	Test Report Serial No.:		010406B5D-T711-S15W	Report Issue No.:		S711-012106-R0
	Date(s) of Evaluation:		January 17-18, 2006	Report Issue Date:		January 21, 2006
	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

**RF EXPOSURE EVALUATION**  
**SPECIFIC ABSORPTION RATE**

**SAR TEST REPORT**

FOR

**TELEX COMMUNICATIONS, INC.**

**BODY-WORN BELTPACK TRANSCEIVER with 802.11b**

**MODEL: XO-1**

**FCC ID: B5DM526**

**IC: 1321A-XO1**

**Test Report Serial Number**

**010406B5D-T711-S15W**


**Test Report Issue No.**


**S711-012106-R0**

**Test Lab**

**Celltech Compliance Testing & Engineering Lab  
(Celltech Labs Inc.)  
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<p><b>Test Report Prepared By:</b></p> <p><i>Cheri Frangiadakis</i></p> <hr/> <p><b>Cheri Frangiadakis Test Report Writer Celltech Labs Inc.</b></p>	<p><b>Test Report Approved By:</b></p> <p><i>[Signature]</i></p> <hr/> <p><b>Jonathan Hughes General Manager Celltech Labs Inc.</b></p>
--	---

<b>Applicant:</b>	Telex Communications, Inc.		<b>FCC ID:</b>	B5DM526	<b>IC ID:</b>	1321A-XO1	
<b>Model(s):</b>	XO-1	<b>DUT:</b>	Body-worn Beltpack Transceiver with 802.11b		<b>Freq.:</b>	2412-2462 MHz	
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	Description of Test(s):	RF Exposure    SAR	FCC 47 CFR §2.1093	IC RSS-102 Issue 2

## DECLARATION OF COMPLIANCE SAR RF EXPOSURE EVALUATION

### Test Lab

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### Applicant Information

**TELEX COMMUNICATIONS, INC.**  
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**FCC IDENTIFIER:** B5DM526  
**IC IDENTIFIER:** 1321A-XO1  
**Model(s):** XO-1

**SAR Test Requirement(s):** FCC 47 CFR §2.1093; Health Canada Safety Code 6  
**SAR Test Procedure(s):** FCC OET Bulletin 65, Supplement C (Edition 01-01)  
Industry Canada RSS-102 Issue 2  
**Device Classification:** Digital Transmission System (DTS)  
**Device Description:** Body-Worn Beltpack Transceiver with 802.11b  
**Mode(s) of Operation:** Direct Sequence Spread Spectrum (DSSS)

**Transmitter Frequency Range:** 2412 - 2462 MHz  
**Max. RF Output Power Tested:** 17.5 dBm (56.2 mW) 2437 MHz (Free Space Power)  
**Max. Data Rate(s) Tested:** 5.5 Mbps  
**Battery Type(s) Tested:** Internal Lithium-ion (7.2 V, 2000 mAh)  
**Antenna Type(s) Tested:** Internal Dipole

**Body-Worn Accessories Tested:** Metal Belt-Clip (1.2 cm spacing)  
**Audio Accessories Tested:** Headset with Microphone (Model: PH-1)

**Max. SAR Level(s) Measured:** Body-worn: 0.00647 W/kg (Peak SAR measured from Area Scan)

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. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01) and Industry Canada RSS-102 Issue 2 for the General Population / Uncontrolled Exposure environment. All measurements were performed in accordance with the SAR system manufacturer recommendations.

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

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

**Tested By:**




**Sean Johnston**  
Compliance Technologist  
Celltech Labs Inc.

**Reviewed By:**



**Spencer Watson**  
Senior Compliance Technologist  
Celltech Labs Inc.



<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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Applicant:	Telex Communications, Inc.	FCC ID:	B5DM526	IC ID:	1321A-XO1	
Model(s):	XO-1	DUT:	Body-worn Beltpack Transceiver with 802.11b	Freq.:	2412-2462 MHz	
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## 1.0 INTRODUCTION

This measurement report demonstrates that the TELEX COMMUNICATIONS, INC. Model: XO-1 Wireless Body-Worn Beltpack Transceiver with 802.11b FCC ID: B5DM526 complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada Safety Code 6 (see reference [2]) for the General Population / Uncontrolled Exposure environment. The test procedures described in FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [3]) and IC RSS-102 Issue 2 (see reference [4]) were employed. A description of the product and 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 DESCRIPTION of DEVICE UNDER TEST (DUT)

SAR Test Requirement(s)	FCC Rule Part 47 CFR §2.1093			Health Canada Safety Code 6	
SAR Test Procedure(s)	FCC OET Bulletin 65, Supplement C (01-01)				
	Industry Canada RSS-102 Issue 2				
FCC Device Classification	Digital Transmission System (DTS)			Rule Part 15C	
IC Device Classification	Low Power License-Exempt Radiocommunication Device			RSS-210 Issue 6	
Device Description	Wireless Body-worn Beltpack Transceiver with 802.11b				
RF Exposure Category	General Population / Uncontrolled Environment				
FCC IDENTIFIER	B5DM526				
IC IDENTIFIER	1321A-XO1				
Model(s)	XO-1				
Test Sample Serial No.	S/N: 000501			Production Sample	
Transmission Type(s)	DSSS			Direct Sequence Spread Spectrum	
Modulation Scheme(s)	DBPSK, DQPSK, CCK				
Transmitter Frequency Range	2412 - 2462 MHz				
Max. RF Output Power Tested	17.5 dBm	56.2 dBm	2437 MHz	Channel 6	Free-Space Power
Max. Data Rate(s) Tested	5.5 Mbps				
Battery Type(s) Tested	Internal	Lithium-ion	7.2 V	2000 mAh	
Antenna Type(s) Tested	Internal Dipole				
Body-Worn Accessories Tested	Metal Belt-Clip (1.2 cm spacing)				
Audio Accessories Tested	Headset with Microphone (Model: PH-1)				

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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### 3.0 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 brain 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 its own controller with a built in VME-bus computer.




