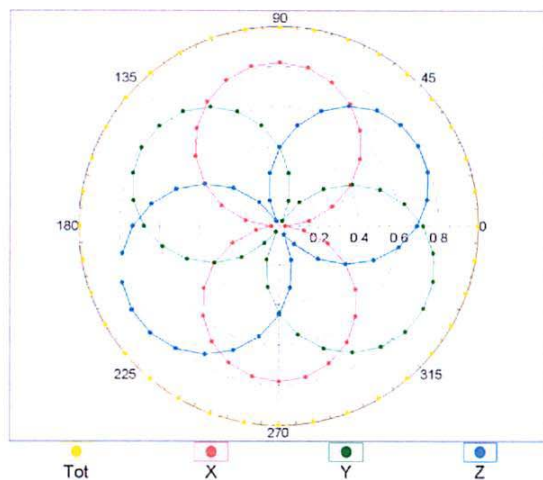
(TEM-Cell:ifi110 EXX, Waveguide: R22)



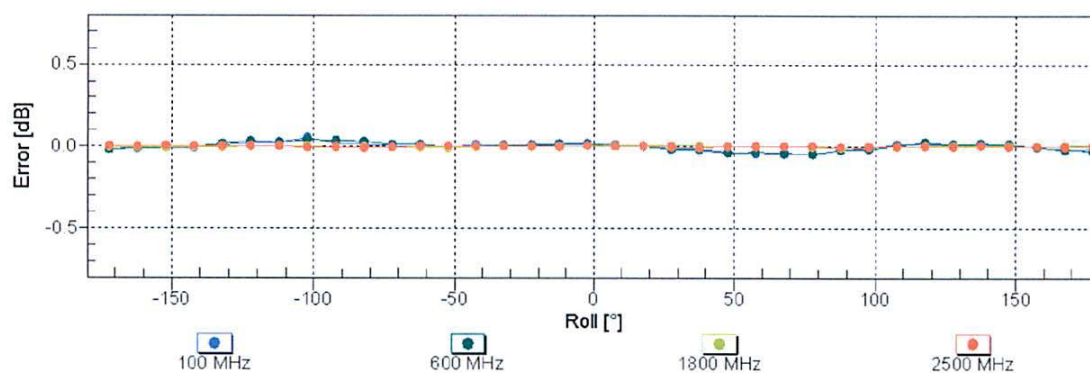
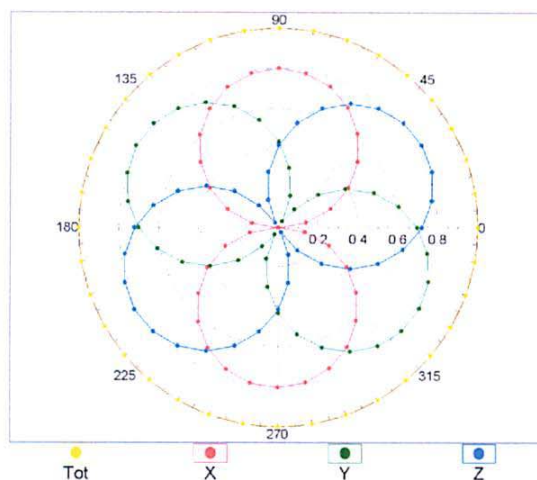
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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

