




	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	


SAR TEST REPORT (FCC/IC)

RF EXPOSURE EVALUATION		SPECIFIC ABSORPTION RATE		
APPLICANT / MANUFACTURER	THALES COMMUNICATIONS INC.			
DEVICE UNDER TEST (DUT)	PORTABLE MULTIBAND LAND MOBILE PTT RADIO TRANSCEIVER			
	MODES	ANALOG (FM) / DIGITAL (P25)		
FREQUENCY RANGE UNDER TEST	VHF	150.8 - 173.4 MHz		
DEVICE MODEL(S)	NAME	LIBERTY	NO.	4102023-501
DEVICE IDENTIFIER(S)	FCC ID:	OKC-4102023501	IC:	473C-4102023501
APPLICATION TYPE	FCC/IC Certification			
STANDARD(S) APPLIED	FCC 47 CFR §2.1093			
	Health Canada Safety Code 6			
PROCEDURE(S) APPLIED	FCC OET Bulletin 65, Supplement C (01-01)			
	FCC Mobile & Portable RF Exposure Proc. (KDB 447498 D01 v03r03)			
	Industry Canada RSS-102 Issue 2			
	IEEE 1528-2003		IEC 62209-1:2005	
FCC DEVICE CLASSIFICATION	Licensed Non-Broadcast Transmitter Held to Face (TNF)			
IC DEVICE CLASSIFICATION	Land Mobile Radio Transmitter/Receiver (27.41-960 MHz)			
RF EXPOSURE CATEGORY	Occupational / Controlled			
RF EXPOSURE EVALUATION(S)	Face-held & Body-worn			
DATE(S) OF EVALUATION	March 09 & April 07, 2009			
TEST REPORT SERIAL NO.	030409OKC-T954-S90V			
TEST REPORT REVISION NO.	Revision 1.1	Response to FCC		April 09, 2009
	Revision 1.0	Initial Release		March 12, 2009
TEST REPORT SIGNATORIES	Testing Performed By		Test Report Prepared By	
	Sean Johnston Celltech Labs Inc.		Jonathan Hughes Celltech Labs Inc.	
TEST LAB AND LOCATION	Celltech Compliance Testing and Engineering Lab			
	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada			
TEST LAB CONTACT INFO.	Tel.: 250-765-7650		Fax: 250-765-7645	
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TEST LAB ACCREDITATION(S)	<div></div> <div>Test Lab Certificate No. 2470.01</div>			

Applicant:		Thales Communications Inc.		FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501		Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz		
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DECLARATION OF COMPLIANCE SAR RF EXPOSURE EVALUATION

Test Lab Information	Name	CELLTECH LABS INC.			
	Address	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada			
Applicant Information	Name	THALES COMMUNICATIONS INC.			
	Address	22605 Gateway Center Drive, Clarksburg, MD 20871 United States			
Standard(s) Applied	FCC	47 CFR §2.1093	IC	Health Canada Safety Code 6	
Procedure(s) Applied	FCC	OET Bulletin 65, Supplement C (Edition 01-01)			
	FCC	Mobile & Portable RF Exposure Procedures (KDB 447498 D01 v03r03)			
	IC	RSS-102 Issue 2	IEEE	1528-2003	IEC
Application Type(s)	FCC/IC	New Certification			
Device Classification(s)	FCC	Licensed Non-Broadcast Transmitter Held to Face (TNF)			
	IC	Land Mobile Radio Transmitter/Receiver (27.41-960 MHz)			
Device RF Exposure Category	Portable	Occupational / Controlled Environment			
Device Identifier(s)	FCC ID:	OKC-4102023501			
	IC:	473C-4102023501			
Device Model (Name / No.)	Liberty 4102023-501				
Test Sample Serial No.	10007 (Identical Prototype)				
Device-Under-Test Description	Portable Multiband Land Mobile Push-To-Talk (PTT) Radio Transceiver				
Device Modes of Operation	Analog (FM) / Digital (P25)				
Frequency Range Under Test	VHF Band	150.8 - 173.4 MHz			
Max. RF Output Power Tested	5.2 Watts	37.16 dBm	Conducted	150.8 MHz	
	5.2 Watts	37.16 dBm	Conducted	155.0 MHz	
	5.2 Watts	37.16 dBm	Conducted	173.4 MHz	
Antenna Type(s) Tested	Detachable	Multiband Flex	P/N: 1600678-1	Length: 216 mm	
Battery Type(s) Tested	Lithium-ion	10.8 V	4.8 Ah	P/N: 1600691-2	
Body-worn Accessories Tested	Belt-Clip	Contains Metal Components			P/N: 40508
	Belt-Holster	Contains Metal Components			P/N: 1600702-1
Audio Accessories Tested	Speaker-Microphone (P/N: 1600696-01)				
Max. SAR Level(s) Evaluated	Face-held	0.576 W/kg	1g	50% duty cycle	Occupational / Controlled Exposure
	Body-worn	1.71 W/kg	1g	50% duty cycle	Occupational / Controlled Exposure
FCC/IC Spatial Peak SAR Limit	Head/Body	8.0 W/kg	1g	50% duty cycle	Occupational / Controlled Exposure
<p>Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada's Safety Code 6 for the Occupational / Controlled Exposure environment. The device was tested in accordance with the measurement procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 2, IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005. All measurements were performed in accordance with the SAR system manufacturer recommendations.</p> <p>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.</p> <p>The results and statements contained in this report pertain only to the device(s) evaluated.</p> <p>This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc.</p>					
Test Report Approved By			Sean Johnston	Celltech Labs Inc.	





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Test Lab Certificate No. 2470.01

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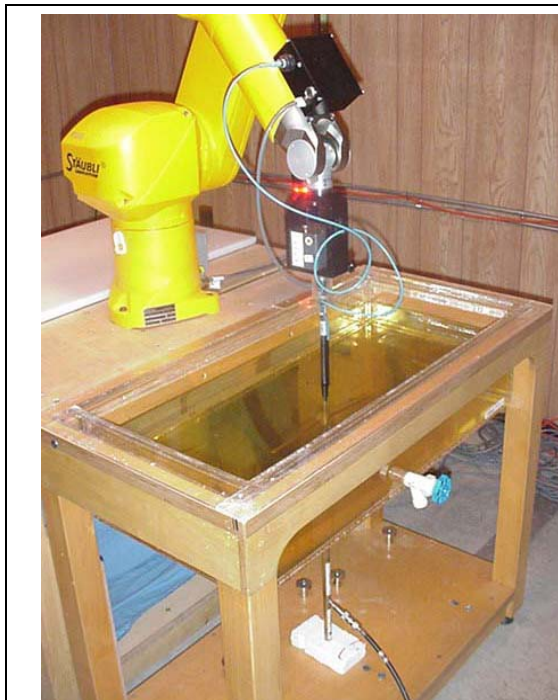
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1.0 INTRODUCTION

This measurement report demonstrates that the Thales Communications Inc. Model: Liberty 4102023-501 Portable Analog/Digital Multiband Land Mobile PTT Radio Transceiver (VHF Band) complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the Occupational / Controlled Exposure environment. The measurement procedures described in FCC OET Bulletin 65, Supplement C (Edition 01-01) (see reference [3]), IC RSS-102 Issue 2 (see reference [4]), IEEE Standard 1528-2003 (see reference [5]) and IEC International Standard 62209-1:2005 (see reference [6]) were employed. A description of the device, operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used and the various provisions of the rules are included within this test report.

2.0 SAR MEASUREMENT SYSTEM

Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and 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.





DASY4 SAR System with Plexiglas validation phantom



DASY4 SAR System with Plexiglas side planar phantom

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3.0 SAR EVALUATION POWER THRESHOLDS FOR PTT DEVICES

The power thresholds and operating conditions listed in the table below are used to determine SAR test requirements for PTT radios required to comply with the general population and occupational exposure limit. SAR is required for PTT devices with maximum output power greater than these thresholds. SAR evaluation is also required for separation distances smaller than those listed in the table below.

SAR Evaluation Power Thresholds for PTT Devices, $f \leq 0.5$ GHz (FCC KDB 447498 D01 v03r03 Section 5)b)i) - Mobile & Portable RF Exposure Procedures)			Measured RF Conducted Output Power	
Exposure Conditions	General Population P mW	Occupational P mW	100% PTT Duty Cycle	50% PTT Duty Cycle
Held to face $d \geq 2.5$ cm	250	1250	5.2 Watts	2.6 Watts
Body-worn $d \geq 1.5$ cm	200	1000	5.2 Watts	2.6 Watts
Body-worn $d \geq 1.0$ cm	150	750	n/a	n/a
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.				



4.0 SAR PROBE CALIBRATION & MEASUREMENT FREQUENCIES

The following procedures are recommended for measurements at 150 MHz - 3 GHz to minimize probe calibration and tissue dielectric parameter discrepancies. In general, SAR measurements below 300 MHz should be within ± 50 MHz of the probe calibration frequency. At 300 MHz to 3 GHz, measurements should be within ± 100 MHz of the probe calibration frequency. Measurements exceeding 50% of these intervals, ± 25 MHz < 300 MHz and ± 50 MHz ≥ 300 MHz, require additional steps (per FCC KDB 450824 D01 v01r01, SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz - see reference [8]).

Probe Calibration Freq.	Device Measurement Freq.	Frequency Interval	± 25 MHz < 300 MHz
150 MHz	150.8 MHz	0.8 MHz	< 25 MHz
	155.0 MHz	5 MHz	< 25 MHz
	173.4 MHz	23.4 MHz	< 25 MHz

The probe calibration and measurement frequency interval is < 25 MHz; therefore the additional steps are not required for this evaluation.



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5.0 MEASUREMENT SUMMARY

SAR EVALUATION RESULTS																	
Test Type	Freq.	Ch.	Batt. Type	Antenna Position	Accessory Type(s)		Device Distance to Planar Phantom		Cond. Power Before Test	Measured SAR 1g (W/kg)		SAR Drift During Test	Scaled SAR with droop 1g (W/kg)				
	Duty Cycle									Duty Cycle							
	MHz							Body-worn		Audio	DUT		Antenna	Watts	100%	50%	dB
Face	155.0	Mid	Li-ion	Fixed	n/a	n/a	2.5 cm	5.5 cm	5.2	1.14	0.570	-0.047	1.15	0.576			
Body	150.8	Low	Li-ion	Fixed	Belt-Clip	Spkr-Mic	1.6 cm	2.0 cm	5.2	1.96	0.980	0.009	1.96	0.980			
Body	150.8	Low	Li-ion	Fixed	Belt-Holster	Spkr-Mic	2.0 cm	2.2 cm	5.2	P	1.11	0.555	-0.072	P	1.13	0.565	
										S	1.10	0.550		S	1.12	0.560	
										S	1.09	0.545		S	1.11	0.555	
Body	155.0	Mid	Li-ion	Fixed	Belt-Clip	Spkr-Mic	1.6 cm	2.0 cm	5.2	P	3.24	1.62	-0.232	P	3.42	1.71	
										S	2.46	1.23		S	2.60	1.30	
Body	155.0	Mid	Li-ion	Fixed	Belt-Holster	Spkr-Mic	2.0 cm	2.2 cm	5.2	P	2.44	1.22	-0.222	P	2.57	1.28	
										S	2.20	1.10		S	2.32	1.16	
										S	1.48	0.740		S	1.56	0.779	
Body	173.4	High	Li-ion	Fixed	Belt-Clip	Spkr-Mic	1.6 cm	2.0 cm	5.2	0.365	0.183	-0.673	0.426	0.213			
Body	173.4	High	Li-ion	Fixed	Belt-Holster	Spkr-Mic	2.0 cm	2.2 cm	5.2	0.344	0.172	-0.853	0.419	0.210			
SAR LIMIT(S)						HEAD & BODY		SPATIAL PEAK			RF EXPOSURE CATEGORY						
FCC 47 CFR 2.1093			Health Canada Safety Code 6			8.0 W/kg		averaged over 1 gram			Occupational / Controlled						
Date of Measurement		March 09, 2009				March 09, 2009				April 07, 2009				April 07, 2009			
Measured Fluid Type		150 Head		150 MHz Meas.		150 Body		150 MHz Meas.		150 Body		150 MHz Meas.		150 Body		170 MHz Meas.	
Dielectric Constant ϵ_r		IEEE Target		Meas.	Dev.	IEEE Target		Meas.	Dev.	IEEE Target		Meas.	Dev.	IEEE Target		Meas.	Dev.
		52.3	± 5%	52.5	+0.4%	61.9	± 5%	61.5	-0.7%	61.9	± 5%	59.7	-3.5%	61.9	± 5%	61.5	-0.6%
Measured Fluid Type		150 Head		150 MHz Meas.		150 Body		150 MHz Meas.		150 Body		150 MHz Meas.		150 Body		170 MHz Meas.	
Conductivity σ (mho/m)		IEEE Target		Meas.	Dev.	IEEE Target		Meas.	Dev.	IEEE Target		Meas.	Dev.	IEEE Target		Meas.	Dev.
		0.76	± 5%	0.79	+4.0%	0.80	± 5%	0.83	+3.8%	0.80	± 5%	0.79	-1.2%	0.80	± 5%	0.81	+1.2%
Test Date		Fluid Type		Ambient Temp.		Fluid Temp.		Fluid Depth		Atmospheric Pressure			Relative Humidity			ρ (Kg/m ³)	
March 9, 2009		Head		24.2 °C		21.5 °C		≥ 15 cm		101 kPa			35%			1000	
March 9, 2009		Body		24.5 °C		22.0 °C		≥ 15 cm		101 kPa			35%			1000	
April 7, 2009		Body		22.0 °C		21.0 °C		≥ 15 cm		101 kPa			35%			1000	
Notes																	
1.	Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.																
2.	The SAR drift 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 level and the scaled SAR results are shown in the above test data table. A SAR-versus-Time droop evaluation was performed in the maximum measured SAR droop configuration.																
3.	Secondary peak SAR levels measured within 2 dB of the primary were reported (P = Primary, S = Secondary).																
4.	The DUT was tested at the maximum 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.																