DASY4 Measurement System with SAM Phantom and validation dipole



DASY4 SAR Measurement System with SAM phantom and device holder

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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## 4.0 MEASUREMENT SUMMARY

BODY-WORN SAR EVALUATION RESULTS												
Freq. (MHz)	Chan.	Test Mode	Data Rate (Mbps)	Battery Type	Antenna Position	Accessories Tested		DUT Position to Planar Phantom	Separation Distance to Planar Phantom (cm)	Free Space Power (dBm)	SAR Drift During Test (dB)	Peak SAR Measured from Area Scan <sup>3</sup> (W/kg)
						Body-Worn	Audio					
2437	6	DSSS	5.5	Li-ion	Internal	Belt-Clip	Headset with Microphone	Back Side	1.2	17.5	0.612	0.00647
ANSI / IEEE C95.1 1999 - SAFETY LIMIT				BODY: 1.6 W/kg (averaged over 1 gram)				Spatial Peak - Uncontrolled Exposure / General Population				
Test Date(s)			January 18, 2006				Relative Humidity			30		%
Measured Fluid Type			2450 MHz Body				Atmospheric Pressure			102.2		kPa
Dielectric Constant $\epsilon_r$			IEEE Target		Measured	Deviation	Ambient Temperature			23.4		°C
			52.7	± 5%	50.2	-4.7%	Fluid Temperature			23.7		°C
Conductivity $\sigma$ (mho/m)			IEEE Target		Measured	Deviation	Fluid Depth			≥ 15		cm
			1.95	± 5%	1.88	-3.6%	$\rho$ (Kg/m <sup>3</sup> )			1000		

Note(s):

- The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
- If the SAR levels measured at the highest output channel were ≥ 3 dB below the SAR limit, SAR evaluation for all other selected channels was optional (October 2005 TCB Council Workshop - see reference [6]).
- The 1g-averaged SAR was not measured because the peak SAR value from the area scan evaluations for each test configuration was less than 1% of the 1g average limit. The peak SAR values measured during the area scan evaluations for each test configuration are reported. The mathematical formula used to extrapolate the SAR value at the surface from the Zoom Scan SAR values measured at 5 mm steps leading away from the surface assumes a curving slope (i.e. the SAR values gradually decrease as the probe moves away from the surface). When the peak SAR of a device is so low that the RF noise level is competing with the level of the SAR, the Zoom Scan measurements leading away from the surface are no longer a curving slope and the extrapolation formula cannot accurately estimate the 1g average SAR. In this manner, we have reported the peak values from the Area Scan in place of the 1g averaged SAR values whenever the peak values are less than 1% of the average limit. This avoids gross uncertainties in the 1g average SAR calculation while maintaining a conservative estimation of the SAR level. It is the engineering judgment of Celltech Labs Inc. that no device operating in this frequency band could have a peak SAR value (measured on an Area Scan) less than 0.016 mW/g and simultaneously have a 1g average value greater than 1.6 mW/g (1g average limit).
- The power drift was measured by the DASY4 system for the duration of the SAR evaluation.
- The DUT battery was fully charged prior to the SAR evaluation.
- The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures reported were consistent for all measurement periods.
- The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluation using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C).
- The SAR evaluation was performed within 24 hours of the system performance check.

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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## 5.0 DETAILS OF SAR EVALUATION

The TELEX COMMUNICATIONS, INC. Model: XO-1 Wireless Body-Worn Beltpack Transceiver with 802.11b FCC ID: B5DM526 was compliant for localized Specific Absorption Rate (Uncontrolled Exposure) based on the test provisions and conditions described below. Detailed test setup photographs are shown in Appendix D.

### SAR Test Configurations

1. The DUT was tested in a body-worn configuration with the back side facing the outer surface of the SAM phantom (planar section). The attached metal belt-clip accessory was touching the SAM phantom (planar section) and provided a 1.2 cm separation distance from the back of the DUT to the outer surface of the SAM phantom (planar section). The DUT was evaluated for body-worn SAR with the headset/microphone audio accessory connected to the standard 4-pin XLR connector.

### Test Modes & Power Settings

2. The conducted power level(s) of the DUT could not be measured for the SAR evaluation due to internal antenna. The DUT was evaluated for SAR at the maximum conducted power level preset by the manufacturer. The RF output power of the DUT was evaluated prior to the SAR evaluation at FLOM Test Labs using the free-space power measurement method.
3. The DUT was placed in a continuous transmit mode (100% duty cycle) using the top panel control and tested at maximum power with a modulated DSSS signal.
4. The power drift of the DUT was measured by the DASY4 system for the duration of the SAR evaluation.
5. The DUT battery was fully charged prior to the SAR evaluation.

## 6.0 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 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>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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## 7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluation a system check was performed at the planar section of the SAM phantom with a 2450MHz dipole (see Appendix E for system validation procedures). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of  $\pm 10\%$  (see Appendix B). See Table 1 below for the SAR system manufacturer's reference body SAR values from the DASY4 Operation Manual (see reference [7]).

### SYSTEM PERFORMANCE CHECK EVALUATION

Test Date	2450MHz 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)
		IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.						
1/17/06	Body	12.8 $\pm 10\%$	13.8	+7.8%	52.7 $\pm 5\%$	50.4	-4.4%	1.95 $\pm 5\%$	1.98	+1.5%	1000	23.5	23.8	$\geq 15$	30	102.1

Note(s):

1. The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the system performance check. The temperatures listed in the table above were consistent for all measurement periods.

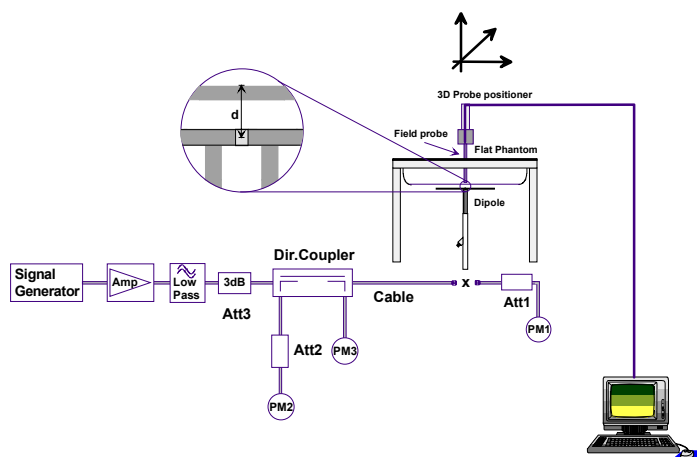


Figure 1. System Performance Check Measurement Setup


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

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


Table 1. SAR system manufacturer's reference body SAR values



2450MHz Dipole Setup

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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## 8.0 SIMULATED EQUIVALENT TISSUES

The 2450MHz simulated body tissue mixture consisted of Glycol-monobutyl, water, and salt. The fluids were prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).