f=600 MHz, TEM



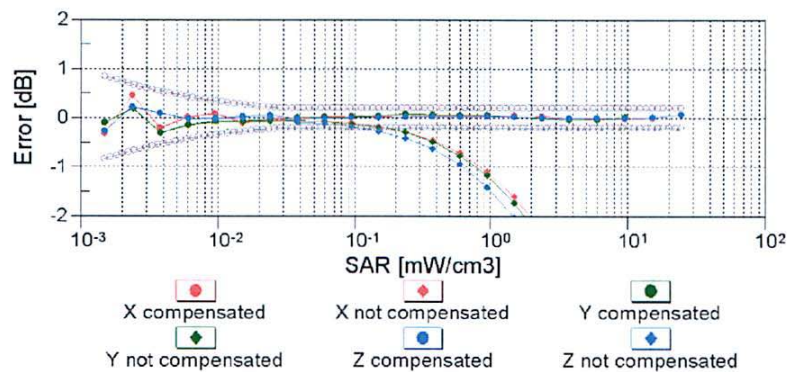
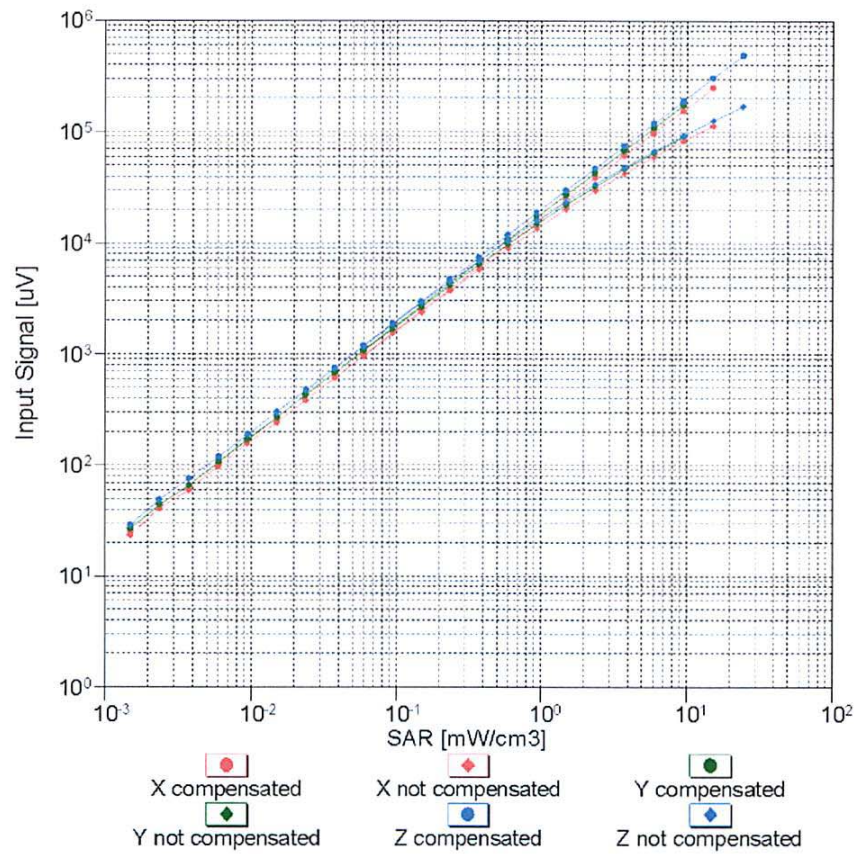
f=1800 MHz, R22



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

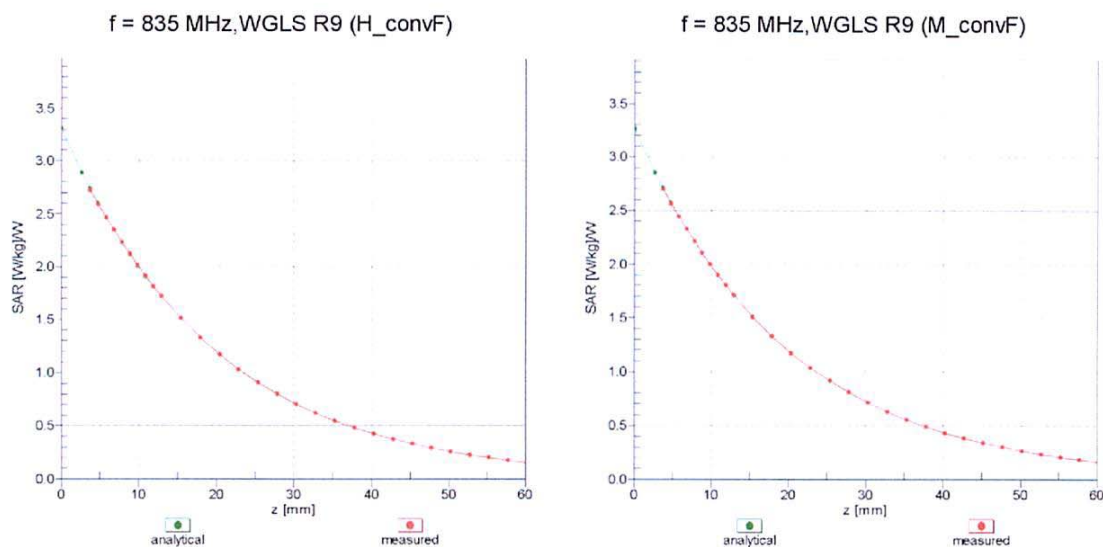
Dynamic Range f(SAR_{head})