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6.0 DETAILS OF SAR EVALUATION



The Thales Communications Inc. Model: Liberty 4102023-501 Portable Analog/Digital Multiband Land Mobile PTT Radio Transceiver (VHF Band) described in this report was compliant for localized Specific Absorption Rate (Occupational / Controlled Exposure) based on the test provisions and conditions described below. Detailed photographs of the test setup are shown in Appendix D.

1. The DUT was evaluated in a face-held configuration with the front of the radio placed parallel to the outer surface of the planar phantom. A 2.5 cm spacing was maintained between the front side of the DUT and the outer surface of the planar phantom.
2. The DUT was evaluated in a body-worn configuration with the back of the radio facing the outer surface of the planar phantom and the attached belt-clip accessory placed parallel to and touching the planar phantom. The belt-clip accessory provided a 1.6 cm spacing from the back of the DUT to the planar phantom. The DUT was evaluated for body-worn SAR with the customer-supplied speaker-microphone accessory connected to the input connector.
3. The DUT was evaluated in a body-worn configuration with the radio placed inside the belt-holster accessory. The back of the radio was facing the outer surface of the planar phantom and the belt-holster accessory was touching the planar phantom. The belt-holster accessory provided a 2.0 cm spacing from the back of the DUT to the planar phantom. The DUT was evaluated for body-worn SAR with the customer-supplied speaker-microphone accessory connected to the input connector.
4. The conducted output power levels referenced in this report were measured prior to the SAR evaluations at the antenna connector of the DUT using a Gigatronics 8652A Universal Power Meter in accordance with FCC 47 CFR §2.1046 and IC RSS-Gen.
5. The area scan evaluation was performed with a fully charged battery. After the area scan was completed the radio was cooled down and the battery was replaced with a fully charged battery prior to the zoom scan evaluation.
6. The fluid temperature was measured prior to and after the SAR evaluations to ensure the temperature remained within $\pm 2^{\circ}\text{C}$ of the fluid temperature reported during the dielectric parameter measurements.
7. 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).

7.0 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 E). 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.

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8.0 SYSTEM PERFORMANCE CHECK

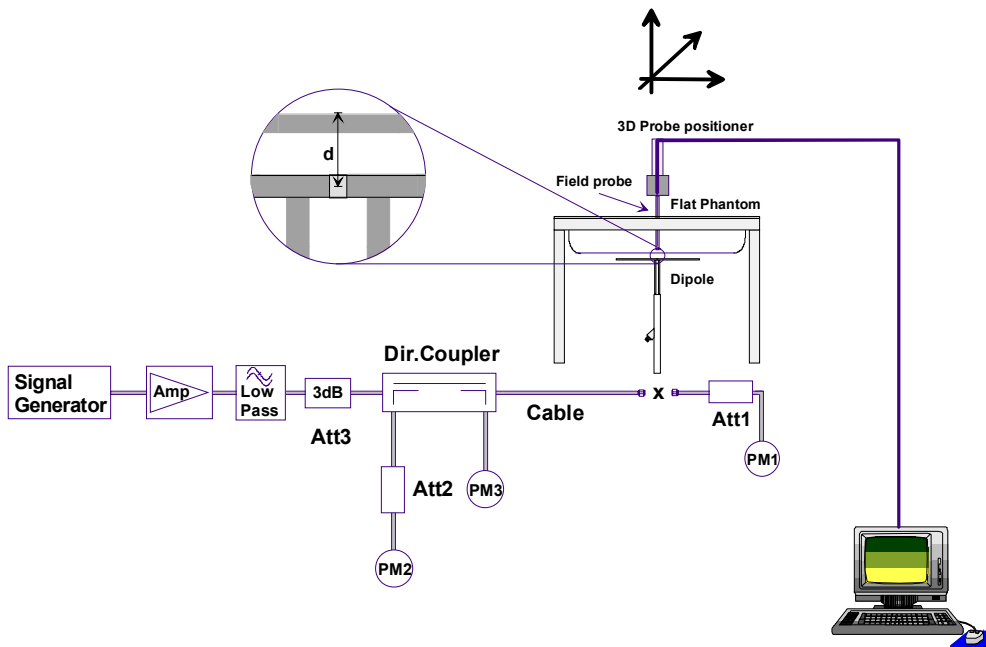
Prior to the SAR evaluations a daily system check was performed using a Plexiglas planar phantom and 300 MHz dipole (see Appendix B for system performance check test plot) in accordance with the procedures described in IEEE Standard 1528-2003 (see reference [5]) and IEC International Standard 62209-1:2005 (see reference [6]). 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 validation target SAR value (see Appendix E for system validation target SAR value listed on page 10 of the dipole calibration report).

SYSTEM PERFORMANCE CHECK EVALUATION

Test Date	Equiv. Tissue	SAR 1g (W/kg)			Dielectric Constant ϵ_r			Conductivity σ (mho/m)			ρ (Kg/m ³)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
	Freq. (MHz)	Sys. Val. Target	Meas.	Dev.	Sys. Val. Target	Meas.	Dev.	Sys. Val. Target	Meas.	Dev.						
Mar. 9	Head 300	0.760 ±10%	0.763	+0.4%	44.9 ±5%	45.3	+0.9%	0.85 ±5%	0.86	+1.2%	1000	21.5	22.0	≥ 15	35	101.1
Apr. 7	Head 300	0.760 ±10%	0.753	-0.9%	44.9 ±5%	45.5	+1.4%	0.85 ±5%	0.85	0.0%	1000	22.0	21.3	≥ 15	35	101.1

Notes

- The target SAR value is referenced from the System Validation performed by Celltech Labs Inc. (see Appendix E).
- The target dielectric parameters are referenced from the System Validation performed by Celltech Labs Inc. (see Appendix E).
- The fluid temperature was measured prior to and after the system performance check to ensure the temperature remained within $\pm 2^\circ\text{C}$ of the fluid temperature reported during the dielectric parameter measurements.
- 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).





System Performance Check Measurement Setup Diagram



300 MHz Validation Dipole Setup

Applicant:		Thales Communications Inc.		FCC ID:		OKC-4102023501		IC:		473C-4102023501		THALES
Model:		Liberty 4102023-501		Portable Multiband Land Mobile Radio Transceiver				VHF:		150.8 - 173.4 MHz		
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Test Lab Certificate No. 2470.01

9.0 SIMULATED EQUIVALENT TISSUES



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

SIMULATED TISSUE MIXTURES							
INGREDIENT	Water	300 MHz Head Tissue Mixture	37.56 %	150 MHz Head Tissue Mixture	38.35 %	150 MHz Body Tissue Mixture	46.6 %
	Sugar		55.32 %		55.5%		49.7 %
	Salt		5.95 %		5.15%		2.6 %
	HEC		0.98 %		0.9%		1.0 %
	Bactericide		0.19 %		0.1%		0.1 %

10.0 SAR LIMITS

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



Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
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11.0 ROBOT SYSTEM SPECIFICATIONS

<u>Specifications</u>	
Positioner	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability	0.02 mm
No. of axis	6
<u>Data Acquisition Electronic (DAE) System</u>	
<u>Cell Controller</u>	
Processor	AMD Athlon XP 2400+
Clock Speed	2.0 GHz
Operating System	Windows XP Professional
<u>Data Converter</u>	
Features	Signal Amplifier, multiplexer, A/D converter, and control logic
Software	Measurement Software: DASY4, V4.7 Build 44
	Postprocessing Software: SEMCAD, V1.8 Build 171
Connecting Lines	Optical downlink for data and status info., Optical uplink for commands and clock
<u>DASY4 Measurement Server</u>	
Function	Real-time data evaluation for field measurements and surface detection
Hardware	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
Connections	COM1, COM2, DAE, Robot, Ethernet, Service Interface
<u>E-Field Probe</u>	
Model	ET3DV6
Serial No.	1590
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 GHz)
<u>Evaluation Phantom</u>	
Type	Side Planar Phantom
Shell Material	Plexiglas
Bottom Thickness	2.0 mm ± 0.1 mm
Inner Dimensions	72.6 cm (L) x 20.3 cm (W) x 20.3 cm (H)
<u>Validation Phantom (≤ 450MHz)</u>	
Type	Planar Phantom
Shell Material	Plexiglas
Bottom Thickness	6 mm ± 0.1 mm
Inner Dimensions	83.5 cm (L) x 36.9 cm (W) x 21.8 cm (H)

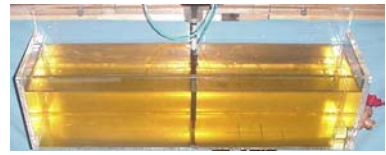
Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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12.0 PROBE SPECIFICATION (ET3DV6)

<p>Construction: Symmetrical design with triangular core; Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, glycol)</p> <p>Calibration: In air from 10 MHz to 2.5 GHz In head simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm 8\%$)</p> <p>Frequency: 10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)</p> <p>Directivity: ± 0.2 dB in head tissue (rotation around probe axis) ± 0.4 dB in head tissue (rotation normal to probe axis)</p> <p>Dynamic Range: 5 μW/g to > 100 mW/g; Linearity: ± 0.2 dB</p> <p>Surface Detect: ± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces</p> <p>Dimensions: Overall length: 330 mm; Tip length: 16 mm; Body diameter: 12 mm; Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm</p> <p>Application: General dosimetry up to 3 GHz; Compliance tests of mobile phone</p>	 <p>ET3DV6 E-Field Probe</p>
--	--


13.0 SIDE PLANAR PHANTOM

<p>The side planar phantom is constructed of Plexiglas material with a 2.0 mm shell thickness for face-held and body-worn SAR evaluations of portable radio transceivers. The side planar phantom is mounted on the side of the DASY4 compact system table.</p>	 <p>Plexiglas Side Planar Phantom</p>
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14.0 VALIDATION PLANAR PHANTOM

<p>The validation planar phantom is constructed of Plexiglas material with a 6.0 mm shell thickness for system validations at 450MHz and below. The validation planar phantom is mounted to the table of the DASY4 compact system.</p>	 <p>Plexiglas Validation Planar Phantom</p>
--	---

15.0 DEVICE HOLDER

<p>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.</p>	 <p>Device Holder</p>
--	---




