



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 Report Issue Date  
August 11, 2011

Description of Test(s)  
Specific Absorption Rate

RF Exposure Category  
Occupational (Controlled)

Test Lab Certificate No. 2470.01

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

|   |  |  |   |                              |                             |                                |               |              |
|---|--|--|---|------------------------------|-----------------------------|--------------------------------|---------------|--------------|
| <b>Test Lab Information</b>   |  | <b>Name</b>  | CELLTECH LABS INC.  |                              |                             |                                |               |              |
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| <b>Test Lab Accreditation(s)</b>  |  | <b>A2LA</b>  | ISO/IEC 17025:2005 (A2LA Test Lab Certificate No. 2470.01)            |                              |                             |                                |               |              |
| <b>Applicant Information</b>  |  | <b>Name</b>  | RELM WIRELESS CORPORATION - BK RADIO                                  |                              |                             |                                |               |              |
|   |  | <b>Address</b>   | 7100 Technology Drive, W. Melbourne, FL 32904 USA                     |                              |                             |                                |               |              |
| <b>Standard(s) Applied</b>  |  | <b>FCC</b>   | 47 CFR §2.1093  | <b>IC</b>                    | Health Canada Safety Code 6 |                                |               |              |
| <b>Procedure(s) Applied</b>   |  | <b>FCC</b>   | OET Bulletin 65, Supplement C (01/01)                                 |                              |                             |                                |               |              |
|   |  |  | KDB 447498 D01v04 (Mobile & Portable Device - RF Exposure Procedures) |                              |                             |                                |               |              |
|   |  | <b>IC</b>  | RSS-102 Issue 4   | <b>IEEE</b>                  | 1528-2003                   | <b>IEC</b>                     | 62209-2:2010  |              |
| <b>Device Classification(s)</b>   |  | <b>FCC</b>   | Licensed Non-Broadcast Transmitter Held to Face (TNF) - FCC Part 90   |                              |                             |                                |               |              |
|   |  | <b>IC</b>  | Land Mobile Radio Transmitter/Receiver (27.41-960 MHz) - RSS-119      |                              |                             |                                |               |              |
| <b>Device Identifier(s)</b>   |  | <b>FCC ID:</b>   | K95KNGP800C   | <b>Application Type</b>      | FCC TCB Certification       |                                |               |              |
|   |  | <b>IC</b>  | 2116A-KNGP800C  | <b>Application Type</b>      | IC CB Certification         |                                |               |              |
| <b>Date of Sample Receipt</b>   |  | July 11, 2011  |   |                              |                             |                                |               |              |
| <b>Dates of Evaluation</b>  |  | August 04-05, 08, 2011   |   |                              |                             |                                |               |              |
| <b>Device Description</b>   |  | Portable 700/800-Band P25 Push-To-Talk (PTT) Radio Transceiver |   |                              |                             |                                |               |              |
| <b>Device Model(s)</b>  |  | KNG-P800   |   |                              |                             |                                |               |              |
| <b>Test Sample Serial No.</b>   |  | 11130001 (Pre-production)                                      |   |                              |                             |                                |               |              |
| <b>Test Sample Revision No.s</b>  |  | <b>Hardware</b>  | RF Assembly: Ver. 8; System Logic: Ver. 6                             | <b>Firmware</b>              | 4.1.2                       |                                |               |              |
| <b>Transmit Frequency Range(s)</b>  |  | <b>FCC/IC</b>  | 764 - 777 MHz   | 794 - 805 MHz                | 806 - 824 MHz               | 851 - 870 MHz                  |               |              |
| <b>Manufacturer's Rated Output Power</b>  |  | 2.5 W (Conducted) - 700 Band                                   |   | <b>Upper Tolerance Spec.</b> |                             | + 0.5 W (700 Band)             |               |              |
|   |  | 3.0 W (Conducted) - 800 Band                                   |   |                              |                             | + 0.5 W (800 Band)             |               |              |
| <b>Antenna Type(s) Tested</b>   |  | 1/2-wave Whip  | Detachable  |                              | Length: 195 mm              |                                | P/N: KAA0825  |              |
| <b>Battery Type(s) Tested</b>   |  | Li-Ion   | 10.8 V  |                              | 1950 mAh                    |                                | P/N: KAA0100  |              |
|   |  | Li-Ion   | 10.8 V  |                              | 3450 mAh                    |                                | P/N: KAA0101  |              |
| <b>Body-worn Accessories Tested</b>   |  | Belt-Clip  |   | Contains metal components    |                             |                                | P/N: KAA0400  |              |
|   |  | Carry Case   |   | Contains metal components    |                             |                                | P/N: KAA0451B |              |
| <b>Audio Accessories Tested</b>   |  | Speaker-Microphone   |   |                              |                             |                                |               | P/N: KAA0200 |
| <b>Max. SAR Level(s) Evaluated</b>  |  | Face-held  | <b>1.28 W/kg</b>  | 1g                           | 50% PTT duty cycle          | Occupational / Controlled Exp. |               |              |
|   |  | Body-worn  | <b>3.21 W/kg</b>  | 1g                           | 50% PTT duty cycle          | Occupational / Controlled Exp. |               |              |
| <b>FCC/IC Spatial Peak SAR Limit</b>  |  | 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.  |  |  |   |                              |                             |                                |               |              |
| This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc.  |  |  |   |                              |                             |                                |               |              |
| The results and statements contained in this report pertain only to the device(s) evaluated.  |  |  |   |                              |                             |                                |               |              |
| <b>Test Report Approved By</b>  |  |  |   | Sean Johnston                | <b>Lab Manager</b>          | Celltech Labs Inc.             |               |              |

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

### 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 | <br><b>RELM</b><br><small>WIRELESS</small> |
| DUT Type:               | Portable 700/800 P25 PTT Radio Transceiver   | Model:  | KNG-P800    | 764-805 / 806-869 MHz |     |                |   |
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| <br><b>Celltech</b><br>Testing and Engineering Services Ltd. | <u>Date(s) of Evaluation</u><br>August 04-05, 08, 2011 | <u>Test Report Serial No.</u><br>071111K95-T1109-S90P     | <u>Test Report Revision No.</u><br>Rev. 1.0 (Initial Release) | <br>Test Lab Certificate No. 2470.01 |
|  | <u>Test Report Issue Date</u><br>August 11, 2011       | <u>Description of Test(s)</u><br>Specific Absorption Rate | <u>RF Exposure Category</u><br>Occupational (Controlled)      |  |

## 1.0 INTRODUCTION

This measurement report demonstrates that the Rehm 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:              | Rehm 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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|   |                          |                           |                            |   |
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| <br>Testing and Engineering Services Ltd. | Date(s) of Evaluation    | Test Report Serial No.    | Test Report Revision No.   | <br>IAC-MRA |
|   | August 04-05, 08, 2011   | 071111K95-T1109-S90P      | Rev. 1.0 (Initial Release) |   |
| Test Report Issue Date  | Description of Test(s)   | RF Exposure Category      |                            |   |
| August 11, 2011   | Specific Absorption Rate | Occupational (Controlled) |                            | 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)ii) (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  $\pm 50$  MHz of the probe calibration frequency. At 300 MHz to 3 GHz, measurements should be within  $\pm 100$  MHz of the probe calibration frequency. Measurements exceeding 50% of these intervals,  $\pm 25$  MHz  $<$  300 MHz and  $\pm 50$  MHz  $\geq$  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 | $\pm 50$ MHz $\geq$ 300 MHz |
|-------------------------|--------------------------|--------------------|-----------------------------|
| 835 MHz                 | 777.0 MHz                | 58 MHz             | $> 50$ MHz <sup>2</sup>     |
|                         | 805.0 MHz                | 30 MHz             | $< 50$ MHz <sup>1</sup>     |
|                         | 806.0 MHz                | 29 MHz             | $< 50$ MHz <sup>1</sup>     |
|                         | 851.0 MHz                | 16 MHz             | $< 50$ MHz <sup>1</sup>     |

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 | <br>RELM |
| DUT Type:               | Portable 700/800 P25 PTT Radio Transceiver   | Model:  | KNG-P800    | 764-805 / 806-869 MHz |                |   |
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|  | Test Report Issue Date<br>August 11, 2011       | Description of Test(s)<br>Specific Absorption Rate | RF Exposure Category<br>Occupational (Controlled)      |   |

## 7.0 MANUFACTURER'S DISCLOSED ACCESSORY LISTING

|   |                            |                             |
|---|----------------------------|-----------------------------|
| <b>Accessory ID #<br/>for Test Report</b> | <b>ACCESSORY CATEGORY:</b> | <b>ANTENNA</b>              |
|   | <b>Part Number</b>         | <b>Description</b>          |
| 1   | KAA0825                    | 1/2-wave Whip               |
| <b>Accessory ID #<br/>for Test Report</b> | <b>ACCESSORY CATEGORY:</b> | <b>BATTERY</b>              |
|   | <b>Part Number</b>         | <b>Description</b>          |
| a   | KAA0100                    | Lithium Ion 10.8V, 1950mAh  |
| b   | KAA0101                    | Lithium Ion 10.8V, 3450mAh  |
| <b>Accessory ID #<br/>for Test Report</b> | <b>ACCESSORY CATEGORY:</b> | <b>BODY-WORN</b>            |
|   | <b>Part Number</b>         | <b>Description</b>          |
| 1   | KAA0451B                   | Carry Case (contains metal) |
| 2   | KAA0400                    | Belt-clip (contains metal)  |
| <b>Accessory ID #<br/>for Test Report</b> | <b>ACCESSORY CATEGORY:</b> | <b>AUDIO</b>                |
|   | <b>Part Number</b>         | <b>Description</b>          |
| 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 DASY4 software

| Test Date | Fluid Type | Ambient Temperature | Fluid Temperature | Fluid Depth | Atmospheric Pressure | Relative Humidity | $\rho$ (Kg/m <sup>3</sup> ) |
|-----------|------------|---------------------|-------------------|-------------|----------------------|-------------------|-----------------------------|
| Aug 4     | 835 Body   | 23.0 °C             | 23.5 °C           | ≥ 15 cm     | 101.1 kPa            | 34%               | 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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|   |                          |                           |                            |   |
|---|--------------------------|---------------------------|----------------------------|---|
| <br>Testing and Engineering Services Ltd. | Date(s) of Evaluation    | Test Report Serial No.    | Test Report Revision No.   | <br>IAC-MRA |
|   | August 04-05, 08, 2011   | 071111K95-T1109-S90P      | Rev. 1.0 (Initial Release) |   |
| Test Report Issue Date  | Description of Test(s)   | RF Exposure Category      |                            |   |
| August 11, 2011   | Specific Absorption Rate | Occupational (Controlled) |                            | Test Lab Certificate No. 2470.01  |

| 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 | $\rho$ (Kg/m <sup>3</sup> ) |
|-----------|------------|---------------------|-------------------|-------------|----------------------|-------------------|-----------------------------|
| Aug 5     | 835 Body   | 23.0 °C             | 23.3 °C           | ≥ 15 cm     | 101.1 kPa            | 36%               | 1000                        |