(TEM cell , f = 900 MHz)



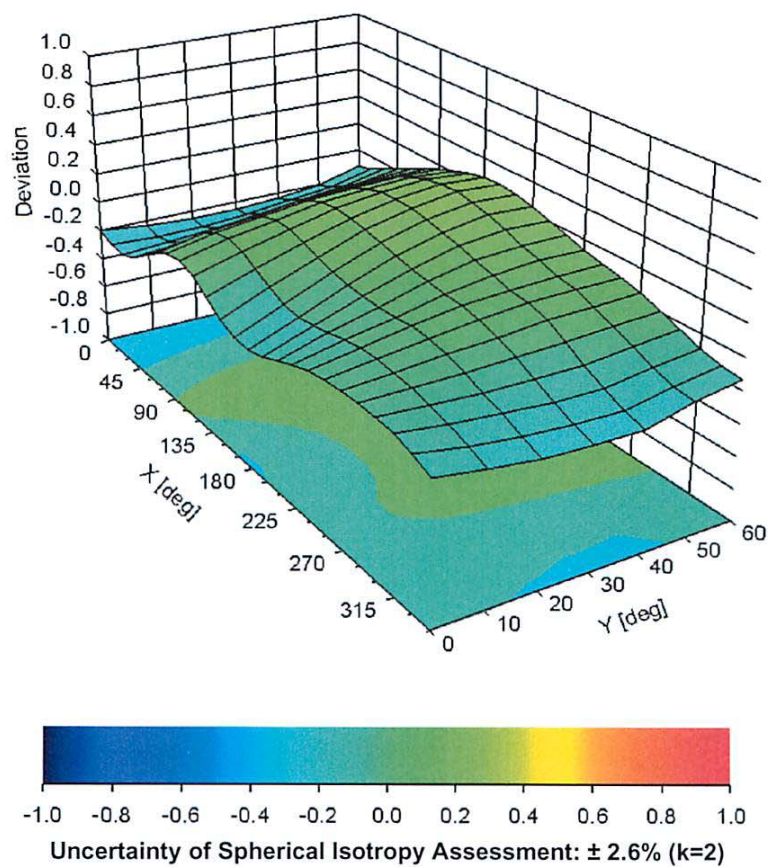
Uncertainty of Linearity Assessment: $\pm 0.6\%$ (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid



Error (ϕ , ϑ), f = 900 MHz




DASY/EASY - Parameters of Probe: ET3DV6 - SN:1590

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	enabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

	<u>Date(s) of Evaluation</u> August 04-05, 08, 2011	<u>Test Report Serial No.</u> 071111K95-T1109-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX G - BARSKI PLANAR PHANTOM CERTIFICATE OF CONFORMITY

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800	764-805 / 806-869 MHz		
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2378 Westlake Road
Kelowna, B.C. Canada
V1Z-2V2



Ph. # 250-769-6848
Fax # 250-769-6334
E-mail: barskiind@shaw.ca
Web: www.bcfiberglass.com

FIBERGLASS FABRICATORS

Certificate of Conformity

Item : Flat Planar Phantom Unit # 03-01
Date: June 16, 2003
Manufacturer: Barski Industries (1985 Ltd)

Test	Requirement	Details
Shape	Compliance to geometry according to drawing	Supplied CAD drawing
Material Thickness	Compliant with the requirements	2mm +/- 0.2mm in measurement area
Material Parameters	Dielectric parameters for required frequencies Based on Dow Chemical technical data	100 MHz-5 GHz Relative permittivity<5 Loss Tangent<0.05

Conformity

Based on the above information, we certify this product to be compliant to the requirements specified.

Signature: 