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16.0 TEST EQUIPMENT LIST

TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED	CALIBRATION DUE DATE
USED	DESCRIPTION				
x	Schmid & Partner DASY4 System	-	-	-	-
x	-DASY4 Measurement Server	00158	1078	CNR	CNR
x	-Robot	00046	599396-01	CNR	CNR
x	-DAE4	00019	353	22Apr08	22Apr09
x	-ET3DV6 E-Field Probe	00017	1590	21Jul08	21Jul09
x	-Celltech 300 MHz Validation Dipole	00023	135	26Jan09	26Jan10
x	-Plexiglas Side Planar Phantom	00156	161	CNR	CNR
x	-Plexiglas Validation Planar Phantom	00157	137	CNR	CNR
x	HP 85070C Dielectric Probe Kit	00033	US39240170	CNR	CNR
x	Gigatronics 8652A Power Meter	00007	1835272	23Apr08	23Apr09
x	Gigatronics 80701A Power Sensor	00014	1833699	23Apr08	23Apr09
x	HP 8753ET Network Analyzer	00134	US39170292	28Apr08	28Apr09
x	HP 8648D Signal Generator	00005	3847A00611	CNR	CNR
x	Amplifier Research 10W1000C Power Amplifier	00041	27887	CNR	CNR
Abbr.	CNR = Calibration Not Required				



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17.0 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 _i or V _{eff}
Measurement System									
Probe Calibration (150 MHz)	E.2.1	10	Normal	1	1	1	10.0	10	∞
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	2.5	Rectangular	1.732050808	1	1	1.4	1.4	∞
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	Rectangular	1.732050808	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	Rectangular	1.732050808	1	1	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	∞
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	∞
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	2.9	Normal	1	1	1	2.9	2.9	12
Device Holder Uncertainty	E.4.1	3.6	Normal	1	1	1	3.6	3.6	8
SAR Drift Measurement	6.6.2	5	Rectangular	1.732050808	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measured)	E.3.3	4	Normal	1	0.64	0.43	2.6	1.7	∞
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measured)	E.3.3	3.5	Normal	1	0.6	0.49	2.1	1.7	∞
Combined Standard Uncertainty			RSS				13.77	13.48	
Expanded Uncertainty (95% Confidence Interval)			k=2				27.54	26.96	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005									



Applicant:		Thales Communications Inc.		FCC ID:		OKC-4102023501		IC:		473C-4102023501		THALES	
Model:		Liberty 4102023-501		Portable Multiband Land Mobile Radio Transceiver				VHF:		150.8 - 173.4 MHz			
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Test Lab Certificate No. 2470.01				

18.0 REFERENCES



- [1] Federal Communications Commission - "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093.
- [2] Health Canada - "Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz", Safety Code 6: 1999.
- [3] Federal Communications Commission - "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields", OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.
- [4] Industry Canada - "Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 2: November 2005.
- [5] IEEE Standard 1528-2003 - "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques": December 2003.
- [6] IEC International Standard 62209-1:2005 - "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures."
- [7] Federal Communications Commission, Office of Engineering and Technology - "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies"; KDB 447498 D01 v03r03: January 2009.
- [8] Federal Communications Commission, Office of Engineering and Technology - "Application Note: SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz"; KDB 450824 D01 v01r01: January 2007.

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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APPENDIX A - SAR MEASUREMENT DATA

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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Test Lab Certificate No. 2470.01				

Date Tested: 03/09/2009

Face-held SAR - VHF Band - Mid Channel - 155.0 MHz

DUT: Kenwood Liberty 4102023-501; Type: Portable Multiband Land Mobile PTT Radio Transceiver; Serial: 10007

Ambient Temp: 24.2°C; Fluid Temp: 21.5°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: VHF (CW)

Frequency: 155.0 MHz; Duty Cycle: 1:1

10.8 V Li-ion Battery (P/N: 1600691-2)

Medium: HSL150 Medium parameters used: $f = 155.0 \text{ MHz}$; $\sigma = 0.79 \text{ mho/m}$; $\epsilon_r = 52.5$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(8.9, 8.9, 8.9); Calibrated: 21/07/2008
- Sensor-Surface: 5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Face-held SAR - 2.5 cm Spacing from Front Side of DUT to Planar Phantom

Area Scan (8x27x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.24 mW/g

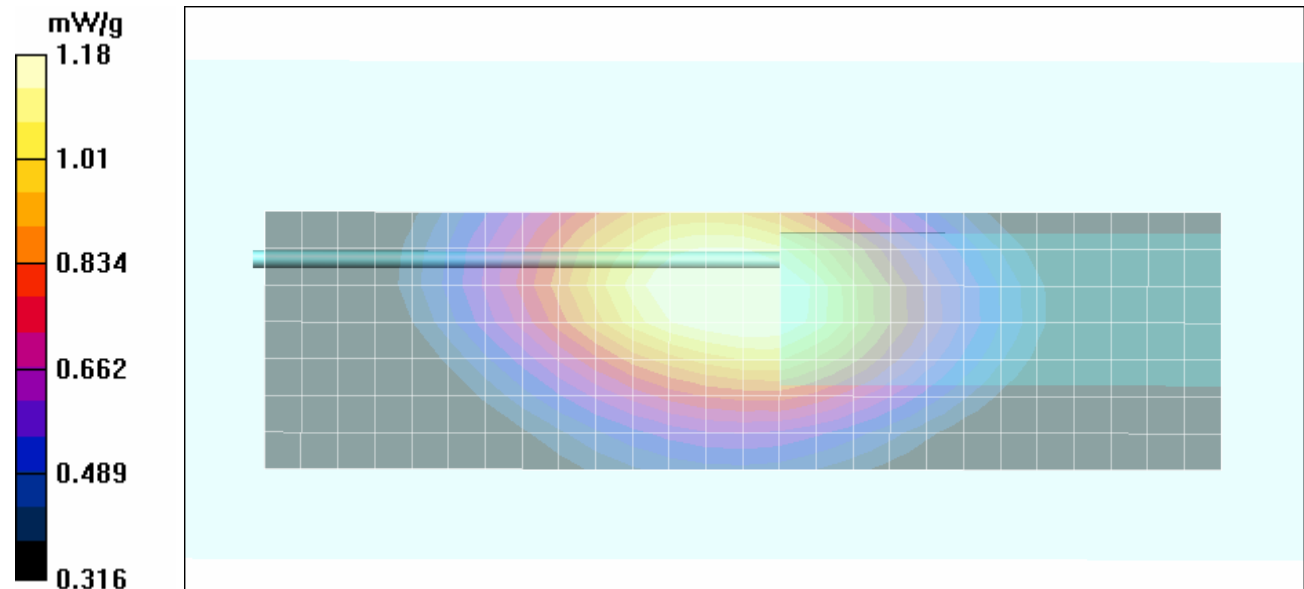
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 37.9 V/m; Power Drift = -0.047 dB



Peak SAR (extrapolated) = 1.68 W/kg

SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.883 mW/g

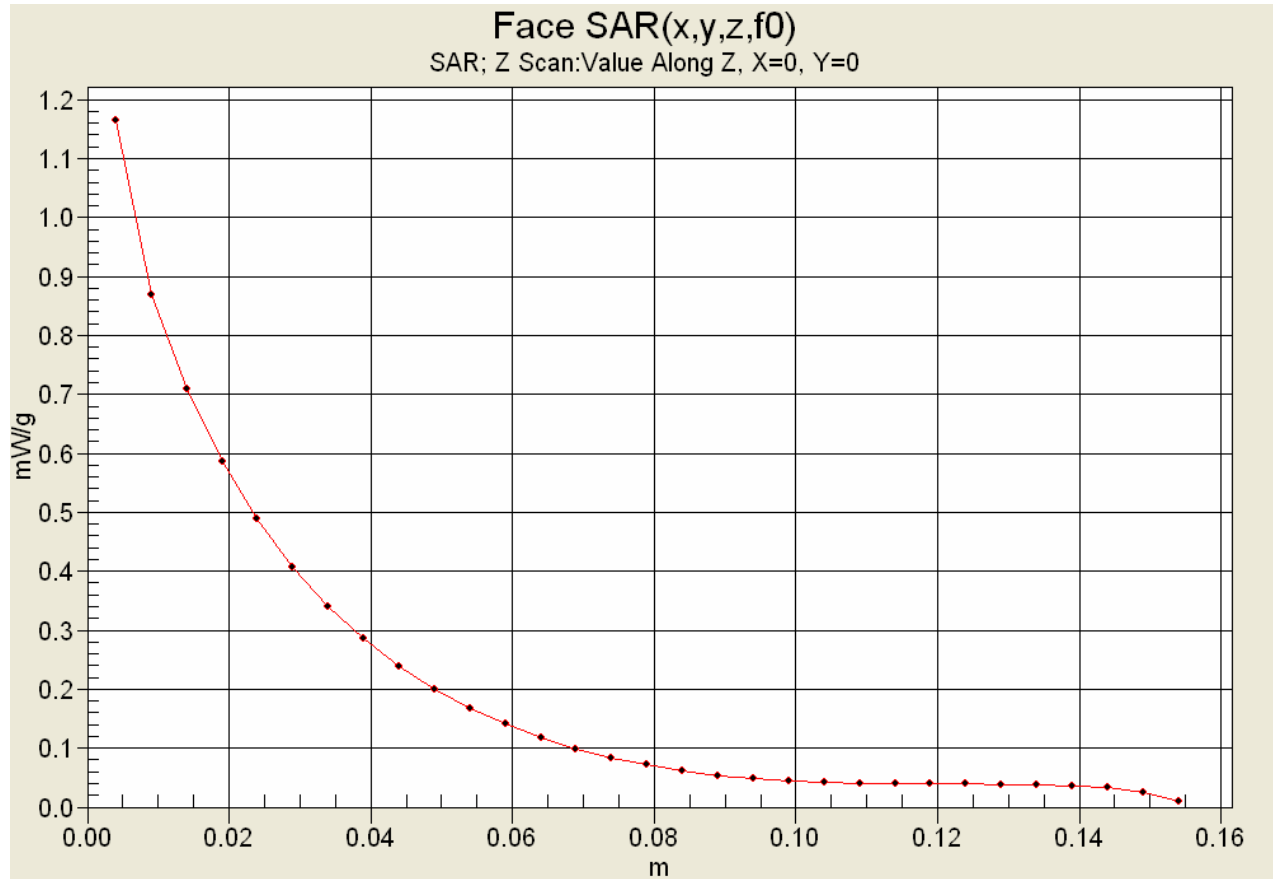
Maximum value of SAR (measured) = 1.18 mW/g





Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
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Z-Axis Scan



Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
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Date Tested: 04/07/2009

Body-worn SAR - DUT with Belt-Clip Accessory - VHF Band - Low Channel - 150.8 MHz

DUT: Kenwood Liberty 4102023-501; Type: Portable Multiband Land Mobile PTT Radio Transceiver; Serial: 10007

Body-worn Accessory: Belt-Clip (P/N: 40508); Audio Accessory: Speaker-Microphone (P/N: 1600696-01)

Ambient Temp: 22.0°C; Fluid Temp: 21.0°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: VHF (CW)

Frequency: 150.8 MHz; Duty Cycle: 1:1

10.8 V Li-ion Battery (P/N: 1600691-2)

Medium: M150 Medium parameters used: $f = 150.8 \text{ MHz}$; $\sigma = 0.79 \text{ mho/m}$; $\epsilon_r = 59.7$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 – SN1590; ConvF(8.5, 8.5, 8.5); Calibrated: 21/07/2008
- Sensor-Surface: 5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.6 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom

Area Scan (8x27x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

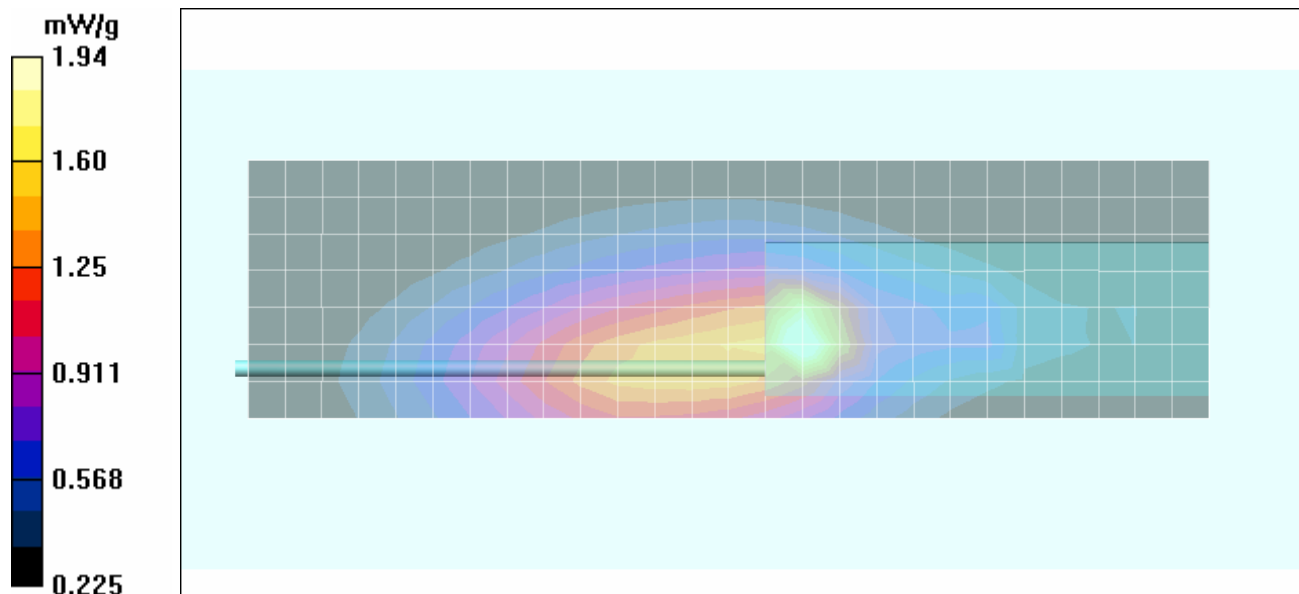
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 42.3 V/m; Power Drift = 0.009 dB



Peak SAR (extrapolated) = 4.86 W/kg

SAR(1 g) = 1.96 mW/g; SAR(10 g) = 1.16 mW/g

Maximum value of SAR (measured) = 1.94 mW/g



Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
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Test Lab Certificate No. 2470.01				

Date Tested: 04/07/2009

Body-worn SAR - DUT with Belt-Holster Accessory - VHF Band - Low Channel - 150.8 MHz

DUT: Kenwood Liberty 4102023-501; Type: Portable Multiband Land Mobile PTT Radio Transceiver; Serial: 10007

Body-worn Accessory: Belt-Holster (P/N: 1600702-1); Audio Accessory: Speaker-Microphone (P/N: 1600696-01)

Ambient Temp: 22.0°C; Fluid Temp: 21.0°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: VHF (CW)

Frequency: 150.8 MHz; Duty Cycle: 1:1

10.8 V Li-ion Battery (P/N: 1600691-2)

Medium: M150 Medium parameters used: $f = 150.8 \text{ MHz}$; $\sigma = 0.79 \text{ mho/m}$; $\epsilon_r = 59.7$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 – SN1590; ConvF(8.5, 8.5, 8.5); Calibrated: 21/07/2008

- Sensor-Surface: 5mm (Mechanical Surface Detection)

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

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

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

Body-worn SAR - 2.0 cm Belt-Holster Spacing from Back Side of DUT to Planar Phantom

Area Scan (8x27x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.24 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 36.6 V/m; Power Drift = -0.072 dB

Peak SAR (extrapolated) = 3.02 W/kg

SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.659 mW/g

Maximum value of SAR (measured) = 1.13 mW/g

Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 36.6 V/m; Power Drift = -0.072 dB

Peak SAR (extrapolated) = 1.66 W/kg

SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.823 mW/g

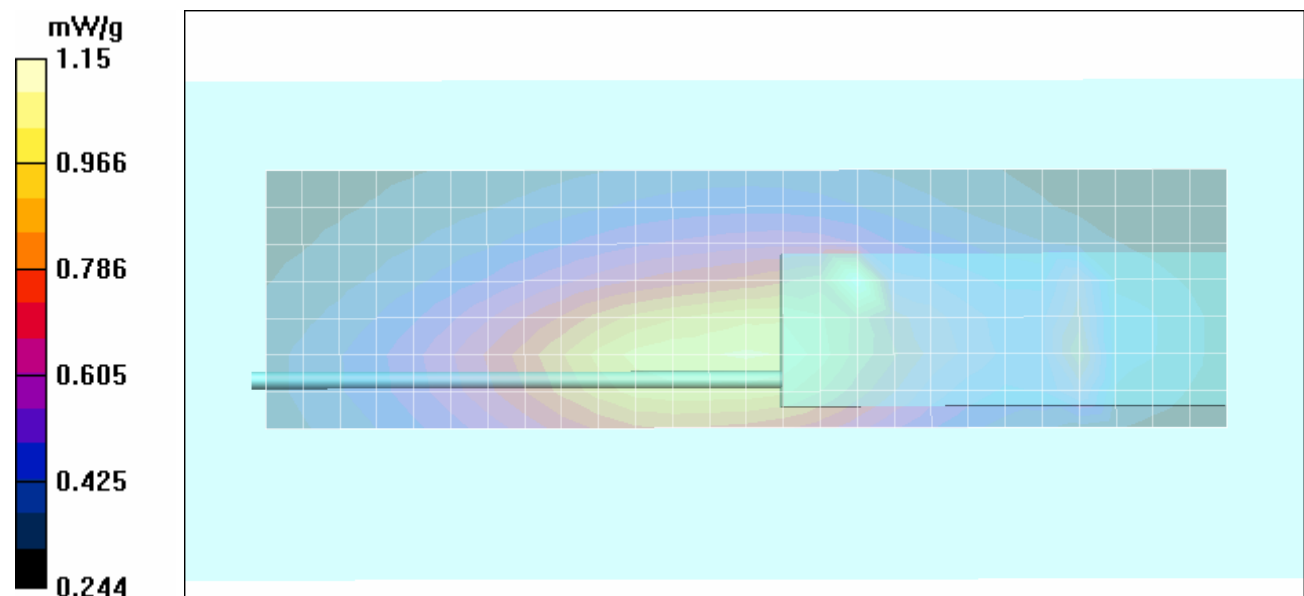
Maximum value of SAR (measured) = 1.15 mW/g

Zoom Scan (5x5x7)/Cube 2: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$



Reference Value = 36.6 V/m; Power Drift = -0.072 dB

Peak SAR (extrapolated) = 1.64 W/kg

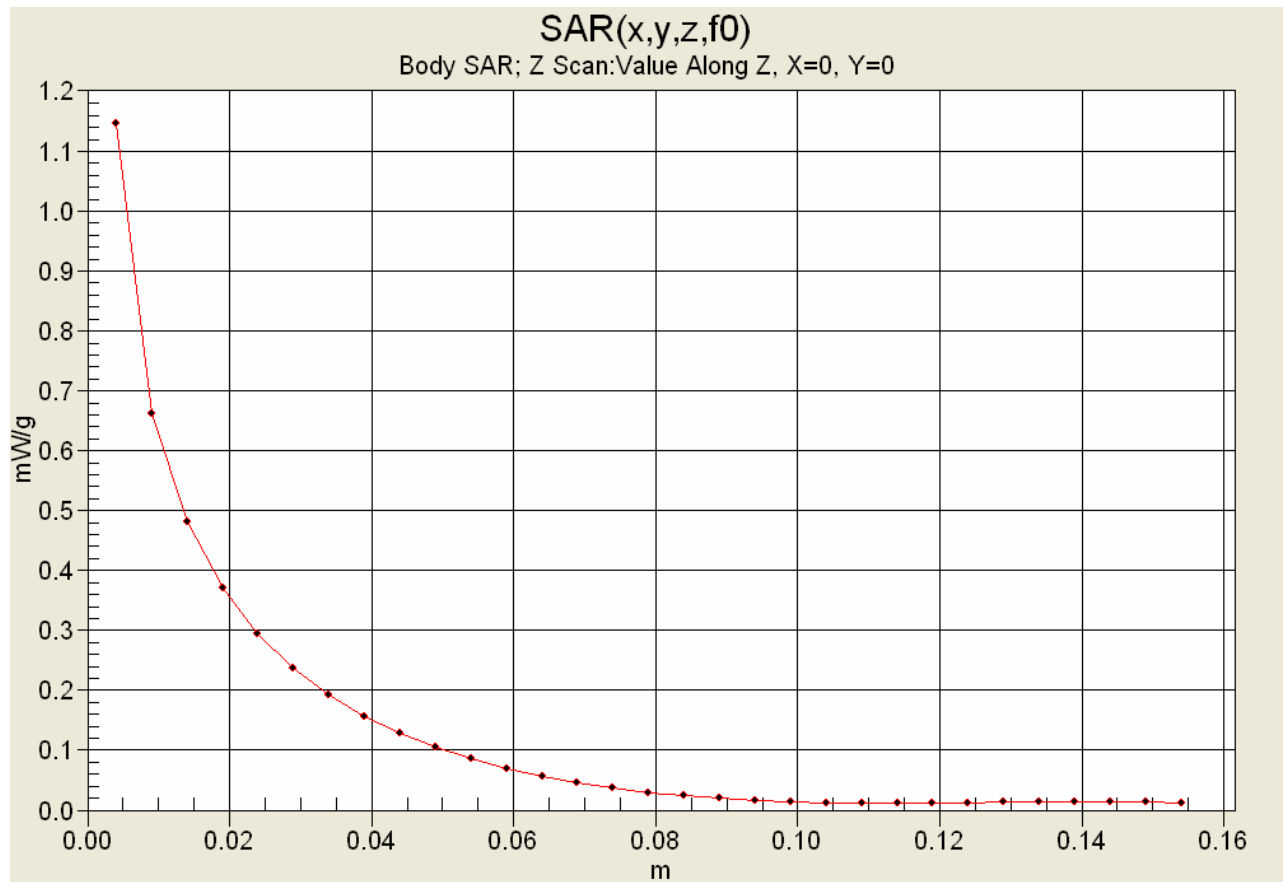
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.816 mW/g





Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan



Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 03/09/2009

Body-worn SAR - DUT with Belt-Clip Accessory - VHF Band - Mid Channel - 155.0 MHz

DUT: Kenwood Liberty 4102023-501; Type: Portable Multiband Land Mobile PTT Radio Transceiver; Serial: 10007

Body-worn Accessory: Belt-Clip (P/N: 40508); Audio Accessory: Speaker-Microphone (P/N: 1600696-01)

Ambient Temp: 24.5°C; Fluid Temp: 22.0°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: VHF (CW)

Frequency: 155.0 MHz; Duty Cycle: 1:1

10.8 V Li-ion Battery (P/N: 1600691-2)

Medium: M150 Medium parameters used: $f = 155.0$ MHz; $\sigma = 0.83$ mho/m; $\epsilon_r = 61.5$; $\rho = 1000$ kg/m³

- Probe: ET3DV6 – SN1590; ConvF(8.5, 8.5, 8.5); Calibrated: 21/07/2008
- Sensor-Surface: 5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.6 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom

Area Scan (8x27x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 3.13 mW/g

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 54.9 V/m; Power Drift = -0.232 dB

Peak SAR (extrapolated) = 7.99 W/kg

SAR(1 g) = 3.24 mW/g; SAR(10 g) = 1.97 mW/g

Maximum value of SAR (measured) = 3.24 mW/g

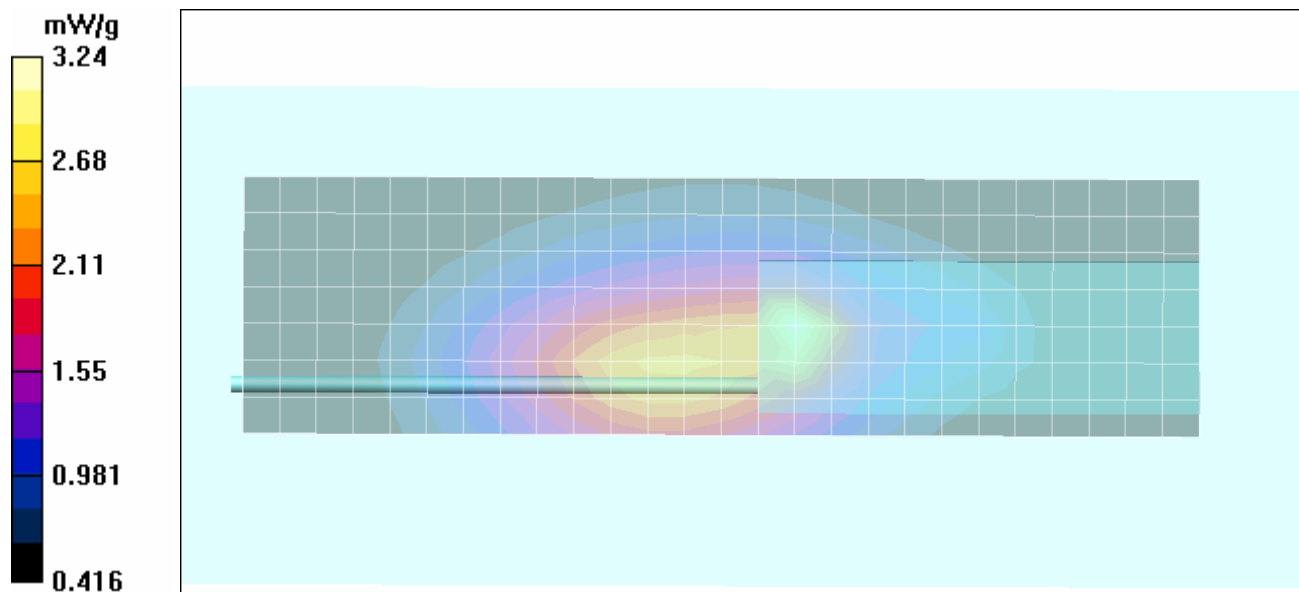
Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 54.9 V/m; Power Drift = -0.232 dB