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

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 | $\rho$ (Kg/m <sup>3</sup> ) |
|-----------|------------|---------------------|-------------------|-------------|----------------------|-------------------|-----------------------------|
| 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 | <br>RELM |
| DUT Type:               | Portable 700/800 P25 PTT Radio Transceiver   | Model:  | KNG-P800    | 764-805 / 806-869 MHz |     |                |   |
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|   |                          |                           |                            |   |
|---|--------------------------|---------------------------|----------------------------|---|
| <br>Testing and Engineering Services Ltd. | Date(s) of Evaluation    | Test Report Serial No.    | Test Report Revision No.   | <br>IAC-MRA |
|   | August 04-05, 08, 2011   | 071111K95-T1109-S90P      | Rev. 1.0 (Initial Release) |   |
| Test Report Issue Date  | Description of Test(s)   | RF Exposure Category      |                            |   |
| August 11, 2011   | Specific Absorption Rate | Occupational (Controlled) |                            | Test Lab Certificate No. 2470.01  |

| 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 | $\rho$ (Kg/m <sup>3</sup> ) |
|-----------|------------|---------------------|-------------------|-------------|----------------------|-------------------|-----------------------------|
| Aug 8     | 835 Head   | 24.0 °C             | 24.2 °C           | ≥ 15 cm     | 101.1 kPa            | 31%               | 1000                        |

|                         |  |         |             |                       |     |                |   |
|-------------------------|--|---------|-------------|-----------------------|-----|----------------|---|
| Applicant:              | Relm Wireless Corp.  | FCC ID: | K95KNGP800C |                       | IC: | 2116A-KNGP800C | <br>RELM |
| DUT Type:               | Portable 700/800 P25 PTT Radio Transceiver   | Model:  | KNG-P800    | 764-805 / 806-869 MHz |     |                |   |
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|  |  |   |   |   |
|--|--|---|---|---|
| <br><b>Celltech</b><br><small>Testing and Engineering Services Ltd</small> | <u>Date(s) of Evaluation</u><br>August 04-05, 08, 2011 | <u>Test Report Serial No.</u><br>071111K95-T1109-S90P     | <u>Test Report Revision No.</u><br>Rev. 1.0 (Initial Release) | <br><b>IAC-MRA</b><br><br><b>ACCREDITED</b> |
|  | <u>Test Report Issue Date</u><br>August 11, 2011       | <u>Description of Test(s)</u><br>Specific Absorption Rate | <u>RF Exposure Category</u><br>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..."*

|                         |  |                |                    |                              |            |                       |   |
|-------------------------|--|----------------|--------------------|------------------------------|------------|-----------------------|---|
| <b>Applicant:</b>       | Relm Wireless Corp.  | <b>FCC ID:</b> | <b>K95KNGP800C</b> |                              | <b>IC:</b> | <b>2116A-KNGP800C</b> | <br><b>RELM</b><br><small>WIRELESS</small> |
| <b>DUT Type:</b>        | Portable 700/800 P25 PTT Radio Transceiver   | <b>Model:</b>  | KNG-P800           | <b>764-805 / 806-869 MHz</b> |            |                       |   |
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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 Report Issue Date  
August 11, 2011

Description of Test(s)  
Specific Absorption Rate

RF Exposure Category  
Occupational (Controlled)



## 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.<br>(MHz) | Conducted<br>Power<br>Before<br>Test<br>(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<br>(KAA0825)              | 764.0               | 3.0  | N/A   |                |                                 | N/A                       |       |  |  |  |  |  |  |  |  |  |  |
| 2  |                             | 777.0               | 3.1  | F1  | 1.02           | 0.510                           | F2                        | 0.939 |  |  |  |  |  |  |  |  |  |  |
|  |                             |                     |  |   | -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  |  |  |  |  |  |  |  |  |  |  |
|  |                             |                     |  |   | 0.262          | -                               |                           | 0.191 |  |  |  |  |  |  |  |  |  |  |
| 5  |                             | 806.0               | 3.8  | F5  | 2.55           | 1.28                            | F6                        | 2.37  |  |  |  |  |  |  |  |  |  |  |
|  |                             |                     |  |   | -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  |  |  |  |  |  |  |  |  |  |  |
|  |                             |                     |  |   | -0.528         | 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 |       |  |  |  |  |  |  |  |  |  |  |
| <b>Notes</b>   |                             |                     |  |   |                |                                 |                           |       |  |  |  |  |  |  |  |  |  |  |
| Test Mode = CW (Unmodulated Continuous Wave)   |                             |                     |  | Phantom = Side Planar Phantom                       |                |                                 |                           |       |  |  |  |  |  |  |  |  |  |  |
| DUT Distance to Planar Phantom<br>(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 |   |                |                                 |                           |       |  |  |  |  |  |  |  |  |  |  |
| <b>Test Procedures in accordance with FCC KDB 643646 (see reference [8])</b>   |                             |                     |  |   |                |                                 |                           |       |  |  |  |  |  |  |  |  |  |  |
| 1. For face-held configuration, battery "a" was selected as the default battery based on the highest capacity battery.   |                             |                     |  |   |                |                                 |                           |       |  |  |  |  |  |  |  |  |  |  |
| 2. When the head SAR of an antenna tested on the highest output power channel using the default battery is $\leq 4.0$ 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 $\leq 3.5$ W/kg (50% PTT duty factor), testing of all other required channels is not necessary. |                             |                     |  |   |                |                                 |                           |       |  |  |  |  |  |  |  |  |  |  |
| 3. When the SAR for all antennas tested using the default battery is $\leq 4.0$ W/kg, test additional batteries using the antenna and channel configuration that resulted in the highest SAR.  |                             |                     |  |   |                |                                 |                           |       |  |  |  |  |  |  |  |  |  |  |
| 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 | RELM<br>WIRELESS |
| DUT Type:               | Portable 700/800 P25 PTT Radio Transceiver |  | Model:      | KNG-P800 | 764-805 / 806-869 MHz |                |                  |
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|  |  |   |   |  |
|--|--|---|---|--|
| <br><b>Celltech</b><br><small>Testing and Engineering Services Ltd.</small> | <u>Date(s) of Evaluation</u><br>August 04-05, 08, 2011 | <u>Test Report Serial No.</u><br>071111K95-T1109-S90P     | <u>Test Report Revision No.</u><br>Rev. 1.0 (Initial Release) | <br><b>ILAC-MRA</b><br><br><b>ACCREDITED</b> |
|  | <u>Test Report Issue Date</u><br>August 11, 2011       | <u>Description of Test(s)</u><br>Specific Absorption Rate | <u>RF Exposure Category</u><br>Occupational (Controlled)      |  |

## 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.<br>(MHz)         | Conducted<br>Power<br>Before<br>Test<br>(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<br>(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  $\leq 3.5$  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  $\leq 4.0$  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).

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

## 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 | <br><small>RELM<br/>WIRELESS</small> |  |
| DUT Type:               | Portable 700/800 P25 PTT Radio Transceiver   | Model:  | KNG-P800    | 764-805 / 806-869 MHz |     |                |   |  |
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| <br><b>Celltech</b><br><small>Testing and Engineering Services Ltd</small> | <u>Date(s) of Evaluation</u><br>August 04-05, 08, 2011 | <u>Test Report Serial No.</u><br>071111K95-T1109-S90P     | <u>Test Report Revision No.</u><br>Rev. 1.0 (Initial Release) | <br><b>IAC-MRA</b><br><br><b>ACCREDITED</b> |
|  | <u>Test Report Issue Date</u><br>August 11, 2011       | <u>Description of Test(s)</u><br>Specific Absorption Rate | <u>RF Exposure Category</u><br>Occupational (Controlled)      |   |

Test Lab Certificate No. 2470.01

## 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:

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

$$\begin{aligned} \text{F1 SAR adjusted for Sensitivity:} &= 0.770 * 5.69\% = \mathbf{0.814 \text{ W/kg}} \\ \text{F2 SAR adjusted for Sensitivity:} &= 0.470 * 5.69\% = \mathbf{0.497 \text{ W/kg}} \end{aligned}$$

For tests B1, B2, B9 and B10:

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

$$\begin{aligned} \text{B1 SAR adjusted for Sensitivity:} &= 1.46 * 3.84\% = \mathbf{1.52 \text{ W/kg}} \\ \text{B2 SAR adjusted for Sensitivity:} &= 0.936 * 3.84\% = \mathbf{0.972 \text{ W/kg}} \\ \text{B9 SAR adjusted for Sensitivity:} &= 1.32 * 3.84\% = \mathbf{1.37 \text{ W/kg}} \\ \text{B10 SAR adjusted for Sensitivity:} &= 0.881 * 3.84\% = \mathbf{0.915 \text{ W/kg}} \end{aligned}$$

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

## 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 droop of the DUT was measured by the DASY4 system for the duration of the SAR evaluations. The measured SAR droop 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 droop evaluation was performed (see Appendix A).
5. The fluid temperature was measured prior to and after the SAR evaluations. The fluid temperature remained within +/-2°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.