SIMULATED TISSUE MIXTURE		
INGREDIENT	2450 MHz Body	2450 MHz Body
	System Performance Check	DUT Evaluation
Water	69.98 %	69.98 %
Glycol Monobutyl	30.00 %	30.00 %
Salt	0.02 %	0.02 %


## 9.0 SAR SAFETY LIMITS

EXPOSURE LIMITS	SAR (W/Kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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## 10.0 ROBOT SYSTEM SPECIFICATIONS

### Specifications

**POSITIONER:** Stäubli Unimation Corp. Robot Model: RX60L  
**Repeatability:** 0.02 mm  
**No. of axis:** 6

### Data Acquisition Electronic (DAE) System

#### Cell Controller

**Processor:** AMD Athlon XP 2400+  
**Clock Speed:** 2.0 GHz  
**Operating System:** Windows XP Professional

#### Data Converter

**Features:** Signal Amplifier, multiplexer, A/D converter, and control logic  
**Software:** DASY4 software  
**Connecting Lines:** Optical downlink for data and status info.  
 Optical uplink for commands and clock

### DASY4 Measurement Server


**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


### E-Field Probe

**Model:** ET3DV6  
**Serial No.:** 1387  
**Construction:** Triangular core fiber optic detection system  
**Frequency:** 10 MHz to 6 GHz  
**Linearity:**  $\pm 0.2$  dB (30 MHz to 3 GHz)

### Phantom(s)

**Type:** SAM V4.0C  
**Shell Material:** Fiberglass  
**Thickness:**  $2.0 \pm 0.1$  mm  
**Volume:** Approx. 25 liters

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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	Description of Test(s): RF Exposure SAR		FCC 47 CFR §2.1093 IC RSS-102 Issue 2	

## 11.0 PROBE SPECIFICATION (ET3DV6)

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



**ET3DV6  
E-Field Probe**

## 12.0 SAM PHANTOM V4.0C

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




**SAM Phantom**

## 13.0 DEVICE HOLDER

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




**Device Holder**

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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## 14.0 TEST EQUIPMENT LIST

TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED		CALIBRATION DUE DATE
USED	DESCRIPTION					
x	Schmid & Partner DASY4 System	-	-	-		-
x	-DASY4 Measurement Server	00158	1078	N/A		N/A
x	-Robot	00046	599396-01	N/A		N/A
x	-DAE4	00019	353	15Jun05		15Jun06
	-DAE3	00018	370	25Jan05		25Jan06
x	-ET3DV6 E-Field Probe	00016	1387	18Mar05		18Mar06
	-ET3DV6 E-Field Probe	00017	1590	20May05		20May06
	-300MHz Validation Dipole	00023	135	25Oct05		25Oct06
	-450MHz Validation Dipole	00024	136	25Oct05		25Oct06
	-835MHz Validation Dipole	00022	411	Brain	30Mar05	30Mar06
				Body	12Apr05	12Apr06
	-900MHz Validation Dipole	00020	054	Brain	10Jun05	10Jun06
				Body	10Jun05	10Jun06
	-1800MHz Validation Dipole	00021	247	Brain	14Jun05	14Jun06
				Body	14Jun05	14Jun06
	-1900MHz Validation Dipole	00032	151	Brain	17Jun05	17Jun06
				Body	22Apr05	22Apr06
	-2450MHz Validation Dipole	00025	150	Brain	20Sep05	20Sep06
x				Body	22Apr05	22Apr06
x	-SAM Phantom V4.0C	00154	1033	N/A		N/A
	-Barski Planar Phantom	00155	03-01	N/A		N/A
	-Plexiglas Side Planar Phantom	00156	161	N/A		N/A
	-Plexiglas Validation Planar Phantom	00157	137	N/A		N/A
	HP 85070C Dielectric Probe Kit	00033	N/A	N/A		N/A
x	ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A		N/A
x	Gigatronics 8652A Power Meter	00110	1835801	16Apr05		16Apr06
x	Gigatronics 80701A Power Sensor	00012	1834350	12Sep05		12Sep06
x	Gigatronics 80701A Power Sensor	00014	1833699	07Sep05		07Sep06
	Gigatronics 80701A Power Sensor	00109	1834366	16Apr05		16Apr06
x	HP 8753ET Network Analyzer	00134	US39170292	04May05		04May06
x	HP 8648D Signal Generator	00005	3847A00611	29Apr05		29Apr06
	Rohde & Schwarz SMR40 Signal Generator	00006	100104	12Apr05		12Apr06
x	Rohde & Schwarz FSP Spectrum Analyzer	N/A	100102	N/A		N/A
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	N/A		N/A


<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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	Date(s) of Evaluation:	January 17-18, 2006	Report Issue Date:	January 21, 2006
	Description of Test(s):	RF Exposure    SAR	FCC 47 CFR §2.1093	IC RSS-102 Issue 2

## 15.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V <sub>i</sub> or V <sub>eff</sub>
<b>Measurement System</b>						
Probe calibration	5.9	Normal	1	1	5.9	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	0.7	1.9	∞
Spherical isotropy of the probe	9.6	Rectangular	1.732050808	0.7	3.9	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	1	Rectangular	1.732050808	1	0.6	∞
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	∞
Detection limit	1	Rectangular	1.732050808	1	0.6	∞
Readout electronics	0.3	Normal	1	1	0.3	∞
Response time	0.8	Rectangular	1.732050808	1	0.5	∞
Integration time	2.6	Rectangular	1.732050808	1	1.5	∞
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	∞
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	∞
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	∞
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	∞
<b>Test Sample Related</b>						
Device positioning	2.9	Normal	1	1	2.9	12
Device holder uncertainty	3.6	Normal	1	1	3.6	8
Power drift	5	Rectangular	1.732050808	1	2.9	∞
<b>Phantom and Setup</b>						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	∞
<b>Combined Standard Uncertainty</b>					<b>10.79</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>21.59</b>	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>			<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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	Description of Test(s):	RF Exposure    SAR	FCC 47 CFR §2.1093	IC RSS-102 Issue 2