Peak SAR (extrapolated) = 3.68 W/kg

SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.82 mW/g

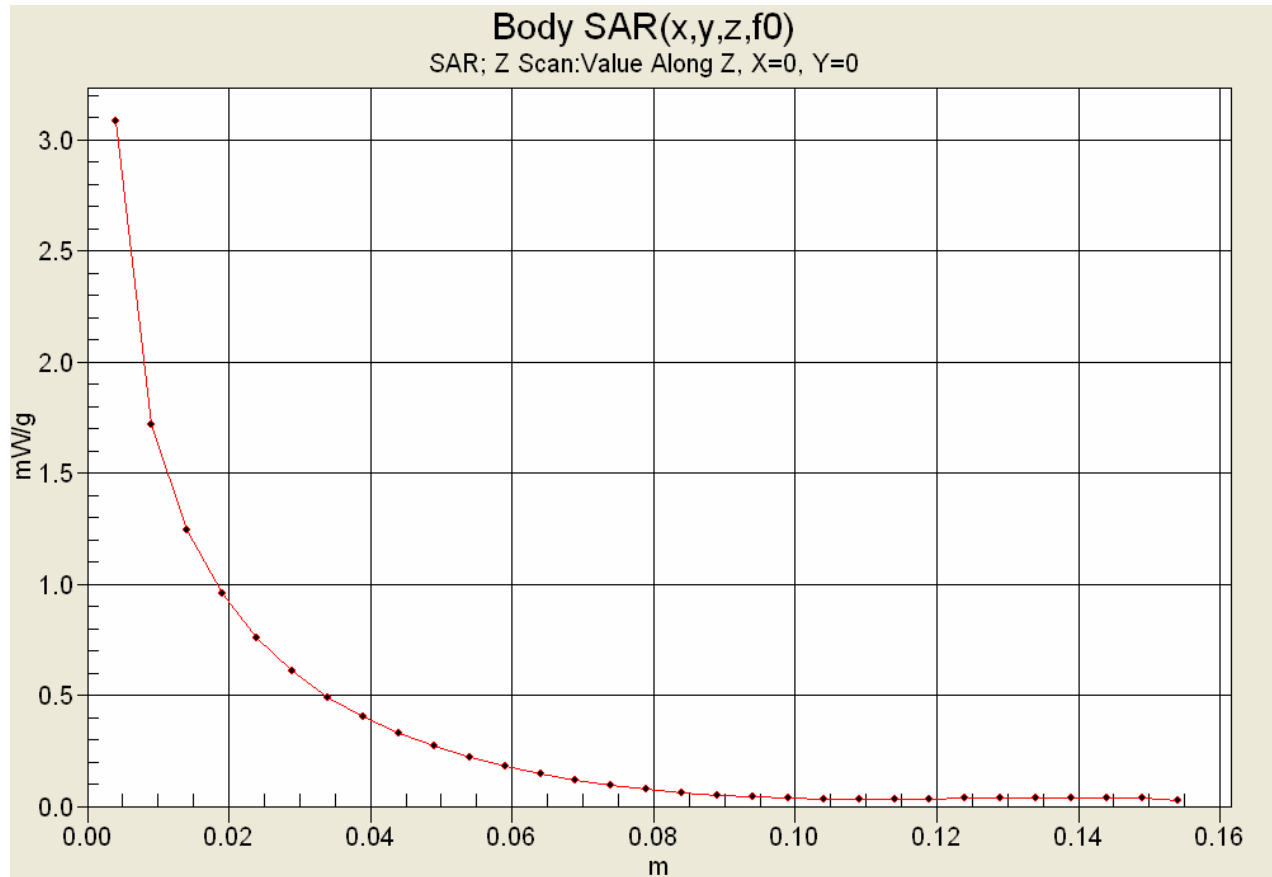
Maximum value of SAR (measured) = 2.54 mW/g





Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan



Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	Test Report Issue Date April 09, 2009	Description of Test(s) Specific Absorption Rate	RF Exposure Category Occupational (Controlled)	

Test Lab Certificate No. 2470.01

Date Tested: 03/09/2009

Body-worn SAR - DUT with Belt-Holster Accessory - VHF Band - Mid Channel - 155.0 MHz

DUT: Kenwood Liberty 4102023-501; Type: Portable Multiband Land Mobile PTT Radio Transceiver; Serial: 10007

Body-worn Accessory: Belt-Holster (P/N: 1600702-1); Audio Accessory: Speaker-Microphone (P/N: 1600696-01)

Ambient Temp: 24.5°C; Fluid Temp: 22.0°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: VHF (CW)

Frequency: 155.0 MHz; Duty Cycle: 1:1

10.8 V Li-ion Battery (P/N: 1600691-2)

Medium: M150 Medium parameters used: $f = 155.0$ MHz; $\sigma = 0.83$ mho/m; $\epsilon_r = 61.5$; $\rho = 1000$ kg/m³

- Probe: ET3DV6 – SN1590; ConvF(8.5, 8.5, 8.5); Calibrated: 21/07/2008

- Sensor-Surface: 5mm (Mechanical Surface Detection)

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

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

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

Body-worn SAR - 2.0 cm Belt-Holster Spacing from Back Side of DUT to Planar Phantom

Area Scan (8x27x1): Measurement grid: $dx=15$ mm, $dy=15$ mm

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

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 49.4 V/m; Power Drift = -0.222 dB

Peak SAR (extrapolated) = 3.64 W/kg

SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.83 mW/g

Maximum value of SAR (measured) = 2.51 mW/g

Zoom Scan (5x5x7)/Cube 1: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 49.4 V/m; Power Drift = -0.222 dB

Peak SAR (extrapolated) = 5.52 W/kg

SAR(1 g) = 2.2 mW/g; SAR(10 g) = 1.36 mW/g

Maximum value of SAR (measured) = 2.32 mW/g

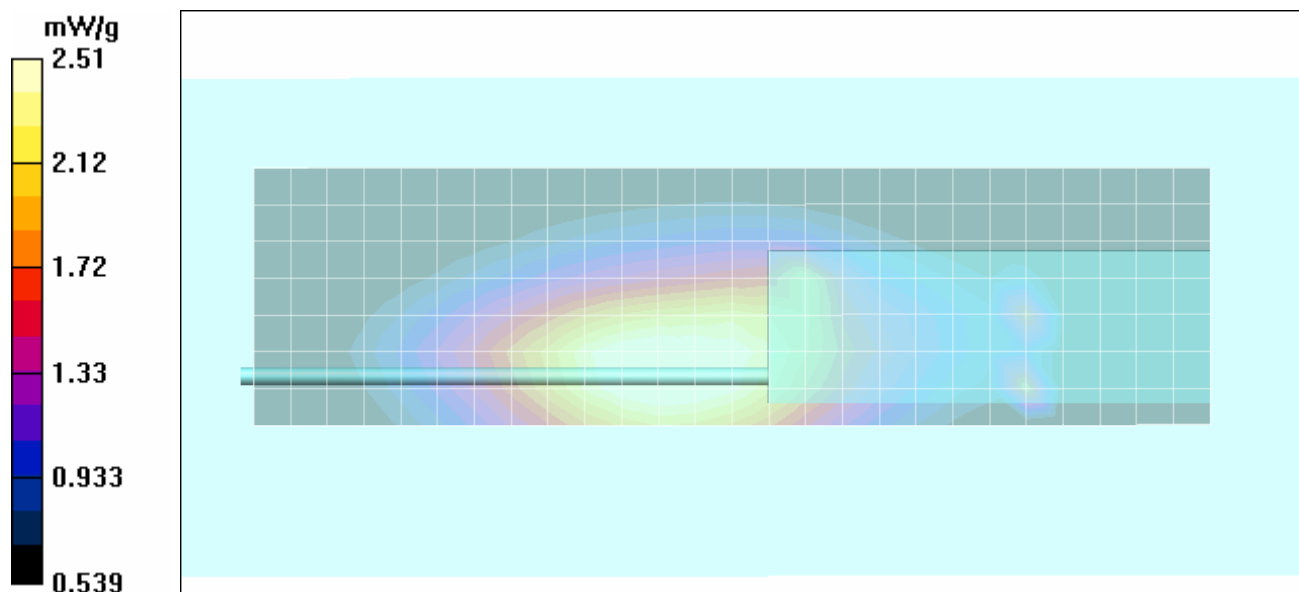
Zoom Scan (5x5x7)/Cube 2: Measurement grid: $dx=7.5$ mm, $dy=7.5$ mm, $dz=5$ mm

Reference Value = 49.4 V/m; Power Drift = -0.222 dB



Peak SAR (extrapolated) = 3.50 W/kg

SAR(1 g) = 1.48 mW/g; SAR(10 g) = 0.675 mW/g

Maximum value of SAR (measured) = 1.91 mW/g



Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 04/07/2009

Body-worn SAR - DUT with Belt-Clip Accessory - VHF Band - High Channel - 173.4 MHz

DUT: Kenwood Liberty 4102023-501; Type: Portable Multiband Land Mobile PTT Radio Transceiver; Serial: 10007

Body-worn Accessory: Belt-Clip (P/N: 40508); Audio Accessory: Speaker-Microphone (P/N: 1600696-01)

Ambient Temp: 22.0°C; Fluid Temp: 21.0°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: VHF (CW)

Frequency: 173.4 MHz; Duty Cycle: 1:1

10.8 V Li-ion Battery (P/N: 1600691-2)

Medium: M150 Medium parameters used: $f = 173.4 \text{ MHz}$; $\sigma = 0.81 \text{ mho/m}$; $\epsilon_r = 61.5$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 – SN1590; ConvF(8.5, 8.5, 8.5); Calibrated: 21/07/2008
- Sensor-Surface: 5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.6 cm Belt-Clip Spacing from Back Side of DUT to Planar Phantom

Area Scan (8x27x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.503 mW/g

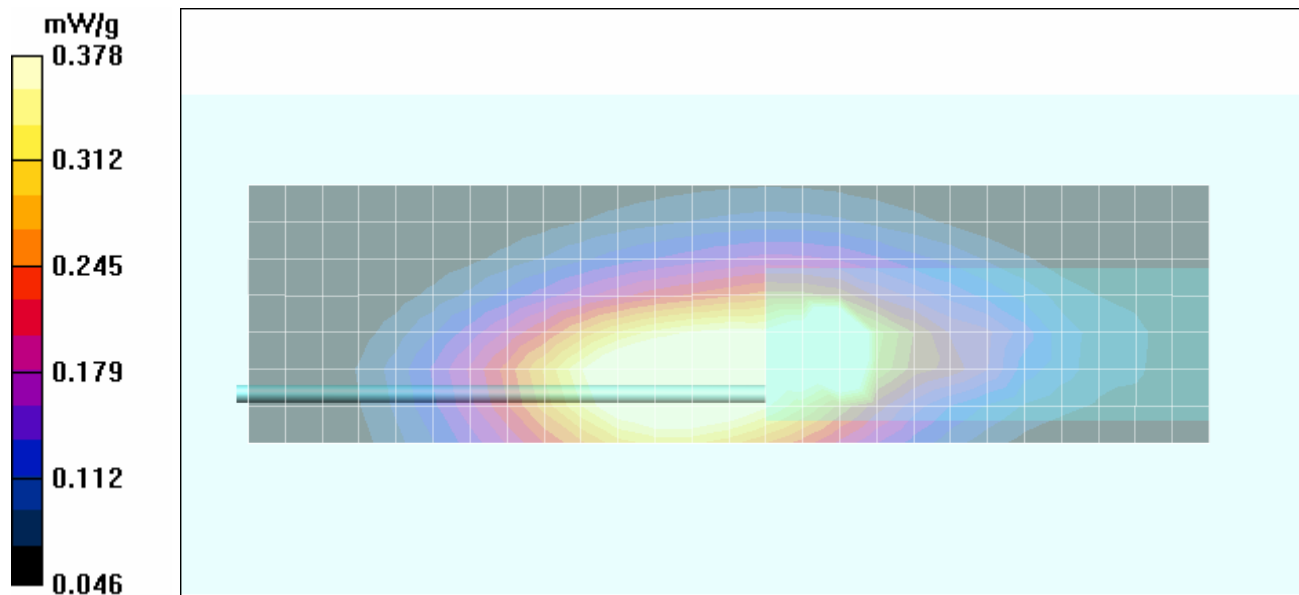
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 22.0 V/m; Power Drift = -0.673 dB