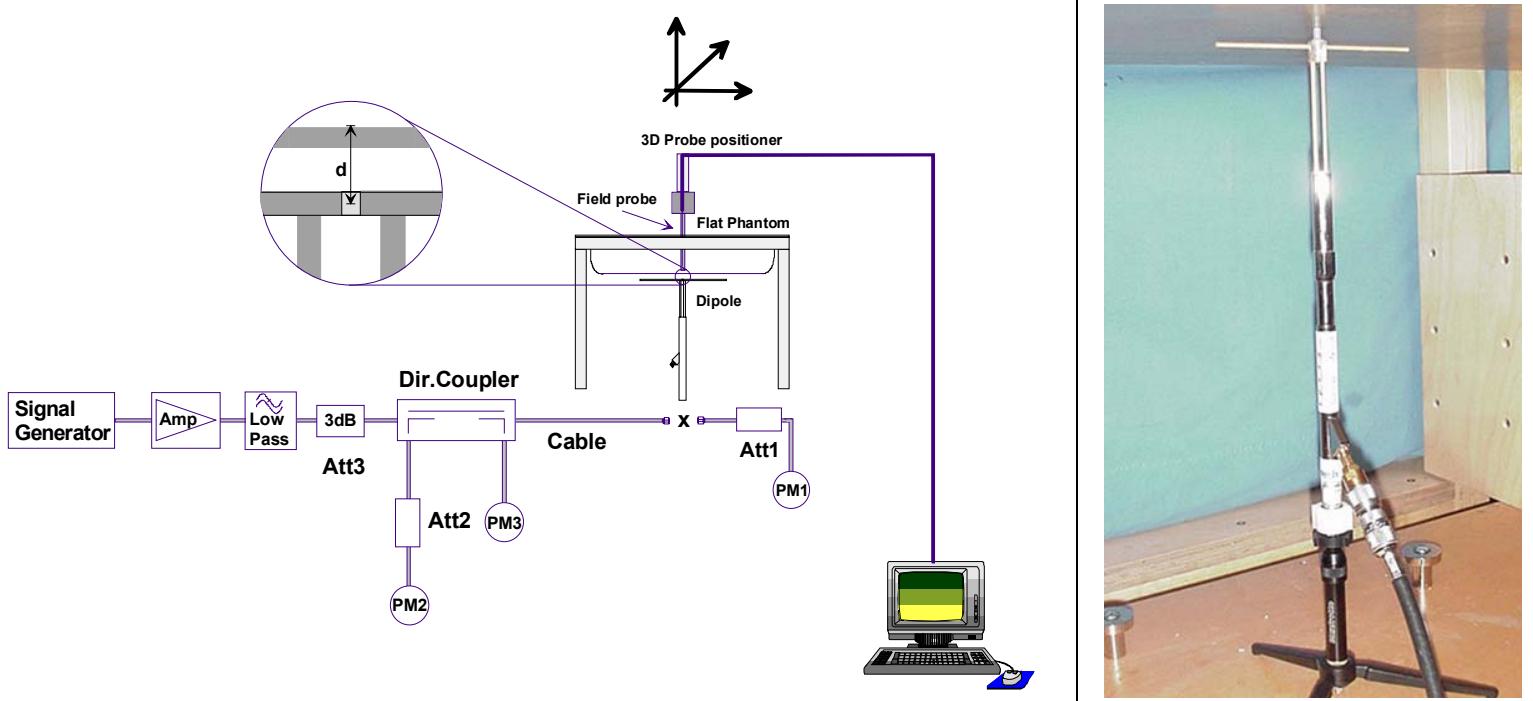
|                   |  |                |                    |                       |            |                       |   |
|-------------------|--|----------------|--------------------|-----------------------|------------|-----------------------|---|
| <b>Applicant:</b> | Relm Wireless Corp.   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

## 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 | 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) |
|-----------|---------------|---|--------|-------|----------------------------------|--------|-------|-------------------------------|--------|-------|-----------------------------|-----------------|------------------|------------------|------------|---------------------|
|           |               | Freq. (MHz)   | 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             | $\geq 15$        | 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             | $\geq 15$        | 31         | 101.1               |
| Notes     | 1.            | The target SAR values are the measured values from the dipole calibration performed by SPEAG (see Appendix E).  |        |       |                                  |        |       |                               |        |       |                             |                 |                  |                  |            |                     |
|           | 2.            | The target dielectric parameters are the nominal values from the dipole calibration performed by SPEAG (see Appendix E).  |        |       |                                  |        |       |                               |        |       |                             |                 |                  |                  |            |                     |
|           | 3.            | The fluid temperature was measured prior to and after the system performance check. The temperature remained within $\pm 2^\circ\text{C}$ .   |        |       |                                  |        |       |                               |        |       |                             |                 |                  |                  |            |                     |
|           | 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). |        |       |                                  |        |       |                               |        |       |                             |                 |                  |                  |            |                     |
|           | 5.            | 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

|                         |  |  |             |                       |     |                |               |
|-------------------------|--|--|-------------|-----------------------|-----|----------------|---------------|
| 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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|   |   |  |  |   |
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| <br>Testing and Engineering Services Ltd. | Date(s) of Evaluation<br>August 04-05, 08, 2011 | Test Report Serial No.<br>071111K95-T1109-S90P     | Test Report Revision No.<br>Rev. 1.0 (Initial Release) | <br>IAC-MRA<br>ACCREDITED |
|   | Test Report Issue Date<br>August 11, 2011       | Description of Test(s)<br>Specific Absorption Rate | RF Exposure Category<br>Occupational (Controlled)      |   |

Test Lab Certificate No. 2470.01

## 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<br>Tissue Mixture | 40.71 % | 835 MHz Body<br>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<br>(averaged over the whole body)             | 0.08 W/kg                                    | 0.4 W/kg                             |
|  | Spatial Peak<br>(averaged over any 1 g of tissue)             | 1.6 W/kg                                     | 8.0 W/kg                             |
|  | Spatial Peak<br>(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. |   |  |                                      |

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

## 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<br>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                                       | $\pm 0.2$ dB (30 MHz to 3 GHz)  |
| <u>Phantom</u>                                  |   |
| Type  | SAM V4.0C   |
| Shell Material                                  | Fiberglass  |
| Thickness                                       | $2.0 \pm 0.1$ mm  |
| Volume  | Approx. 25 liters   |
| <u>Phantom</u>                                  |   |
| Type  | Side Planar Phantom   |
| Shell Material                                  | Plexiglass  |
| Bottom Thickness                                | $2.0 \text{ mm} \pm 0.1 \text{ mm}$   |
| 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                                       | $2.0 \pm 0.1$ mm  |
| Volume  | Approx. 70 liters   |

|                         |  |  |             |                       |     |                |   |
|-------------------------|--|--|-------------|-----------------------|-----|----------------|---|
| 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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## 19.0 PROBE SPECIFICATION (ET3DV6)

|                 |   |
|-----------------|---|
| Construction:   | Symmetrical design with triangular core;<br>Built-in shielding against static charges   |
| Calibration:    | PEEK enclosure material (resistant to organic solvents, glycol)<br>In air from 10 MHz to 2.5 GHz<br>In head 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 head tissue (rotation around probe axis)<br>$\pm$ 0.4 dB in head 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;<br>Body diameter: 12 mm; Tip diameter: 6.8 mm<br>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

## 20.0 SAM TWIN PHANTOM V4.0C

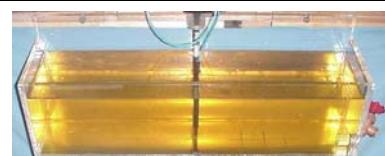
The SAM Twin Phantom V4.0C is a fiberglass shell phantom with a 2.0 mm (+/-0.2 mm) shell thickness for left and right head and flat planar area integrated in a wooden table. The shape of the fiberglass shell corresponds to the phantom defined by SCC34-SC2. The device holder positions are adjusted to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



SAM Twin Phantom V4.0C

## 21.0 SIDE 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

## 22.0 BARSKI PLANAR PHANTOM

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.



Barski Planar Phantom

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

## 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. |  |
|   | <b>Device Holder</b>  |

## 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           |           |            |                 |                      |

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

## 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 (< -20dB, within 20% of prior calibration) and impedance (within 5Ω from prior calibration) requirements per extended calibrations in FCC KDB 450824 (see reference [9]).

| <b>SPEAG D835V3 SN: 4d075</b> |                  |                   |                         |            |                      |            |
|-------------------------------|------------------|-------------------|-------------------------|------------|----------------------|------------|
| <b>Date of Measurement</b>    | <b>Frequency</b> | <b>Fluid Type</b> | <b>Return Loss (dB)</b> | <b>Δ %</b> | <b>Impedance (Ω)</b> | <b>Δ Ω</b> |
| 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        |

|                   |  |                |             |               |                |   |
|-------------------|--|----------------|-------------|---------------|----------------|---|
| <b>Applicant:</b> | Relm Wireless Corp.                        | <b>FCC ID:</b> | K95KNGP800C | <b>IC:</b>    | 2116A-KNGP800C | <br><b>RELM</b><br><small>Wireless Solutions</small> |
| <b>DUT Type:</b>  | Portable 700/800 P25 PTT Radio Transceiver |                |             | <b>Model:</b> | KNG-P800       |   |



Date(s) of Evaluation  
August 04-05, 08, 2011

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Test Report Revision No.  
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Test Report Issue Date  
August 11, 2011

Description of Test(s)  
Specific Absorption Rate

RF Exposure Category  
Occupational (Controlled)