## MEASUREMENT UNCERTAINTIES (Cont.)

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V <sub>i</sub> or V <sub>eff</sub>
<b>Measurement System</b>						
Probe calibration	5.9	Normal	1	1	5.9	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	1	2.7	∞
Spherical isotropy of the probe	0	Rectangular	1.732050808	1	0.0	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	1	Rectangular	1.732050808	1	0.6	∞
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	∞
Detection limit	1	Rectangular	1.732050808	1	0.6	∞
Readout electronics	0.3	Normal	1	1	0.3	∞
Response time	0	Rectangular	1.732050808	1	0.0	∞
Integration time	0	Rectangular	1.732050808	1	0.0	∞
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	∞
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	∞
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	∞
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	∞
<b>Test Sample Related</b>						
Dipole Positioning	2	Normal	1.732050808	1	1.2	∞
Power & Power Drift	4.7	Normal	1.732050808	1	2.7	∞
<b>Phantom and Setup</b>						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	∞
<b>Combined Standard Uncertainty</b>					<b>9.04</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>18.08</b>	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])

Applicant:	Telex Communications, Inc.		FCC ID:	B5DM526	IC ID:	1321A-XO1	
Model(s):	XO-1	DUT:	Body-worn Beltpack Transceiver with 802.11b		Freq.:	2412-2462 MHz	
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	Date(s) of Evaluation:		January 17-18, 2006	Report Issue Date:		January 21, 2006
	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## 16.0 REFERENCES

[1] Federal Communications Commission, "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093: 1999.

[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] FCC TCB Council Workshop, "RF Exposure (RFx) Mobile and Portable Device Review and Approval Procedures": October 2005.


[7] Schmid & Partner Engineering AG, "DASY4 Manual", V4.5: March 2005.

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## APPENDIX A - SAR MEASUREMENT DATA

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>		
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	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

Date Tested: 01/18/2006

## Body-Worn SAR - Back Side of DUT - 802.11b - 5.5 Mbps - Channel 6 - 2437 MHz

**DUT: Telex Model: XO-1; Type: Wireless Body-Worn Beltpack Transceiver with 802.11b; Serial: 000501**

**Body-Worn Accessory: Metal-Belt Clip; Audio Accessory: Headset with Microphone (Model: PH-1)**

Ambient Temp: 23.4 °C; Fluid Temp: 23.7 °C; Barometric Pressure: 102.2 kPa; Humidity: 30%

Communication System: DSSS 802.11b

RF Output Power: 17.5 dBm (Free-Space)

7.2V, 2000mAh Internal Li-ion Battery Pack

Frequency: 2437 MHz; Channel 6; Duty Cycle: 1:1

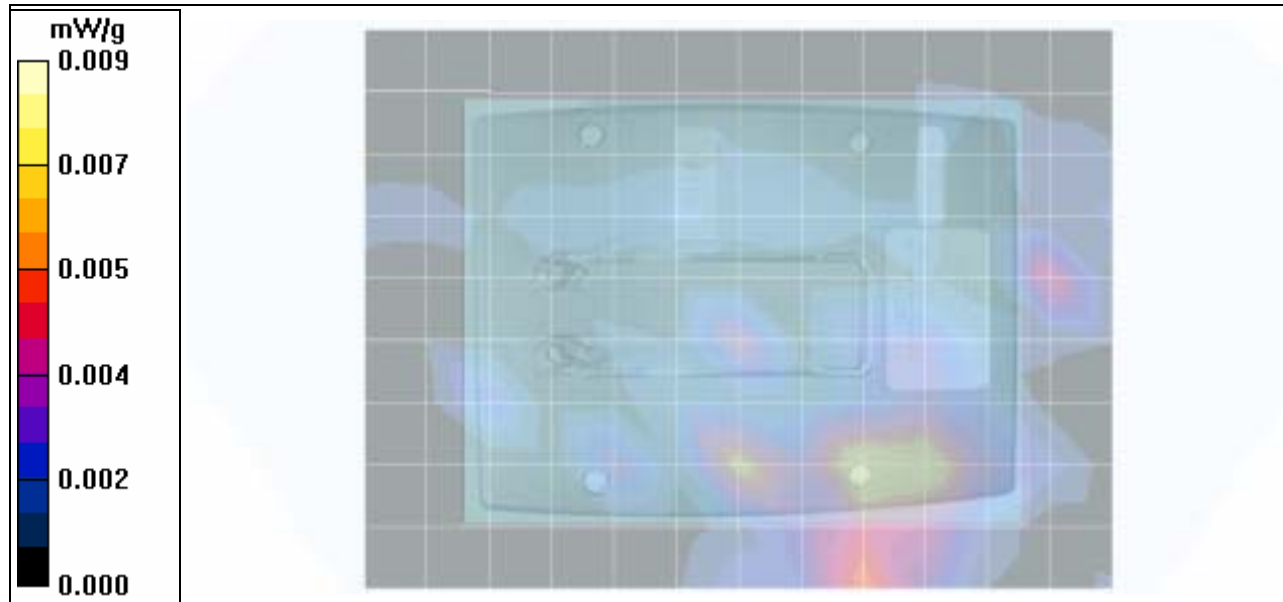
Medium: M2450 ( $\sigma = 1.88 \text{ mho/m}$ ;  $\epsilon_r = 50.2$ ;  $\rho = 1000 \text{ kg/m}^3$ )


- Probe: ET3DV6 - SN1387; ConvF(4.3, 4.3, 4.3); Calibrated: 18/03/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