Peak SAR (extrapolated) = 0.691 W/kg

SAR(1 g) = 0.365 mW/g; SAR(10 g) = 0.234 mW/g

Maximum value of SAR (measured) = 0.378 mW/g



Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Date Tested: 04/07/2009

Body-worn SAR - DUT with Belt-Holster Accessory - VHF Band - High Channel - 173.4 MHz

DUT: Kenwood Liberty 4102023-501; Type: Portable Multiband Land Mobile PTT Radio Transceiver; Serial: 10007

Body-worn Accessory: Belt-Holster (P/N: 1600702-1); Audio Accessory: Speaker-Microphone (P/N: 1600696-01)

Ambient Temp: 22.0°C; Fluid Temp: 21.0°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: VHF (CW)

Frequency: 173.4 MHz; Duty Cycle: 1:1

10.8 V Li-ion Battery (P/N: 1600691-2)

Medium: M150 Medium parameters used: $f = 173.4 \text{ MHz}$; $\sigma = 0.81 \text{ mho/m}$; $\epsilon_r = 61.5$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 – SN1590; ConvF(8.5, 8.5, 8.5); Calibrated: 21/07/2008
- Sensor-Surface: 5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 2.0 cm Belt-Holster Spacing from Back Side of DUT to Planar Phantom

Area Scan (8x27x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.395 mW/g

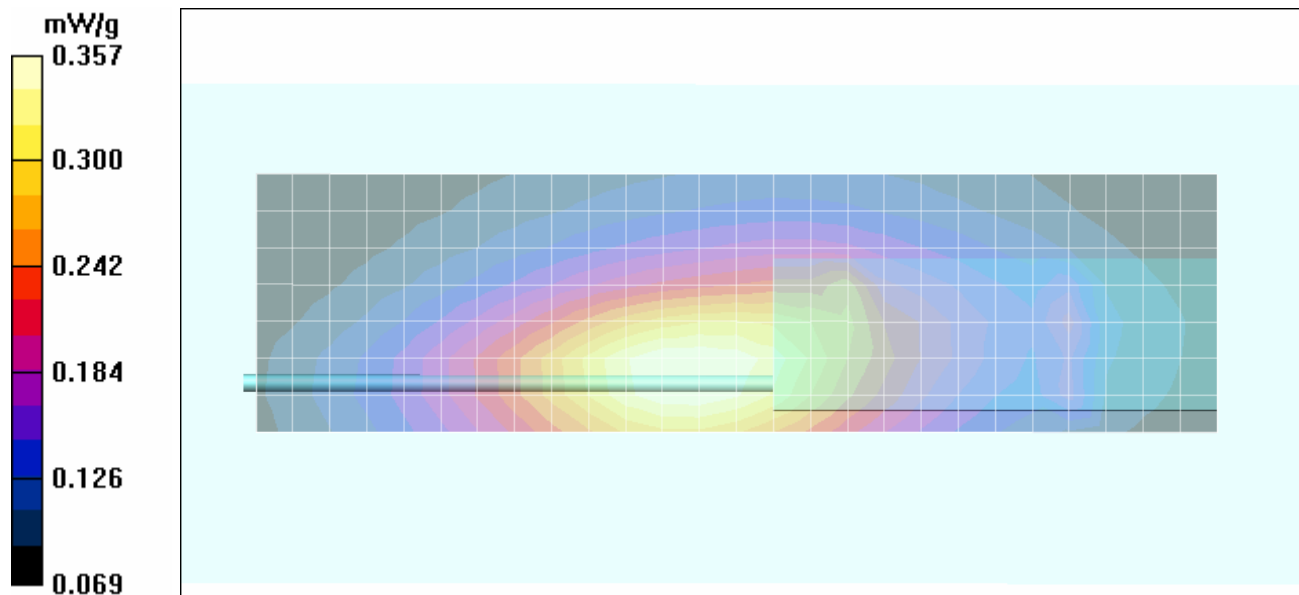
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 20.9 V/m; Power Drift = -0.853 dB



Peak SAR (extrapolated) = 0.525 W/kg

SAR(1 g) = 0.344 mW/g; SAR(10 g) = 0.253 mW/g

Maximum value of SAR (measured) = 0.357 mW/g

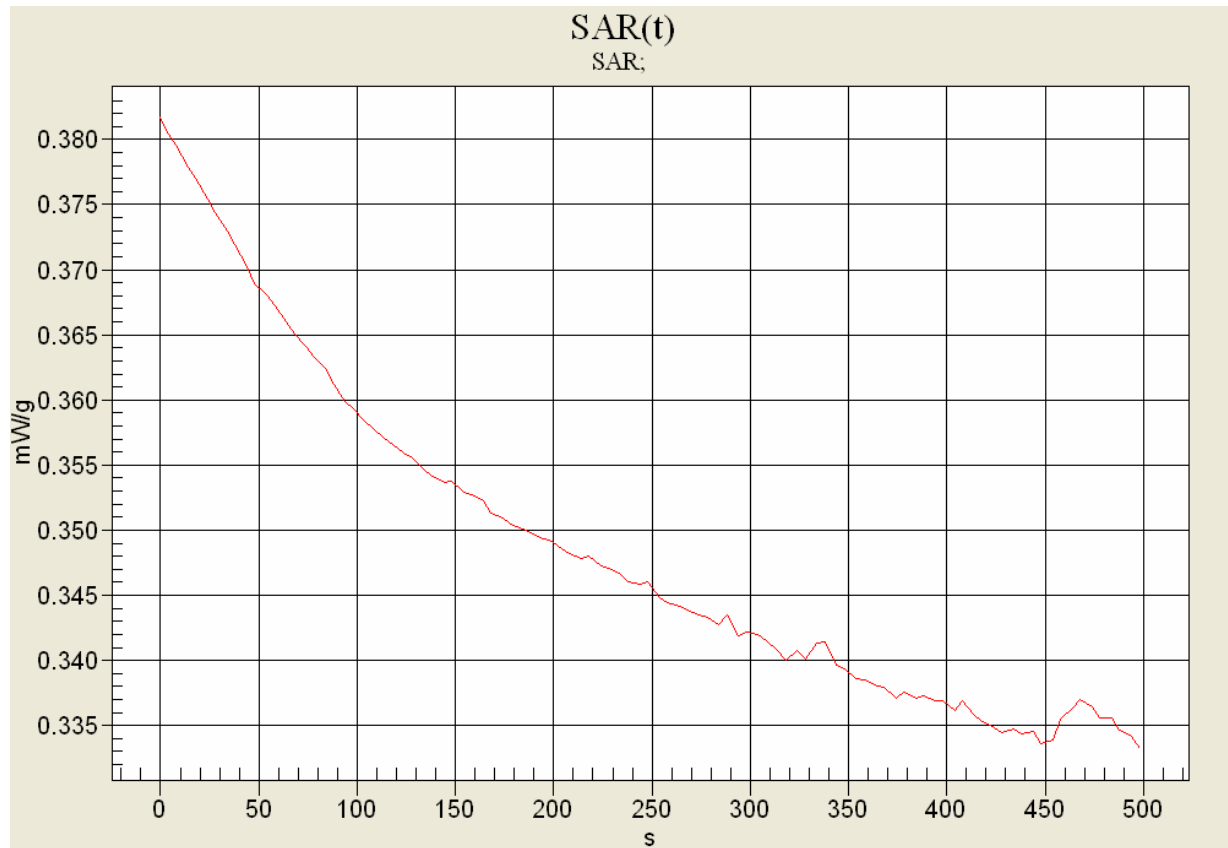


Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	



SAR-versus-Time Droop Evaluation

Body-worn Configuration
High Channel 173.4 MHz
DUT with Belt-Holster





SAR 0s: 0.381709 mW/g
SAR 340s: 0.341459 mW/g (-0.484 dB)
SAR 500s: 0.333253 mW/g (-0.590 dB)
(340s = Zoom Scan Duration)
(500s = Area Scan Duration)

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver			VHF: 150.8 - 173.4 MHz	
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	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	
Test Lab Certificate No. 2470.01				

Date Tested: 03/09/2009

System Performance Check - 300 MHz Dipole - HSL

DUT: Dipole 300 MHz; Asset: 00023; Serial: 135; Calibrated: 01/26/2009

Ambient Temp: 21.5°C; Fluid Temp: 22.0°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 300 MHz; Duty Cycle: 1:1

Medium: 300 HSL Medium parameters used: $f = 300 \text{ MHz}$; $\sigma = 0.86 \text{ mho/m}$; $\epsilon_r = 45.3$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(8, 8, 8); Calibrated: 21/07/2008
- Sensor-Surface: 5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Validation Planar; Type: Plexiglas; Serial: TE#137
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 300 MHz Dipole

Area Scan (6x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.685 mW/g

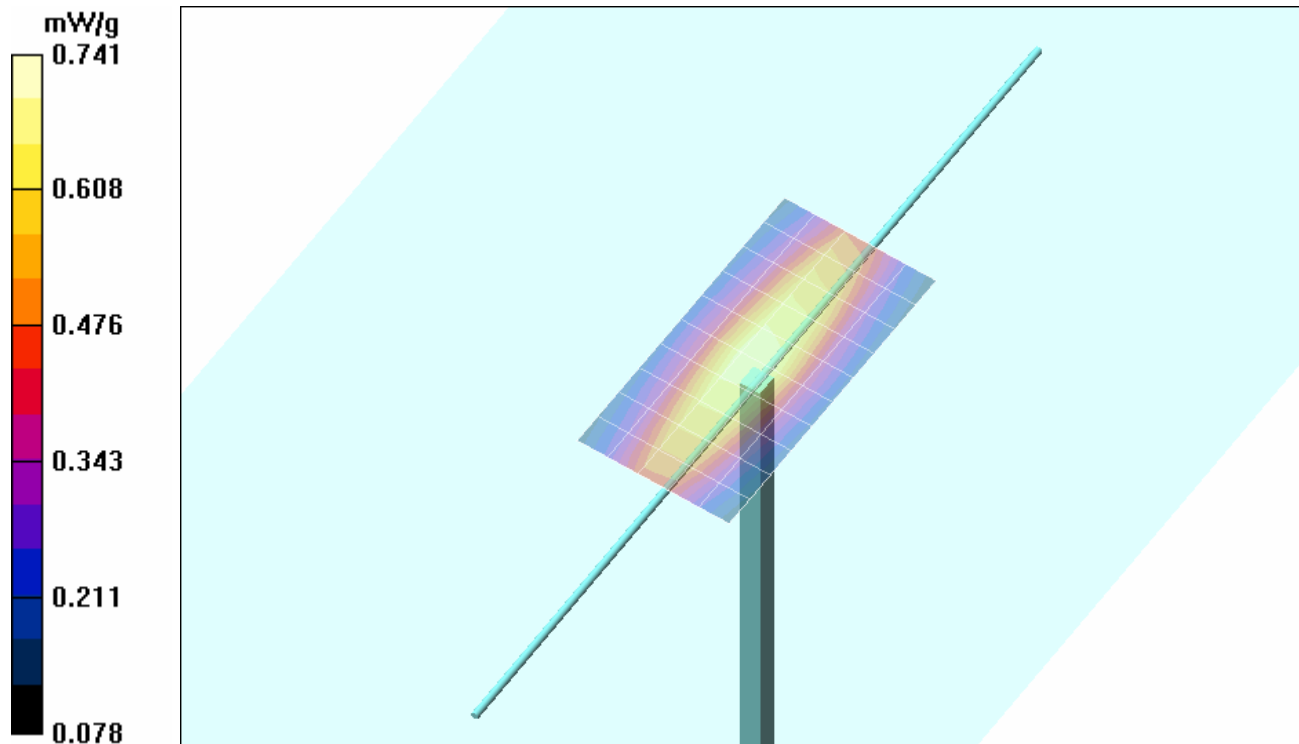
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 29.5 V/m; Power Drift = -0.053 dB



Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.763 mW/g; SAR(10 g) = 0.508 mW/g

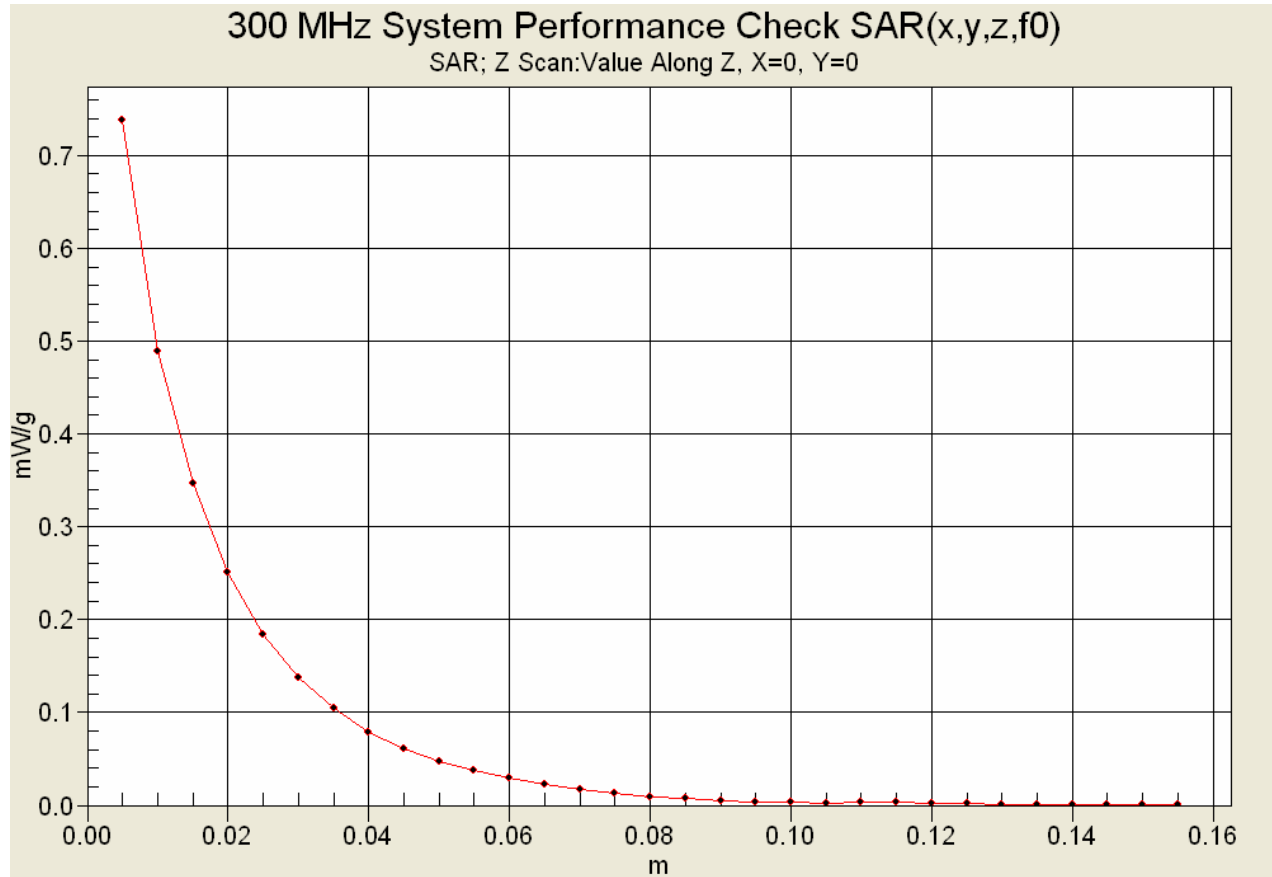
Maximum value of SAR (measured) = 0.741 mW/g





Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan



Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	
Test Lab Certificate No. 2470.01				

Date Tested: 04/07/2009

System Performance Check - 300 MHz Dipole - HSL

DUT: Dipole 300 MHz; Asset: 00023; Serial: 135; Calibrated: 01/26/2009

Ambient Temp: 22.0°C; Fluid Temp: 21.3°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 300 MHz; Duty Cycle: 1:1

Medium: 300 HSL Medium parameters used: $f = 300 \text{ MHz}$; $\sigma = 0.85 \text{ mho/m}$; $\epsilon_r = 45.5$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(8, 8, 8); Calibrated: 21/07/2008
- Sensor-Surface: 5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Validation Planar; Type: Plexiglas; Serial: TE#137
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 300 MHz Dipole

Area Scan (6x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.720 mW/g

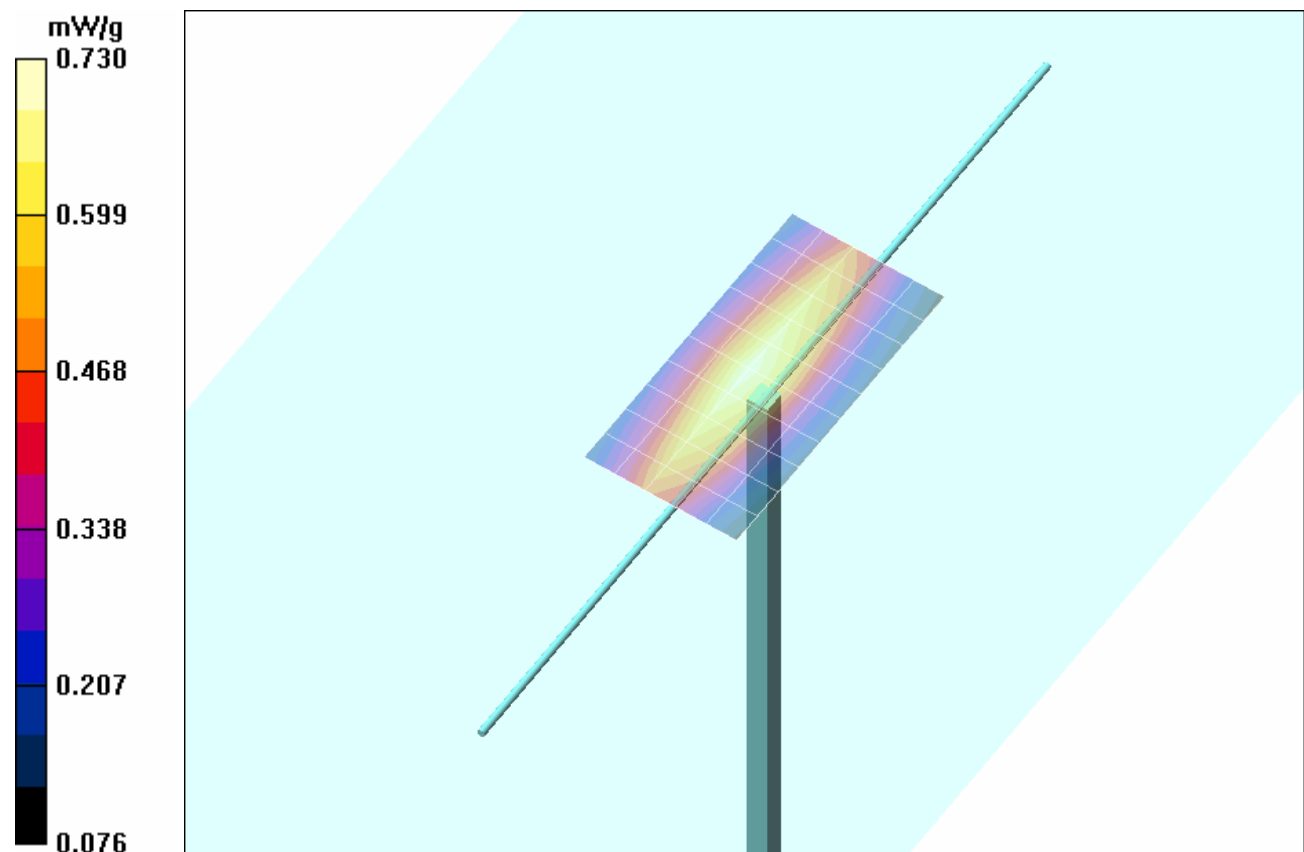
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$

Reference Value = 28.9 V/m; Power Drift = 0.020 dB



Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.753 mW/g; SAR(10 g) = 0.500 mW/g

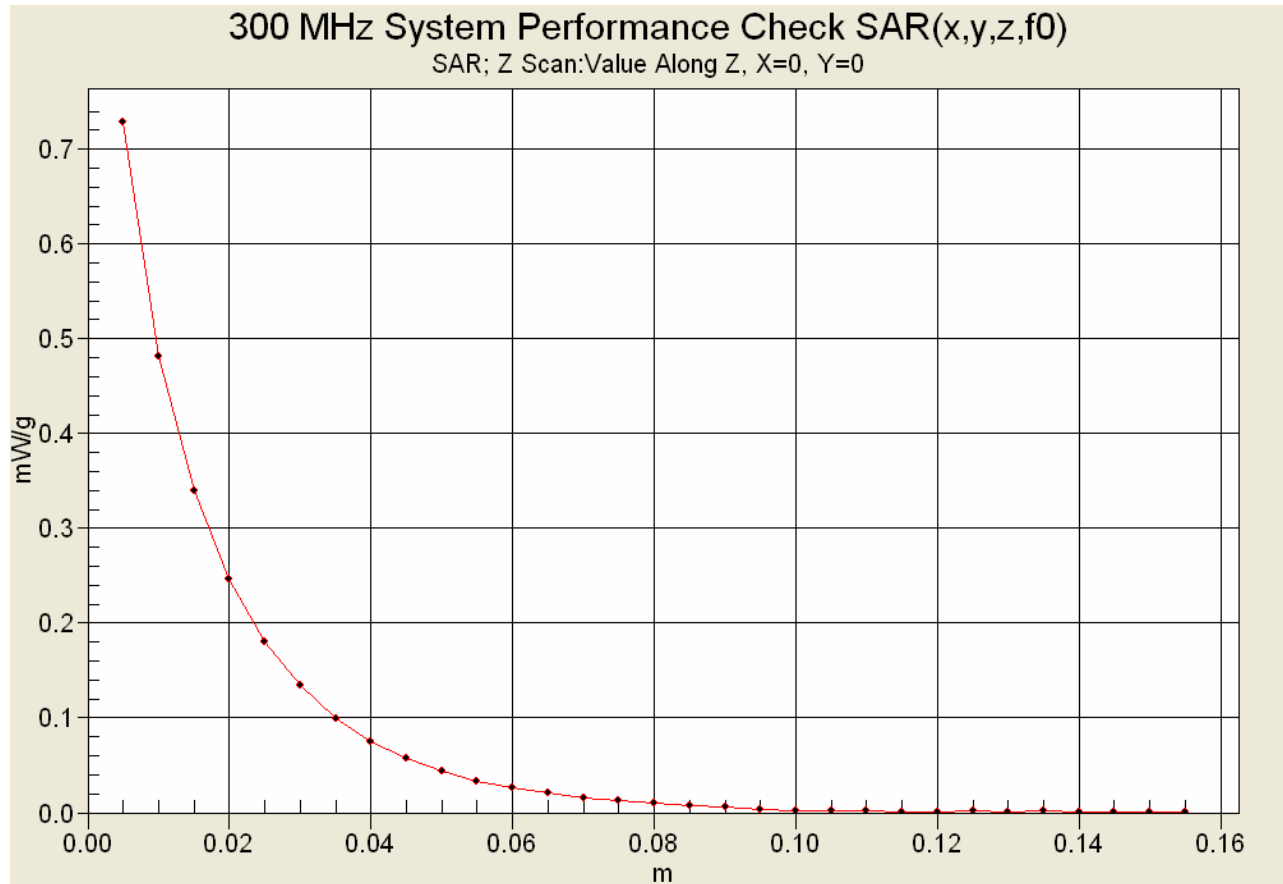
Maximum value of SAR (measured) = 0.730 mW/g





Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Z-Axis Scan





Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

300 MHz System Performance Check (Head)

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

9/Mar/2009

Frequency (GHz)

FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon



FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma

Test_e Epsilon of UIM

Test_s Sigma of UIM

Freq	FCC_eHF	FCC_sH	Test_e	Test_s
0.2000	49.97	0.80	48.61	0.76
0.2100	49.50	0.80	48.48	0.78
0.2200	49.03	0.81	48.32	0.78
0.2300	48.57	0.82	47.60	0.81
0.2400	48.10	0.83	48.30	0.80
0.2500	47.63	0.83	46.43	0.81
0.2600	47.17	0.84	46.93	0.82
0.2700	46.70	0.85	46.50	0.84
0.2800	46.23	0.86	45.44	0.84
0.2900	45.77	0.86	45.25	0.84
0.3000	45.30	0.87	45.27	0.86
0.3100	45.18	0.87	44.70	0.86
0.3200	45.06	0.87	43.85	0.88
0.3300	44.94	0.87	44.00	0.87
0.3400	44.82	0.87	43.60	0.89
0.3500	44.70	0.87	43.46	0.90
0.3600	44.58	0.87	43.46	0.90
0.3700	44.46	0.87	42.59	0.92
0.3800	44.34	0.87	42.30	0.93
0.3900	44.22	0.87	42.36	0.93
0.4000	44.10	0.87	42.44	0.95

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver			VHF: 150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

150 MHz DUT Evaluation (Head)

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
9/Mar/2009
Frequency (GHz)
FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

Freq	FCC_eHF	FCC_sH	Test_e	Test_s
0.0500	56.97	0.69	61.39	0.71
0.0600	56.50	0.69	57.37	0.71
0.0700	56.03	0.70	59.56	0.72
0.0800	55.57	0.71	60.60	0.74
0.0900	55.10	0.72	57.68	0.74
0.1000	54.63	0.72	55.11	0.74
0.1100	54.17	0.73	55.32	0.75
0.1200	53.70	0.74	54.88	0.77
0.1300	53.23	0.75	54.00	0.77
0.1400	52.77	0.75	53.56	0.78
0.1500	52.30	0.76	52.53	0.79
0.1600	51.83	0.77	52.73	0.79
0.1700	51.37	0.77	52.73	0.81
0.1800	50.90	0.78	52.05	0.81
0.1900	50.43	0.79	51.31	0.82
0.2000	49.97	0.80	50.85	0.82
0.2100	49.50	0.80	50.12	0.84
0.2200	49.03	0.81	49.39	0.85
0.2300	48.57	0.82	49.38	0.86
0.2400	48.10	0.83	49.16	0.87
0.2500	47.63	0.83	49.03	0.88

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver			VHF: 150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	



Test Lab Certificate No. 2470.01

150 MHz DUT Evaluation (Body)

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
9/Mar/2009
Frequency (GHz)
FCC_eHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.0500	64.37	0.72	57.49	0.80
0.0600	64.12	0.73	58.47	0.79
0.0700	63.87	0.74	69.54	0.81
0.0800	63.63	0.74	66.29	0.78
0.0900	63.38	0.75	60.21	0.81
0.1000	63.13	0.76	64.56	0.80
0.1100	62.89	0.77	65.74	0.82
0.1200	62.64	0.78	61.80	0.81
0.1300	62.39	0.78	66.18	0.80
0.1400	62.15	0.79	63.22	0.82
0.1500	61.90	0.80	61.54	0.83
0.1600	61.65	0.81	63.52	0.84
0.1700	61.41	0.82	62.28	0.84
0.1800	61.16	0.82	62.14	0.83
0.1900	60.91	0.83	61.19	0.86
0.2000	60.67	0.84	62.43	0.88
0.2100	60.42	0.85	61.69	0.85
0.2200	60.17	0.86	62.42	0.88
0.2300	59.93	0.86	60.87	0.86
0.2400	59.68	0.87	61.56	0.88
0.2500	59.43	0.88	61.94	0.89

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver			VHF: 150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

300 MHz System Performance Check (Head)

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

7/Apr/2009

Frequency (GHz)

FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon



FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma

Test_e Epsilon of UIM

Test_s Sigma of UIM

Freq	FCC_eHF	FCC_sH	Test_e	Test_s
0.2000	49.97	0.80	47.91	0.78
0.2100	49.50	0.80	48.77	0.78
0.2200	49.03	0.81	48.11	0.80
0.2300	48.57	0.82	47.22	0.81
0.2400	48.10	0.83	47.18	0.83
0.2500	47.63	0.83	46.68	0.82
0.2600	47.17	0.84	46.81	0.84
0.2700	46.70	0.85	44.70	0.84
0.2800	46.23	0.86	45.91	0.86
0.2900	45.77	0.86	44.95	0.85
0.3000	45.30	0.87	45.54	0.85
0.3100	45.18	0.87	44.96	0.88
0.3200	45.06	0.87	44.23	0.88
0.3300	44.94	0.87	43.48	0.89
0.3400	44.82	0.87	43.64	0.90
0.3500	44.70	0.87	43.24	0.92
0.3600	44.58	0.87	43.45	0.92
0.3700	44.46	0.87	43.54	0.93
0.3800	44.34	0.87	42.67	0.92
0.3900	44.22	0.87	41.93	0.94
0.4000	44.10	0.87	41.97	0.94

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver			VHF: 150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

150 MHz & 170 MHz DUT Evaluation (Body)

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
7/Apr/2009
Frequency (GHz)
FCC_eHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM



Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.0500	64.37	0.72	68.34	0.73
0.0600	64.12	0.73	65.68	0.77
0.0700	63.87	0.74	69.36	0.81
0.0800	63.63	0.74	60.88	0.76
0.0900	63.38	0.75	62.28	0.79
0.1000	63.13	0.76	60.63	0.79
0.1100	62.89	0.77	63.84	0.78
0.1200	62.64	0.78	61.83	0.79
0.1300	62.39	0.78	61.52	0.81
0.1400	62.15	0.79	62.07	0.80
0.1500	61.90	0.80	59.65	0.79
0.1600	61.65	0.81	62.40	0.82
0.1700	61.41	0.82	61.46	0.81
0.1800	61.16	0.82	59.53	0.81
0.1900	60.91	0.83	60.54	0.83
0.2000	60.67	0.84	59.32	0.83
0.2100	60.42	0.85	60.43	0.84
0.2200	60.17	0.86	59.33	0.83
0.2300	59.93	0.86	59.08	0.84
0.2400	59.68	0.87	60.13	0.85
0.2500	59.43	0.88	60.10	0.86

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

FACE-HELD SAR TEST SETUP PHOTOGRAPHS

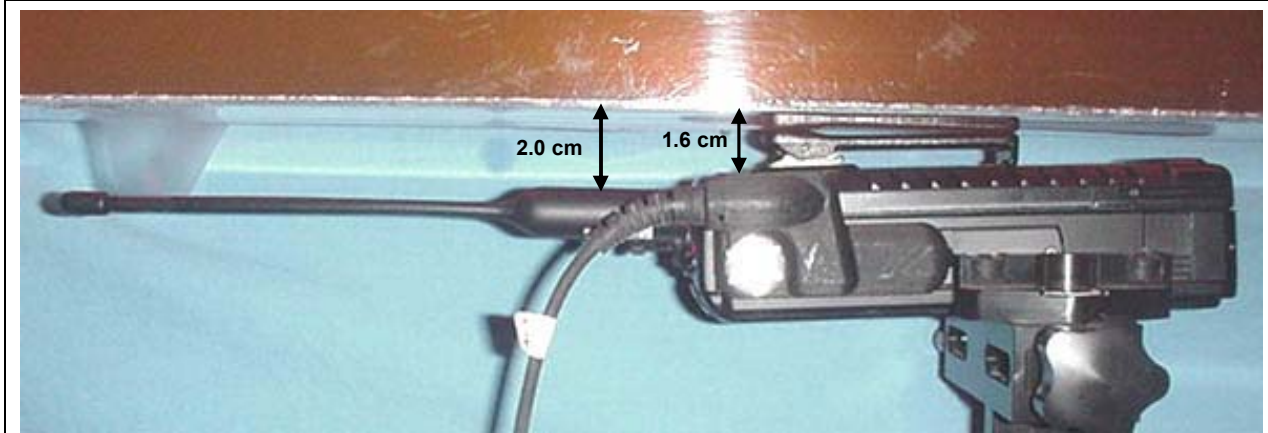
2.5 cm Spacing from Front of DUT to Planar Phantom





Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

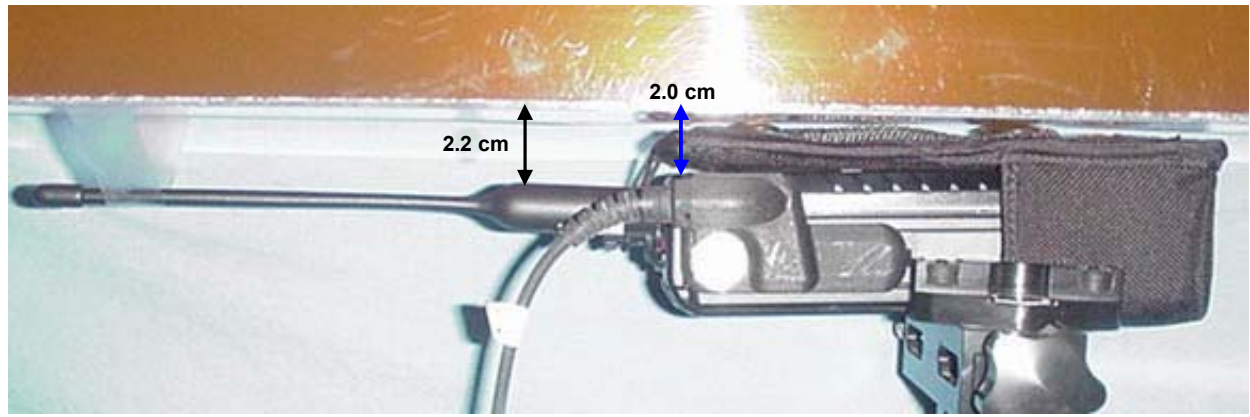
BODY-WORN SAR TEST SETUP PHOTOGRAPHS
1.6 cm Belt-Clip Spacing from Back of DUT to Planar Phantom
DUT with Belt-Clip and Speaker-Microphone Audio Accessory





Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

BODY-WORN SAR TEST SETUP PHOTOGRAPHS
2.0 cm Belt-Holster Spacing from Back of DUT to Planar Phantom
DUT with Belt-Holster and Speaker-Microphone Audio Accessory





Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

DUT PHOTOGRAPHS



Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

Test Lab Certificate No. 2470.01

DUT PHOTOGRAPHS





Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

DUT PHOTOGRAPHS

		
		
Left & Right Sides of DUT with Belt-Holster accessory (P/N: 1600702-1)		Back of Belt-Holster accessory
		
Bottom end of DUT with Belt-Holster	Top end of DUT with Belt-Holster	Front of Belt-Holster accessory



Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

DUT PHOTOGRAPHS

		
DUT Battery Housing	10.8 V 4.8 Ah Lithium-ion Battery (P/N: 1600691-2)	

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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	<u>Date(s) of Evaluation</u> March 09 & April 07, 2009	<u>Test Report Serial No.</u> 030409OKC-T954-S90V	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> April 09, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Occupational (Controlled)	

DUT PHOTOGRAPHS

	
DUT with Belt-Clip & Speaker-Microphone (P/N: 1600696-01)	DUT with Belt-Holster & Speaker-Microphone (P/N: 1600696-01)

Applicant:	Thales Communications Inc.	FCC ID:	OKC-4102023501	IC:	473C-4102023501	THALES
Model:	Liberty 4102023-501	Portable Multiband Land Mobile Radio Transceiver		VHF:	150.8 - 173.4 MHz	
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