Test Lab Certificate No. 2470.01

## 26.0 MEASUREMENT UNCERTAINTIES

### UNCERTAINTY BUDGET FOR DEVICE EVALUATION

| Uncertainty Component   | IEEE 1528 Section | Uncertainty Value ±% | Probability Distribution | Divisor     | ci 1g | ci 10g | Uncertainty Value ±% (1g) | Uncertainty Value ±% (10g) | V <sub>i</sub> or V <sub>eff</sub> |
|---|-------------------|----------------------|--------------------------|-------------|-------|--------|---------------------------|----------------------------|------------------------------------|
| <b>Measurement System</b>   |                   |                      |                          |             |       |        |                           |                            |                                    |
| 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                        | ∞                                  |
| <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                        | ∞                                  |
| <b>Phantom and Tissue Parameters</b>  |                   |                      |                          |             |       |        |                           |                            |                                    |
| 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                        | ∞                                  |
| <b>Combined Standard Uncertainty</b>  |                   |                      |                          | <b>RSS</b>  |       |        |                           | <b>11.97</b>               | <b>11.20</b>                       |
| <b>Expanded Uncertainty (95% Confidence Interval)</b>                           |                   |                      |                          | <b>k=2</b>  |       |        |                           | <b>23.94</b>               | <b>22.41</b>                       |
| <b>Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003</b> |                   |                      |                          |             |       |        |                           |                            |                                    |

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

|                         |  |  |             |                       |     |                |               |
|-------------------------|--|--|-------------|-----------------------|-----|----------------|---------------|
| 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><br>August 11, 2011       | <u>Description of Test(s)</u><br>Specific Absorption Rate | <u>RF Exposure Category</u><br>Occupational (Controlled)      |



Test Lab Certificate No. 2470.01

## APPENDIX B - SYSTEM PERFORMANCE CHECK

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

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

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:  $f = 835$  MHz;  $\sigma = 0.97$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

- 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: Fiberglas 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=10mm, dy=10mm

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

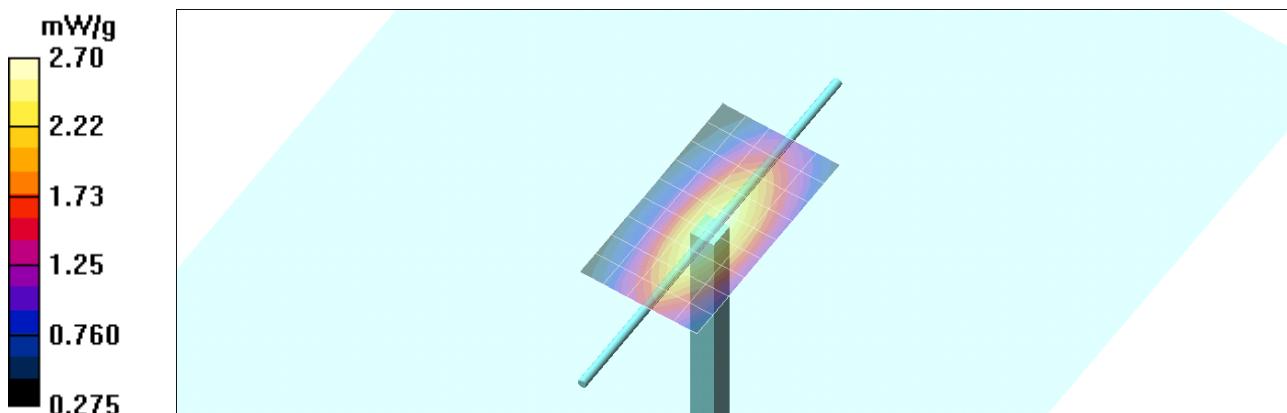
**Body d=15mm Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

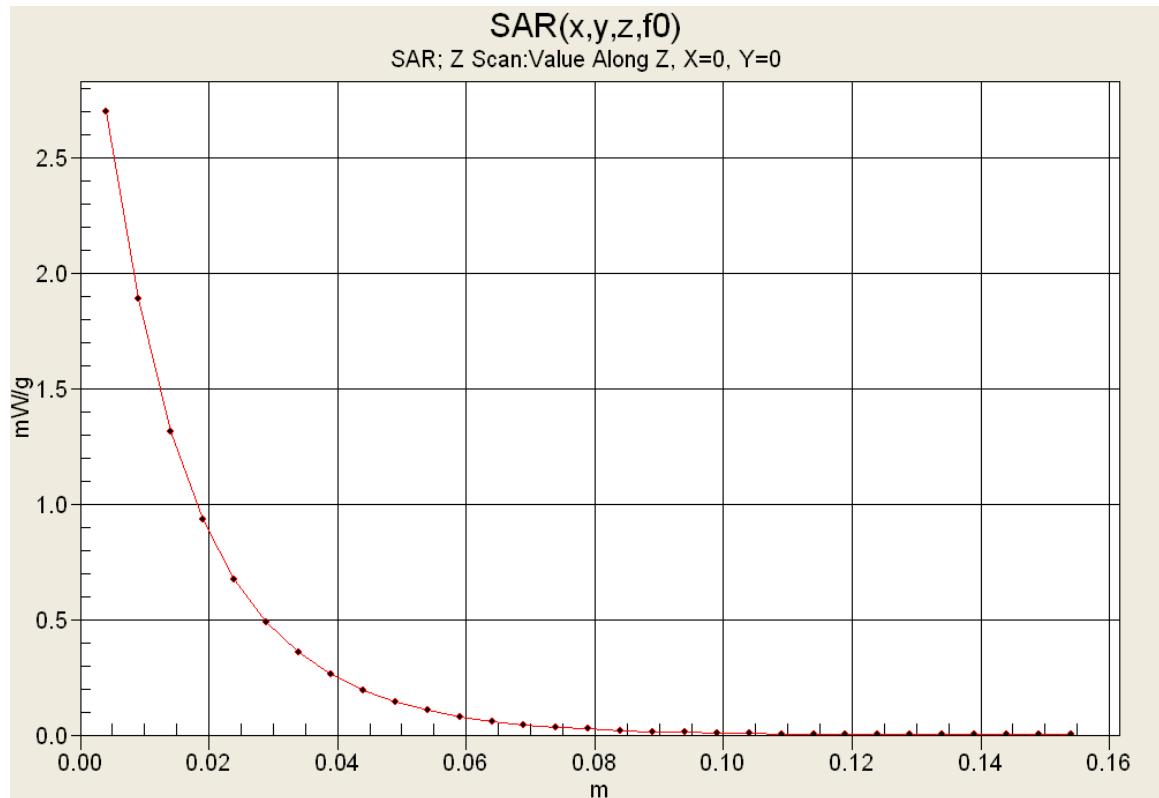


|            |  |         |             |                       |     |                |   |
|------------|--|---------|-------------|-----------------------|-----|----------------|---|
| Applicant: | Relm Wireless Corp.                        | FCC ID: | K95KNGP800C |                       | IC: | 2116A-KNGP800C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

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

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## Z-Axis Scan



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

|  |  |   |   |  |
|--|--|---|---|--|
| <br>Testing and Engineering Services Ltd | <u>Date(s) of Evaluation</u><br>August 04-05, 08, 2011 | <u>Test Report Serial No.</u><br>071111K95-T1109-S90P     | <u>Test Report Revision No.</u><br>Rev. 1.0 (Initial Release) | <br>Test Lab Certificate No. 2470.01 |
|  | <u>Test Report Issue Date</u><br>August 11, 2011       | <u>Description of Test(s)</u><br>Specific Absorption Rate | <u>RF Exposure Category</u><br>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:  $f = 835$  MHz;  $\sigma = 0.89$  mho/m;  $\epsilon_r = 42.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

- 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: Fiberglas; 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=10mm, dy=10mm

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

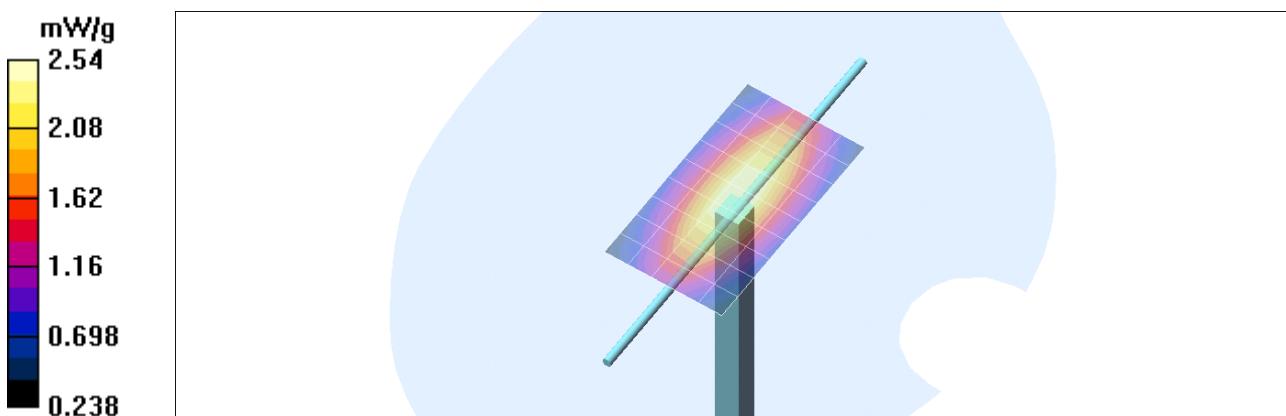
**Head d=15mm Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