## Body-Worn SAR - 1.2 cm Belt-Clip Separation Distance to Planar Phantom - Mid Channel

**Area Scan (10x13x1):** Measurement grid: dx=15mm, dy=15mm

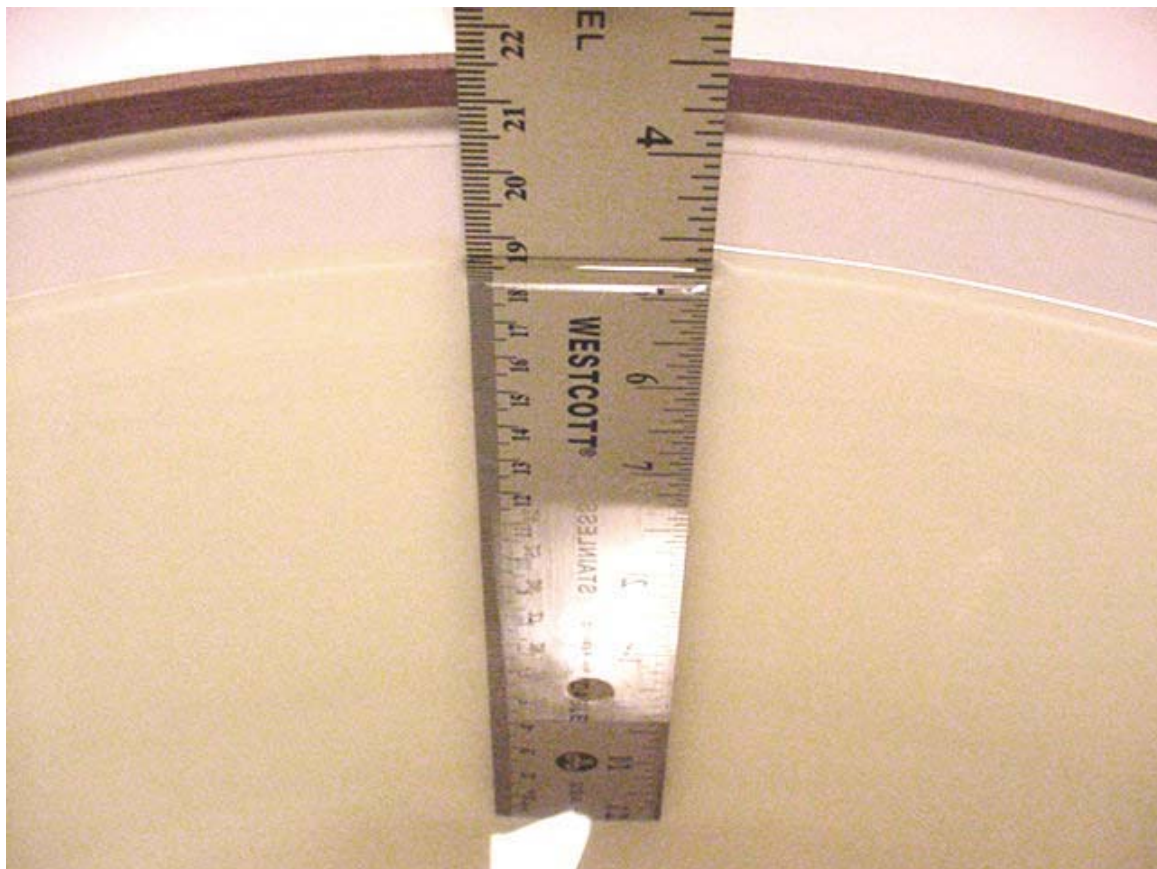
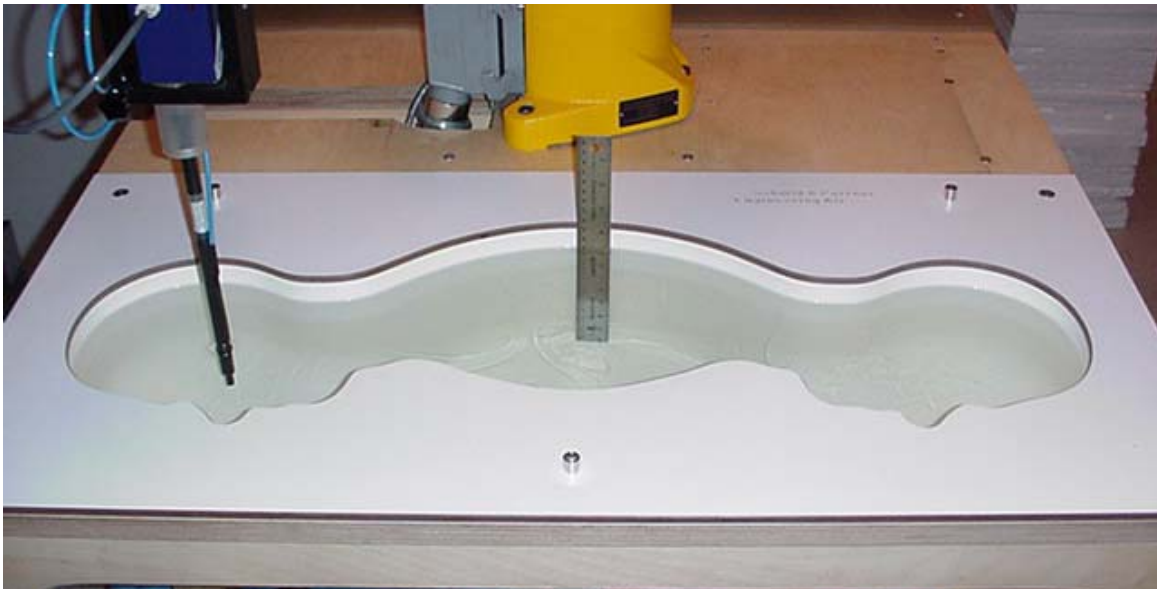
**Maximum Peak Value of SAR (measured) = 0.00647 mW/g**




<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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## Fluid Depth ( $\geq 15$ cm)




<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>		
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	Description of Test(s):		RF Exposure      SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>		
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	Description of Test(s): RF Exposure SAR		FCC 47 CFR §2.1093 IC RSS-102 Issue 2	