Daniel Chailier



Fiberglass Planar Phantom - Top View



Fiberglass Planar Phantom - Front View



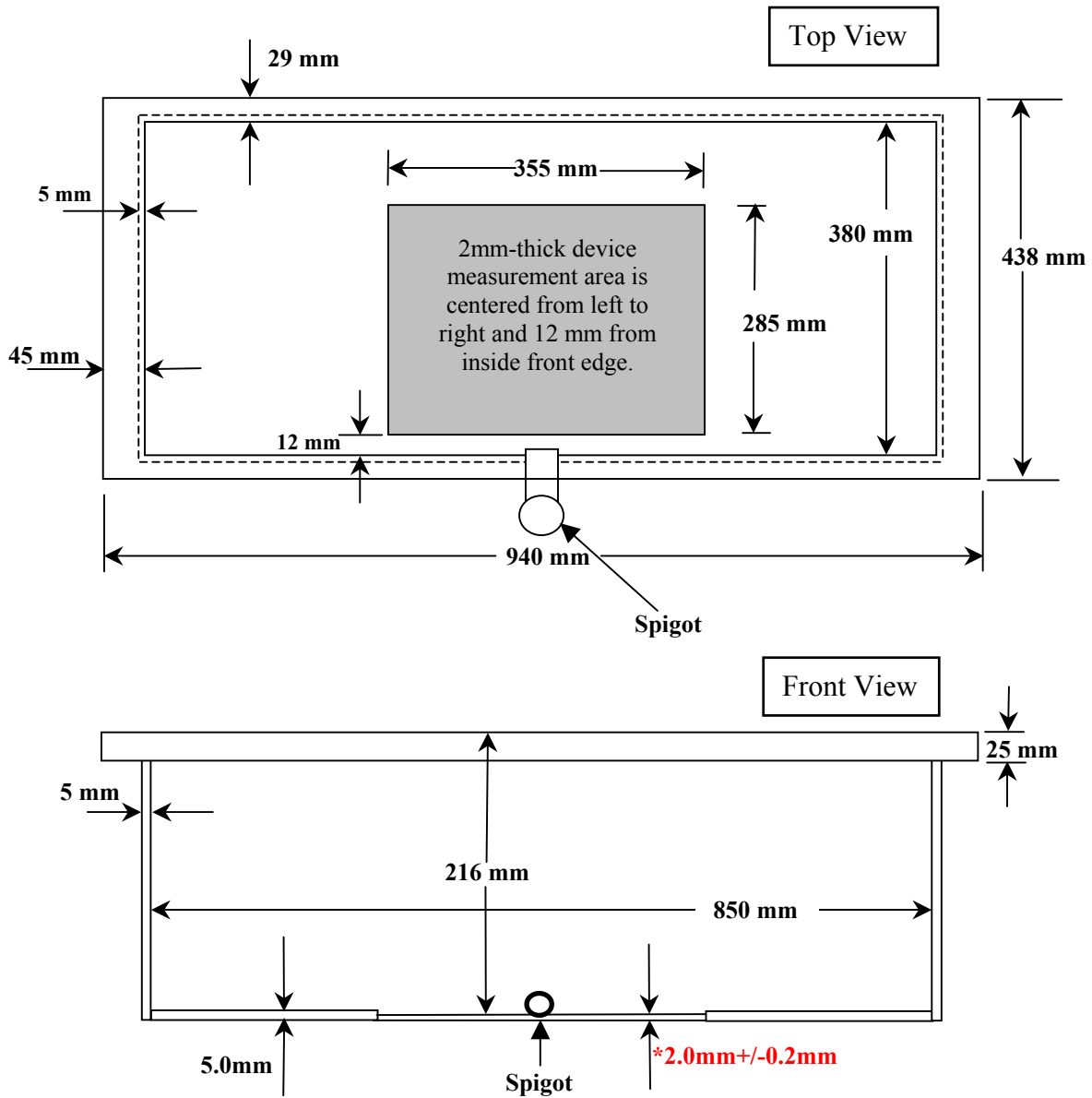
Fiberglass Planar Phantom - Back View





Fiberglass Planar Phantom - Bottom View

Dimensions of Fiberglass Planar Phantom


(Manufactured by Barski Industries Ltd. - Unit# 03-01)



**Note: Measurements that aren't repeated for the opposite sides are the same as the side measured.
This drawing is not to scale.**

	<u>Date(s) of Evaluation</u> August 04-05, 08, 2011	<u>Test Report Serial No.</u> 071111K95-T1109-S90P	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> August 11, 2011	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX H - SAM TWIN PHANTOM CERTIFICATE OF CONFORMITY

Applicant:	Relm Wireless Corp.	FCC ID:	K95KNGP800C	IC:	2116A-KNGP800C	
DUT Type:	Portable 700/800 P25 PTT Radio Transceiver	Model:	KNG-P800	764-805 / 806-869 MHz		
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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

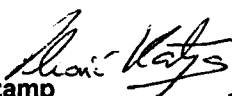
- [1] CENELEC EN 50361
- [2] IEEE P1528-200x draft 6.5
- [3] IEC PT 62209 draft 0.9
- (*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

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**



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