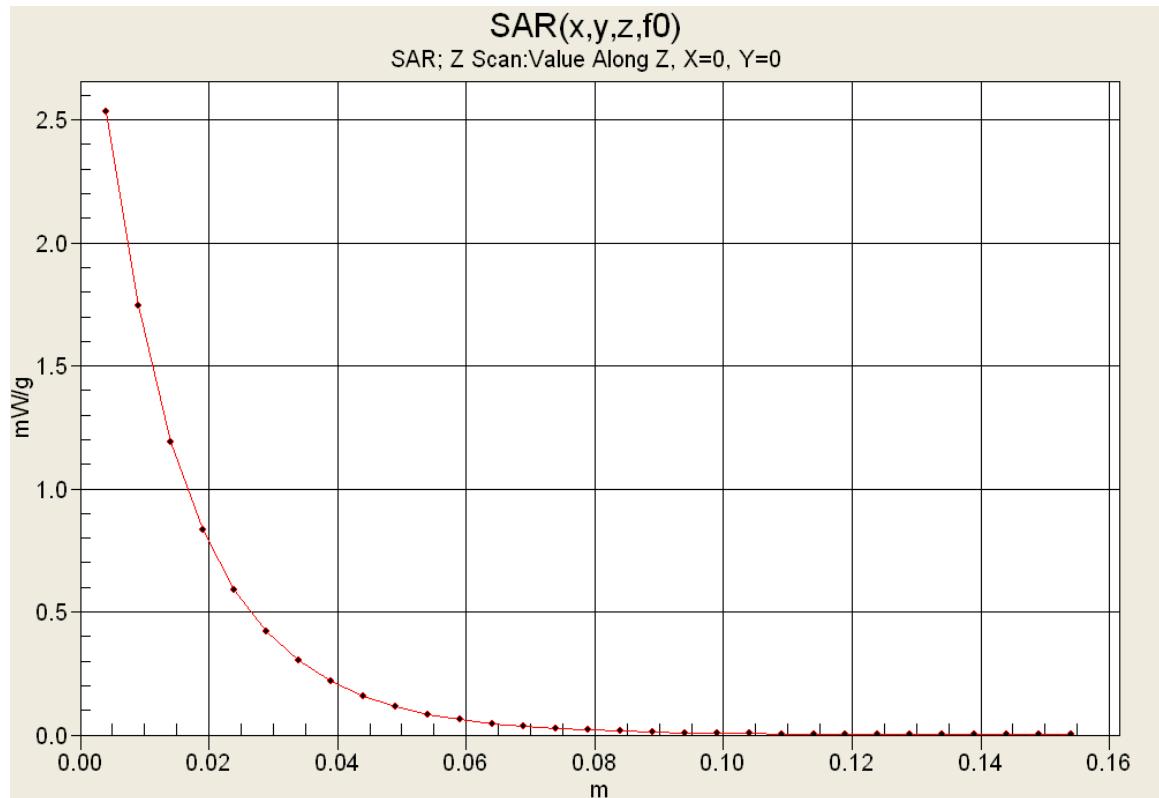


|                   |  |                |             |                       |            |                |   |
|-------------------|--|----------------|-------------|-----------------------|------------|----------------|---|
| <b>Applicant:</b> | Relm Wireless Corp.                        | <b>FCC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

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

Test Lab Certificate No. 2470.01

## Z-Axis Scan



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

|  |  |   |   |  |
|--|--|---|---|--|
| <br><b>Celltech</b><br><small>Testing and Engineering Services Ltd.</small> | <u>Date(s) of Evaluation</u><br>August 04-05, 08, 2011 | <u>Test Report Serial No.</u><br>071111K95-T1109-S90P     | <u>Test Report Revision No.</u><br>Rev. 1.0 (Initial Release) | <br><b>ilac-MRA</b><br><br><b>ACCREDITED</b> |
|  | <u>Test Report Issue Date</u><br>August 11, 2011       | <u>Description of Test(s)</u><br>Specific Absorption Rate | <u>RF Exposure Category</u><br>Occupational (Controlled)      |  |

## APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

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

## 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        |
| <b>0.8350</b> | <b>55.20</b> | <b>0.97</b> | <b>54.34</b> | <b>0.97</b> |
| 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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|   |  |   |   |  |
|---|--|---|---|--|
| <br>Testing and Engineering Services Ltd. | <u>Date(s) of Evaluation</u><br>August 04-05, 08, 2011 | <u>Test Report Serial No.</u><br>071111K95-T1109-S90P     | <u>Test Report Revision No.</u><br>Rev. 1.0 (Initial Release) | <br>Test Lab Certificate No. 2470.01 |
|   | <u>Test Report Issue Date</u><br>August 11, 2011       | <u>Description of Test(s)</u><br>Specific Absorption Rate | <u>RF Exposure Category</u><br>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        |
| <b>0.8350</b> | <b>55.20</b> | <b>0.97</b> | <b>54.78</b> | <b>0.95</b> |
| 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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|   |  |   |   |  |
|---|--|---|---|--|
| <br>Testing and Engineering Services Ltd. | <u>Date(s) of Evaluation</u><br>August 04-05, 08, 2011 | <u>Test Report Serial No.</u><br>071111K95-T1109-S90P     | <u>Test Report Revision No.</u><br>Rev. 1.0 (Initial Release) | <br>Test Lab Certificate No. 2470.01 |
|   | <u>Test Report Issue Date</u><br>August 11, 2011       | <u>Description of Test(s)</u><br>Specific Absorption Rate | <u>RF Exposure Category</u><br>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        |
| <b>0.8350</b> | <b>41.50</b> | <b>0.90</b> | <b>42.99</b> | <b>0.89</b> |
| 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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|  |  |   |   |   |
|--|--|---|---|---|
| <br>Testing and Engineering Services Ltd | <u>Date(s) of Evaluation</u><br>August 04-05, 08, 2011 | <u>Test Report Serial No.</u><br>071111K95-T1109-S90P     | <u>Test Report Revision No.</u><br>Rev. 1.0 (Initial Release) | <br>IAC-MRA |
|  | <u>Test Report Issue Date</u><br>August 11, 2011       | <u>Description of Test(s)</u><br>Specific Absorption Rate | <u>RF Exposure Category</u><br>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\_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        | 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        |
| <b>0.8350</b> | <b>41.50</b> | <b>0.90</b> | <b>42.05</b> | <b>0.89</b> |
| 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 | <br>RELM |  |  |  |  |
| DUT Type:               | Portable 700/800 P25 PTT Radio Transceiver | Model:   | KNG-P800    | 764-805 / 806-869 MHz |     |                |   |  |  |  |  |
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|                         |  |  |             |                       |     |                |   |  |  |  |  |

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



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**

Issued: April 22, 2009

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



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**

**Glossary:**

|       |                                |
|-------|--------------------------------|
| TS    | tissue simulating liquid       |
| ConvF | sensitivity in TS / 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 TS:* 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 TS parameters:* The measured TS parameters are used to calculate the nominal SAR result.

## Measurement Conditions

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

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

## Head TSL parameters

The following parameters and calculations were applied.

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

## SAR result with Head TSL

| <b>SAR averaged over 1 cm<sup>3</sup> (1 g) of Head TSL</b> | 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 <sup>1</sup>            | normalized to 1W   | <b>9.46 mW / g <math>\pm</math> 17.0 % (k=2)</b> |

| <b>SAR averaged over 10 cm<sup>3</sup> (10 g) of Head TSL</b> | 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 <sup>1</sup>              | normalized to 1W   | <b>6.19 mW / g <math>\pm</math> 16.5 % (k=2)</b> |

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

## Body TSL parameters

The following parameters and calculations were applied.

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

## SAR result with Body TSL

| SAR averaged over 1 cm <sup>3</sup> (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 <sup>2</sup>      | normalized to 1W   | <b>9.61 mW / g ± 17.0 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (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 <sup>2</sup>        | normalized to 1W   | <b>6.39 mW / g ± 16.5 % (k=2)</b> |

<sup>2</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

## Appendix

### Antenna Parameters with Head TSL

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 51.8 $\Omega$ - 3.1 $j\Omega$ |
| Return Loss                          | - 29.1 dB                     |

### Antenna Parameters with Body TSL

|                                      |                               |
|--------------------------------------|-------------------------------|
| Impedance, transformed to feed point | 48.0 $\Omega$ - 4.1 $j\Omega$ |
| 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:  $f = 835$  MHz;  $\sigma = 0.89$  mho/m;  $\epsilon_r = 41.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

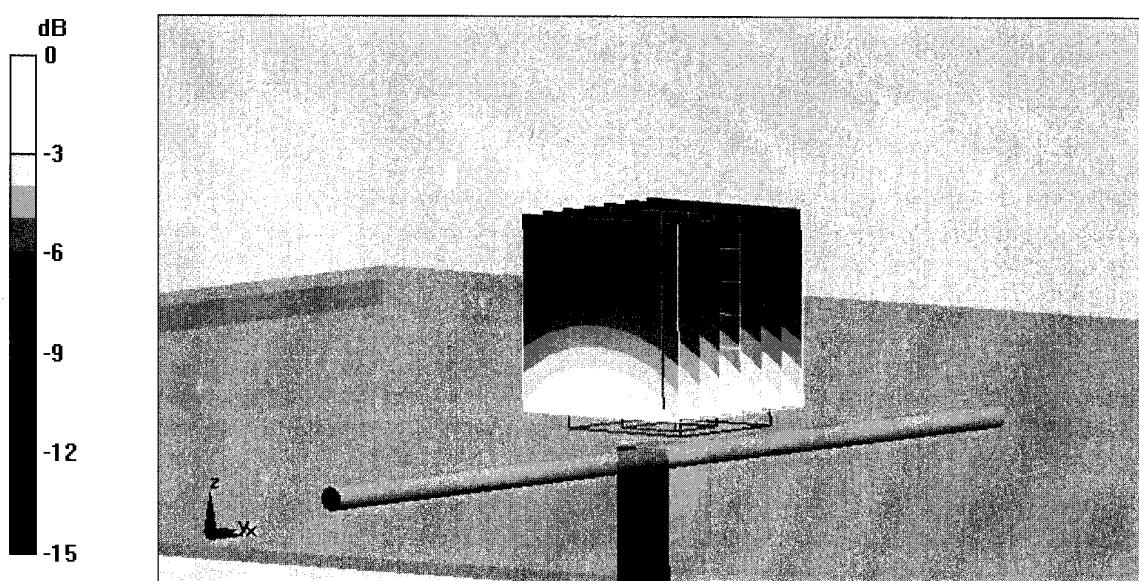
**Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