Date Tested: 01/17/2006

## System Performance Check (Body) - 2450 MHz Dipole

**DUT: Dipole 2450 MHz; Model: D2450V2; Type: System Performance Check; Serial: 150; Calibrated: 04/22/2005**

Ambient Temp: 23.5 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 102.1 kPa; Humidity: 30%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: M2450 ( $\sigma = 1.98$  mho/m;  $\epsilon_r = 50.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>)

- Probe: ET3DV6 - SN1387; ConvF(4.3, 4.3, 4.3); Calibrated: 18/03/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

### 2450 MHz Dipole - System Performance Check/Area Scan (6x10x1):

Measurement grid: dx=10mm, dy=10mm

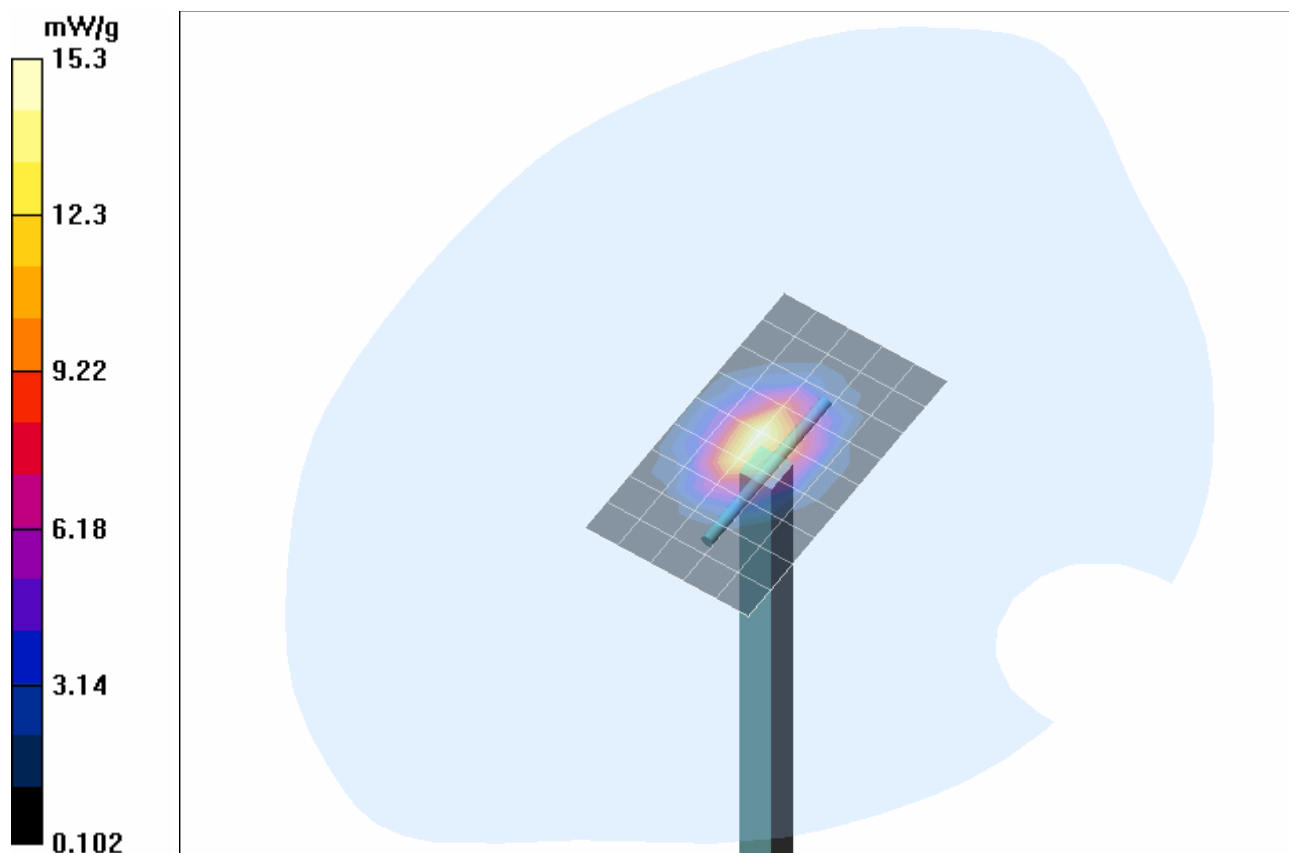
### 2450 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:


Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.2 V/m; Power Drift = -0.077 dB