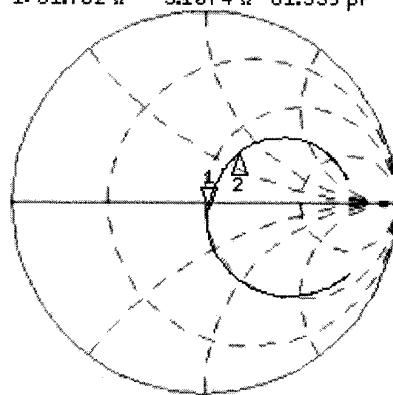
## Impedance Measurement Plot for Head TSL

14 Apr 2009 09:17:58  
[CH1] S11 1 U FS 1: 51.762  $\Omega$  -3.1074  $\Omega$  61.339 pF 835.000 000 MHz

\*  
Del  
Cor

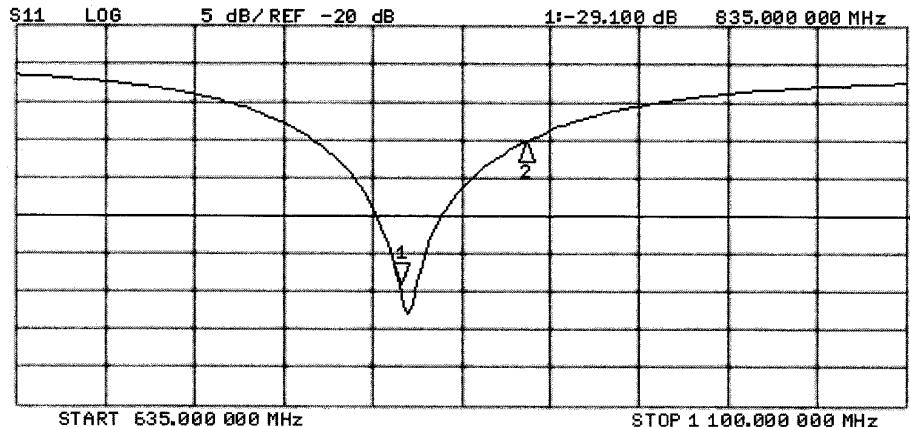
Avg  
16

↑



CH1 Markers  
2: 60.352  $\Omega$   
33.270  $\Omega$   
900.000 MHz

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:  $f = 835$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon_r = 53.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

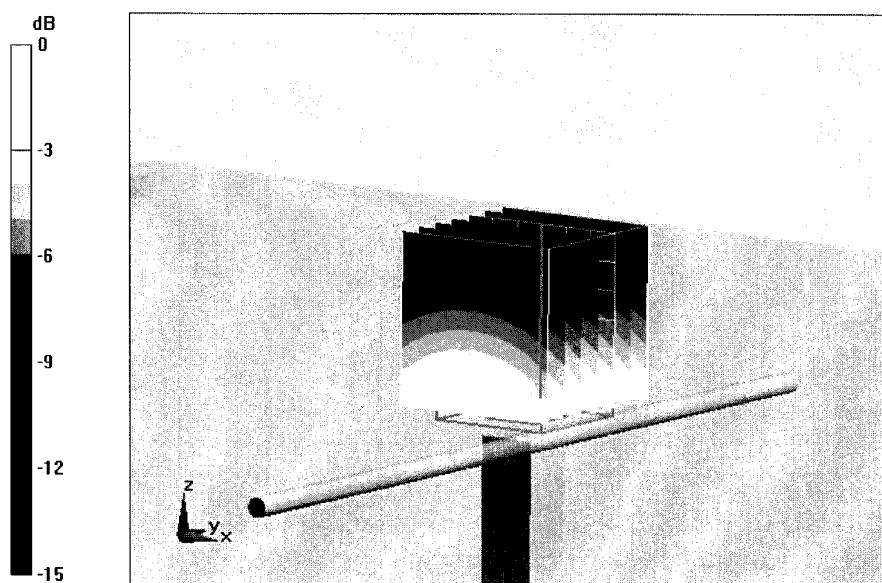
**Pin = 250mW, d = 15mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

Peak SAR (extrapolated) = 3.61 W/kg

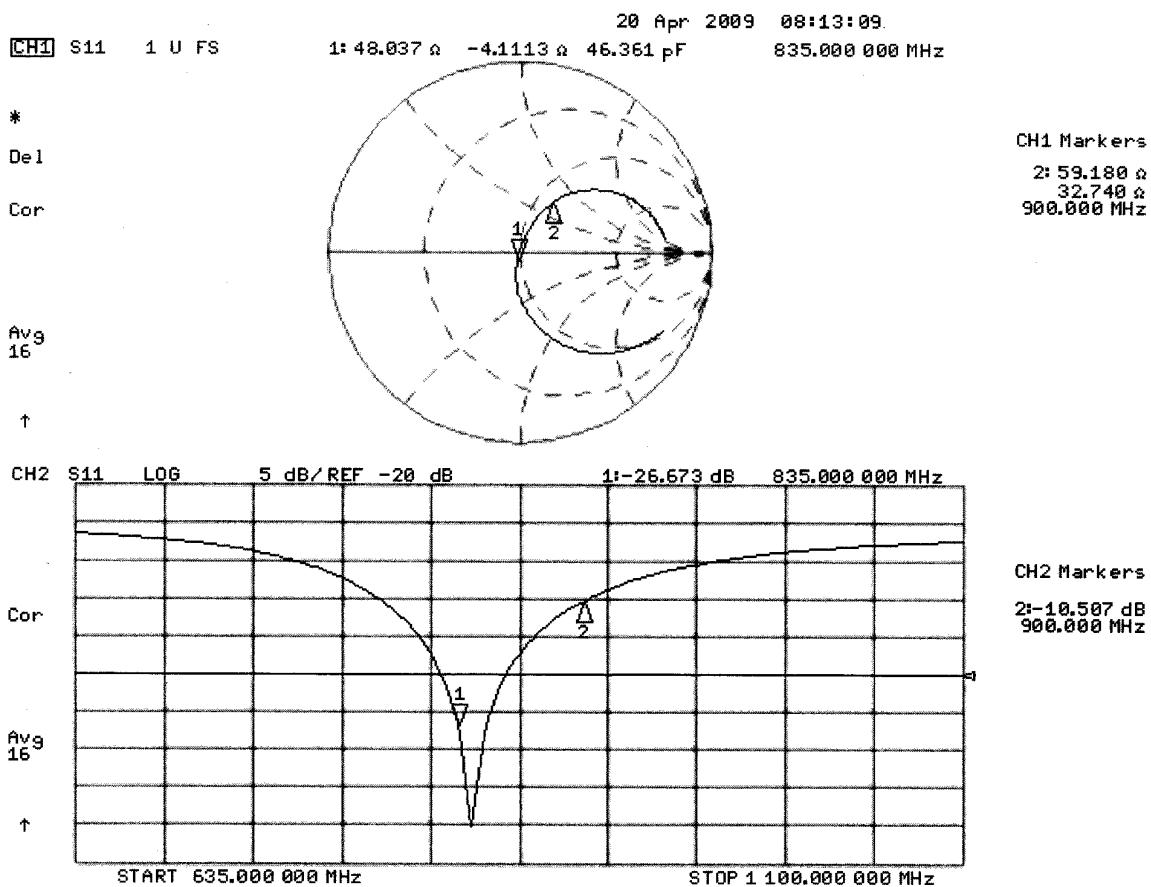
**SAR(1 g) = 2.49 mW/g; SAR(10 g) = 1.64 mW/g**

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



0 dB = 2.9mW/g

## Impedance Measurement Plot for Body TSL



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



Test Lab Certificate No. 2470.01

## APPENDIX F - PROBE CALIBRATION

|                   |  |         |             |                       |     |                |   |
|-------------------|--|---------|-------------|-----------------------|-----|----------------|---|
| <b>Applicant:</b> | Relm Wireless Corp.                        | FCC ID: | K95KNGP800C |                       | IC: | 2116A-KNGP800C | <br><b>RELM</b><br><small>WIRELESS CORP.</small> |
| <b>DUT Type:</b>  | Portable 700/800 P25 PTT Radio Transceiver | Model:  | KNG-P800    | 764-805 / 806-869 MHz |     |                |   |

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



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

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  $(22 \pm 3)^\circ\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID              | Cal Date (Certificate No.)        | Scheduled Calibration  |
|----------------------------|-----------------|-----------------------------------|------------------------|
| Power meter E4419B         | GB41293874      | 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 |

| Calibrated by: | Name           | Function              | Signature |
|----------------|----------------|-----------------------|-----------|
|                | 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)

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

Accreditation No.: **SCS 108**

### 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 $\varphi$ | $\varphi$ rotation around probe axis   |
| Polarization $\theta$  | $\theta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\theta = 0$ is normal to probe axis |

### 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

### Methods Applied and Interpretation of Parameters:

- $NORMx,y,z$ : Assessed for E-field polarization  $\theta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide).  $NORMx,y,z$  are only intermediate values, i.e., the uncertainties of  $NORMx,y,z$  does not affect the  $E^2$ -field uncertainty inside TSL (see below  $ConvF$ ).
- $NORM(f)x,y,z = NORMx,y,z * frequency\_response$  (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  $ConvF$ .
- $DCPx,y,z$ : 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
- $Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z$ :  $A, B, C$  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  $NORMx,y,z * ConvF$  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  $\pm 50$  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  
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 ( $\mu$ V/(V/m) <sup>2</sup> ) <sup>A</sup> | 1.93     | 2.00     | 1.66     | $\pm$ 10.1 % |
| DCP (mV) <sup>B</sup>                            | 96.0     | 98.7     | 88.6     |              |

### Modulation Calibration Parameters

| UID   | Communication System Name | PAR  |   | A<br>dB | B<br>dB | C<br>dB | VR<br>mV | Unc <sup>E</sup><br>(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%.