Peak SAR (extrapolated) = 31.4 W/kg

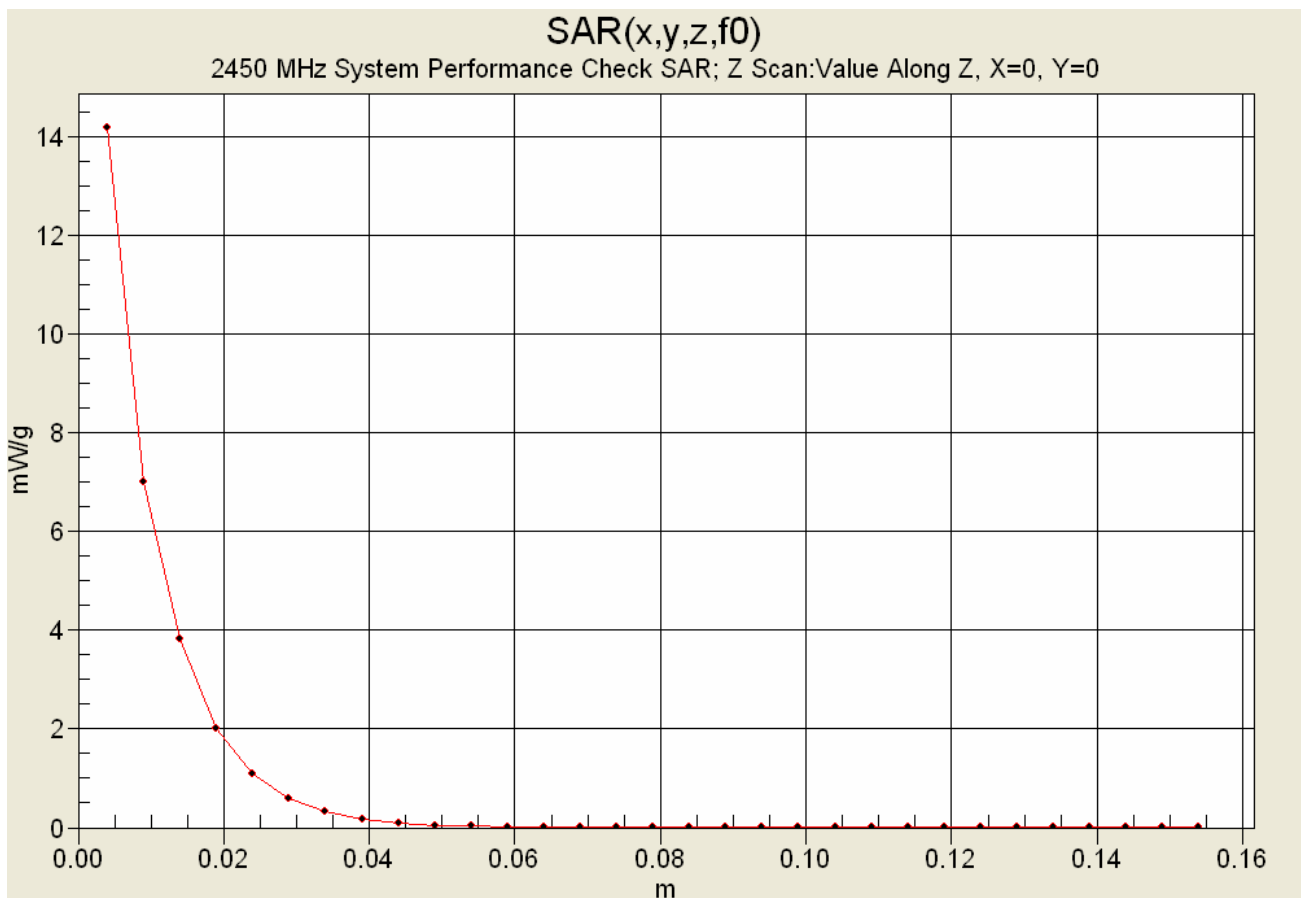
**SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.36 mW/g**




<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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	Description of Test(s):	RF Exposure    SAR	FCC 47 CFR §2.1093	IC RSS-102 Issue 2


## Z-Axis Scan




Applicant:	Telex Communications, Inc.	FCC ID:	B5DM526	IC ID:	1321A-XO1	
Model(s):	XO-1	DUT:	Body-worn Beltpack Transceiver with 802.11b	Freq.:	2412-2462 MHz	
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	Test Report Serial No.:		010406B5D-T711-S15W	Report Issue No.:		S711-012106-R0
	Date(s) of Evaluation:		January 17-18, 2006	Report Issue Date:		January 21, 2006
	Description of Test(s):		RF Exposure      SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>		
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	Test Report Serial No.:		010406B5D-T711-S15W	Report Issue No.:		S711-012106-R0
	Date(s) of Evaluation:		January 17-18, 2006	Report Issue Date:		January 21, 2006
	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## 2450 MHz System Performance Check (Body)

\*\*\*\*\*

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Tue 17/Jan/2006

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
2.3500	52.83	1.85	50.69	1.84
2.3600	52.82	1.86	50.67	1.85
2.3700	52.81	1.87	50.69	1.87
2.3800	52.79	1.88	50.63	1.88
2.3900	52.78	1.89	50.59	1.90
2.4000	52.77	1.90	50.63	1.91
2.4100	52.75	1.91	50.61	1.91
2.4200	52.74	1.92	50.62	1.93
2.4300	52.73	1.93	50.44	1.96
2.4400	52.71	1.94	50.39	1.96
2.4500	52.70	1.95	50.35	1.98
2.4600	52.69	1.96	50.28	1.98
2.4700	52.67	1.98	50.17	2.01
2.4800	52.66	1.99	50.10	2.03
2.4900	52.65	2.01	50.18	2.05
2.5000	52.64	2.02	50.29	2.07
2.5100	52.62	2.04	50.16	2.09
2.5200	52.61	2.05	50.04	2.09
2.5300	52.60	2.06	50.03	2.11
2.5400	52.59	2.08	49.90	2.10
2.5500	52.57	2.09	49.85	2.13

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>		
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	Test Report Serial No.:		010406B5D-T711-S15W	Report Issue No.:		S711-012106-R0
	Date(s) of Evaluation:		January 17-18, 2006	Report Issue Date:		January 21, 2006
	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## 2450 MHz DUT Evaluation (Body)

\*\*\*\*\*

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Wed 18/Jan/2006

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
2.3500	52.83	1.85	50.27	1.77
2.3600	52.82	1.86	50.31	1.77
2.3700	52.81	1.87	50.27	1.77
2.3800	52.79	1.88	50.26	1.80
2.3900	52.78	1.89	50.24	1.81
2.4000	52.77	1.90	50.18	1.82
2.4100	52.75	1.91	50.13	1.82
2.4200	52.74	1.92	50.30	1.85
2.4300	52.73	1.93	50.12	1.86
2.4400	52.71	1.94	49.97	1.87
2.4500	52.70	1.95	50.21	1.88
2.4600	52.69	1.96	50.05	1.89
2.4700	52.67	1.98	49.93	1.92
2.4800	52.66	1.99	49.96	1.93
2.4900	52.65	2.01	49.95	1.94
2.5000	52.64	2.02	49.92	1.96
2.5100	52.62	2.04	49.97	1.97
2.5200	52.61	2.05	49.86	2.00
2.5300	52.60	2.06	49.83	2.01
2.5400	52.59	2.08	49.81	2.01
2.5500	52.57	2.09	49.61	2.05

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>			<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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	Test Report Serial No.:		010406B5D-T711-S15W	Report Issue No.:		S711-012106-R0
	Date(s) of Evaluation:		January 17-18, 2006	Report Issue Date:		January 21, 2006
	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## APPENDIX D - SAR TEST SETUP PHOTOGRAPHS