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

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> 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) <sup>c</sup> | Relative Permittivity <sup>f</sup> | Conductivity (S/m) <sup>f</sup> | 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 %    |

<sup>c</sup> 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.

<sup>f</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) 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

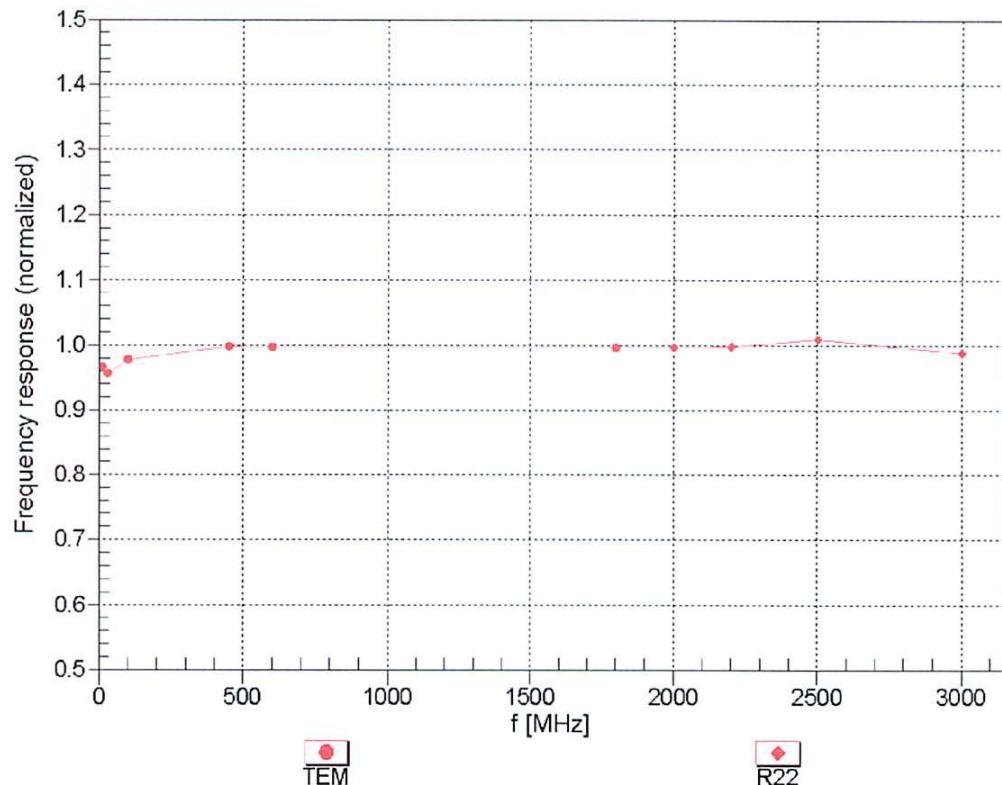
| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha | Depth (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|-------|------------|-------------|
| 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 %    |

<sup>C</sup> 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.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

## Frequency Response of E-Field

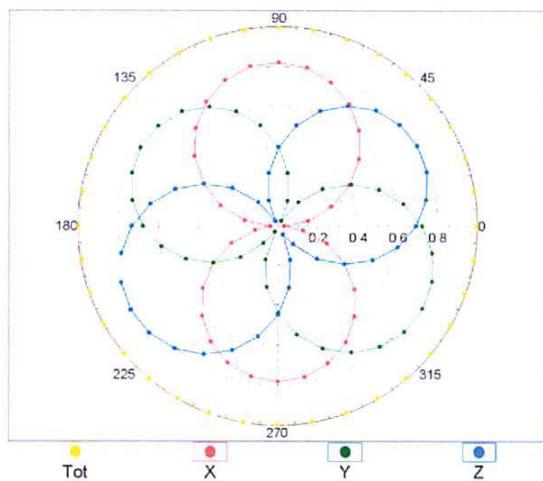
(TEM-Cell:ifi110 EXX, Waveguide: R22)



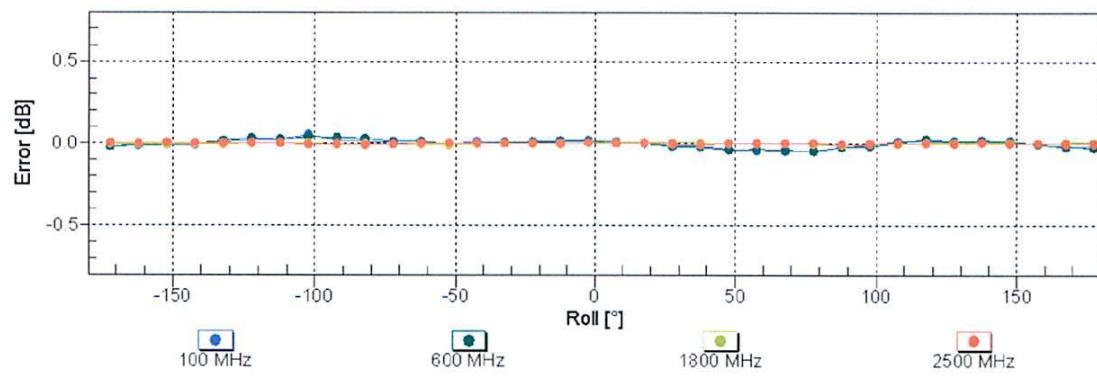
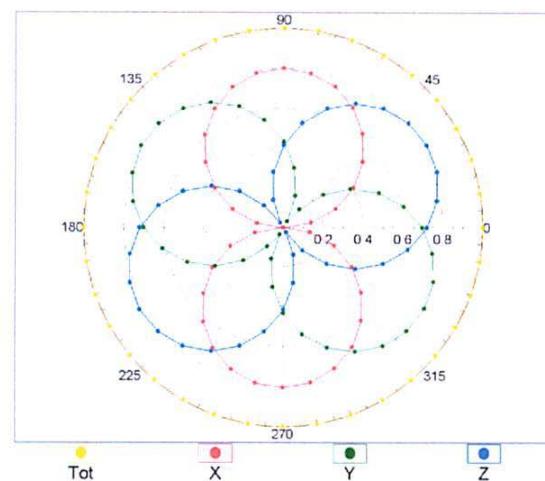
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

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

f=600 MHz,TEM



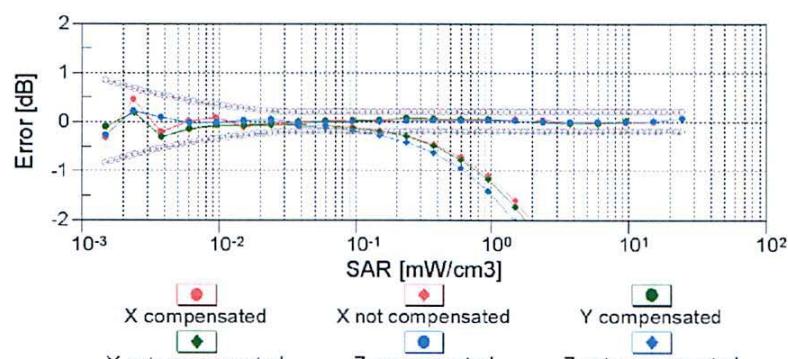
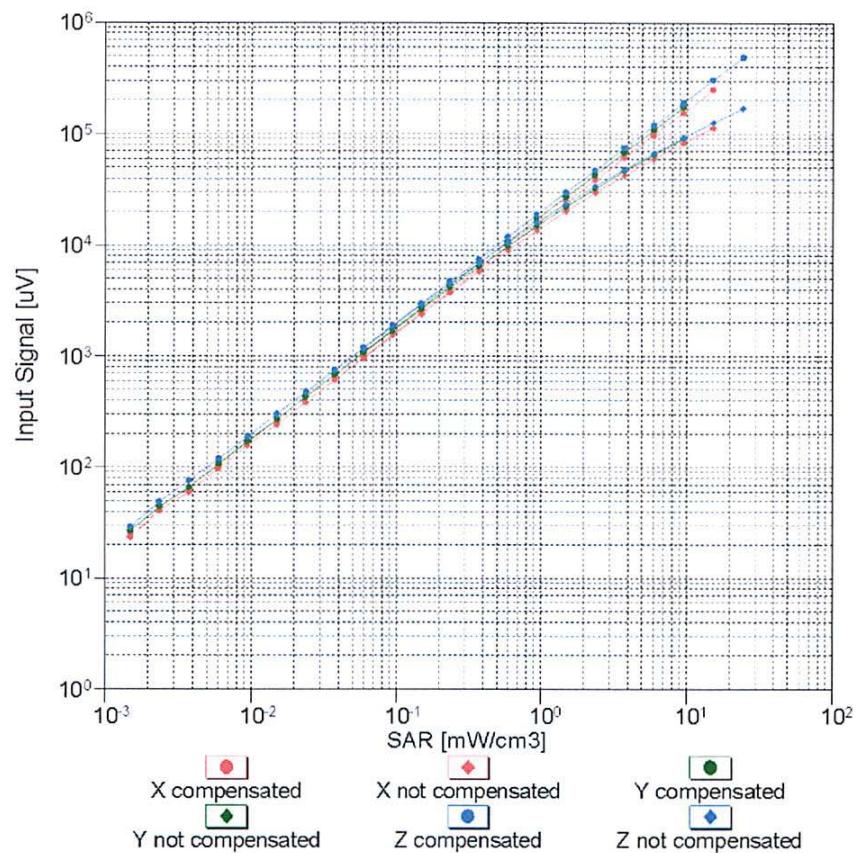
f=1800 MHz,R22



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

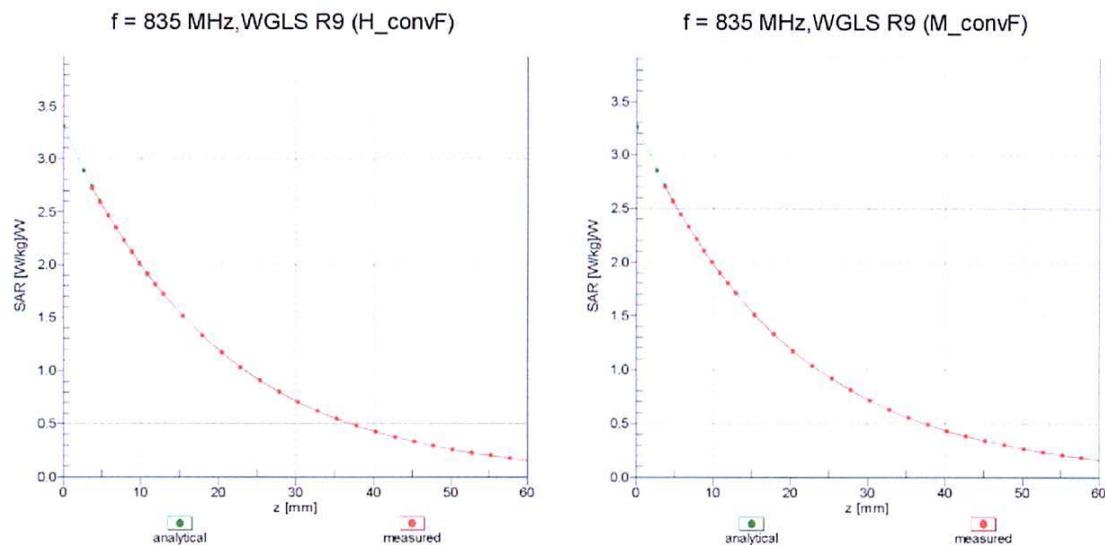
## Dynamic Range $f(\text{SAR}_{\text{head}})$

(TEM cell,  $f = 900$  MHz)



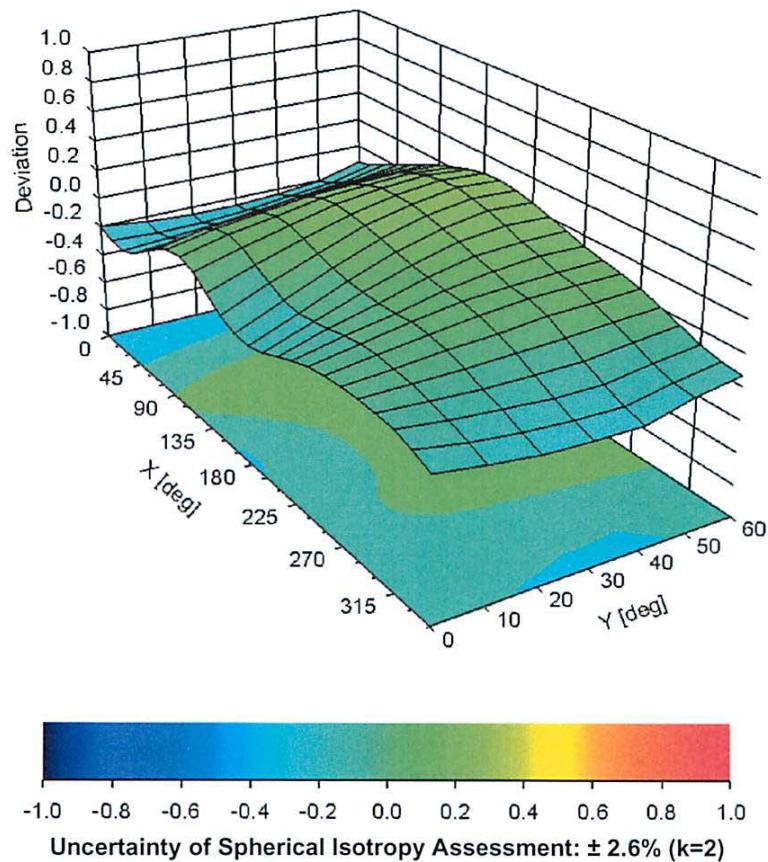
Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid

Error ( $\phi, \theta$ ),  $f = 900 \text{ MHz}$



## 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           |

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



Test Lab Certificate No. 2470.01

## APPENDIX G - BARSKI PLANAR PHANTOM CERTIFICATE OF CONFORMITY

|                         |  |         |             |                       |     |                |   |
|-------------------------|--|---------|-------------|-----------------------|-----|----------------|---|
| Applicant:              | Relm Wireless Corp.  | FCC ID: | K95KNGP800C |                       | IC: | 2116A-KNGP800C | <br><small>RELM</small><br><small>WIRELESS</small> |
| 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](mailto:barskiind@shaw.ca)  
Web: [www.bcfiberglass.com](http://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<br>Based on Dow Chemical technical data | 100 MHz-5 GHz<br>Relative permittivity < 5<br>Loss Tangent < 0.05 |

### Conformity

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

Signature: A handwritten signature in black ink, appearing to read 'Daniel Chailler', is placed over a horizontal line.

Daniel Chailler



**Fiberglass Planar Phantom - Top View**



**Fiberglass Planar Phantom - Front View**



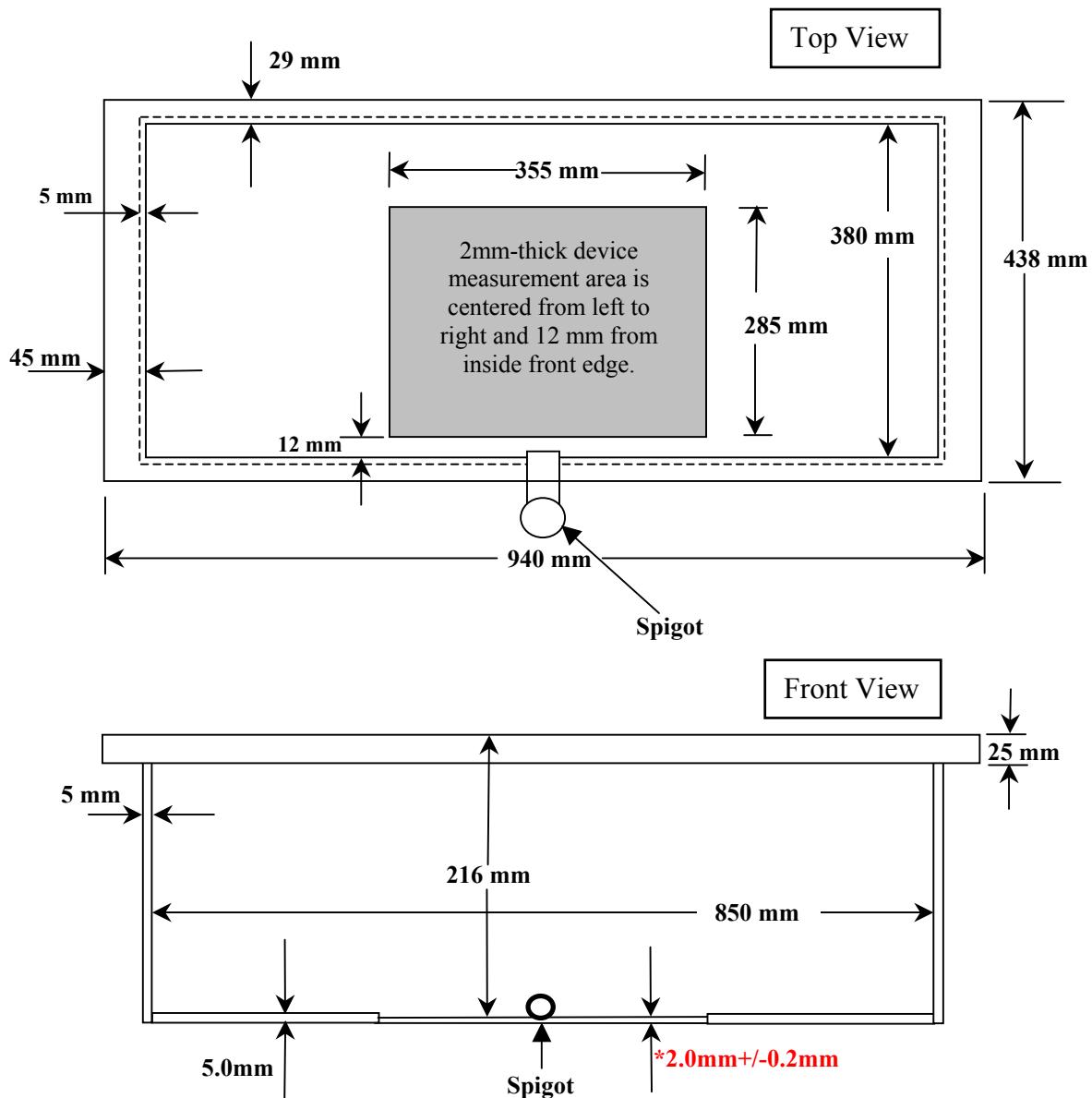
**Fiberglass Planar Phantom - Back View**



**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.

|  |  |   |   |   |
|--|--|---|---|---|
| <br>Celltech<br>Testing and Engineering Services Ltd | <u>Date(s) of Evaluation</u><br>August 04-05, 08, 2011 | <u>Test Report Serial No.</u><br>071111K95-T1109-S90P     | <u>Test Report Revision No.</u><br>Rev. 1.0 (Initial Release) | <br>IAC-MRA<br>ACCREDITED |
|  | <u>Test Report Issue Date</u><br>August 11, 2011       | <u>Description of Test(s)</u><br>Specific Absorption Rate | <u>RF Exposure Category</u><br>Occupational (Controlled)      |   |

Test Lab Certificate No. 2470.01

## 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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## 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<br>Hauptstr. 69<br>CH-8559 Fruthwilen<br>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<br>Relative permittivity < 5<br>Loss tangent < 0.05. | Material sample<br>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

  
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