<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>		
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	Test Report Serial No.:		010406B5D-T711-S15W	Report Issue No.:		S711-012106-R0
	Date(s) of Evaluation:		January 17-18, 2006	Report Issue Date:		January 21, 2006
	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## SAR TEST SETUP PHOTOGRAPHS

1.2 cm Belt-Clip Separation Distance from Back Side of DUT to Planar Phantom  
With Headset/Microphone Audio Accessory (Model: PH-1)



<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>		
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	Test Report Serial No.:	010406B5D-T711-S15W	Report Issue No.:	S711-012106-R0
	Date(s) of Evaluation:	January 17-18, 2006	Report Issue Date:	January 21, 2006
	Description of Test(s):	RF Exposure    SAR	FCC 47 CFR §2.1093	IC RSS-102 Issue 2


## DUT PHOTOGRAPHS



Front Side of DUT




Back Side of DUT with metal belt-clip

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>		
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	Test Report Serial No.:		010406B5D-T711-S15W	Report Issue No.:		S711-012106-R0
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	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## DUT PHOTOGRAPHS



<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>			<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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	Test Report Serial No.:		010406B5D-T711-S15W	Report Issue No.:		S711-012106-R0
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	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## DUT PHOTOGRAPHS

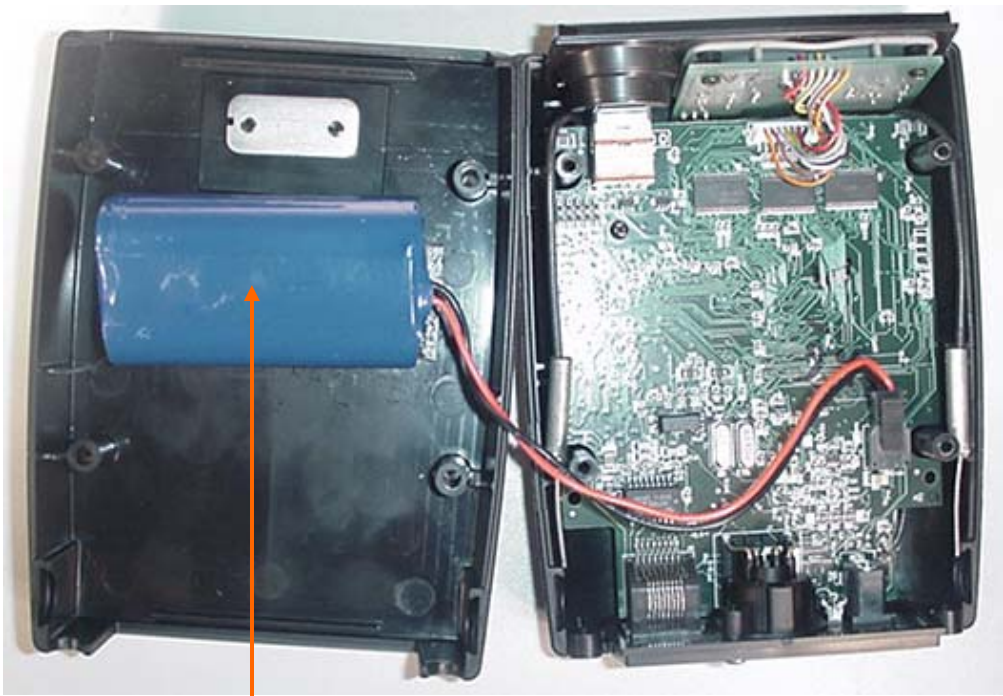


DUT with Headset/Microphone Audio Accessory (Model: PH-1)

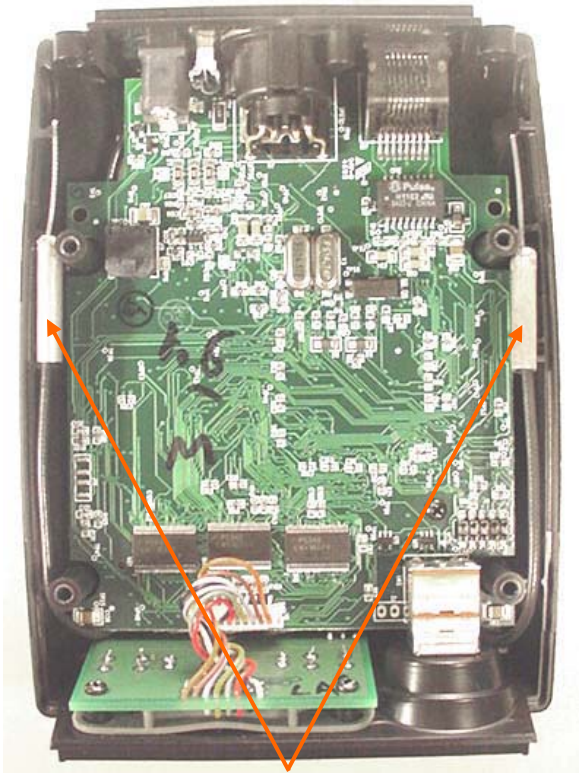
<b>Applicant:</b>	<b>Telex Communications, Inc.</b>		<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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	Test Report Serial No.:		010406B5D-T711-S15W	Report Issue No.:		S711-012106-R0
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	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2


DUT PHOTOGRAPHS



Internal Lithium-ion Battery




Internal Antenna

Applicant:	Telex Communications, Inc.			FCC ID:	B5DM526	IC ID:	1321A-XO1	
Model(s):	XO-1	DUT:	Body-worn Beltpack Transceiver with 802.11b			Freq.:	2412-2462 MHz	
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	Test Report Serial No.:		010406B5D-T711-S15W	Report Issue No.:		S711-012106-R0
	Date(s) of Evaluation:		January 17-18, 2006	Report Issue Date:		January 21, 2006
	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## APPENDIX E - SYSTEM VALIDATION

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>		
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## 2450 MHz SYSTEM VALIDATION DIPOLE

Type:

**2450 MHz Validation Dipole**

Serial Number:

**150**

Place of Calibration:

**Celltech Labs Inc.**

Date of Calibration:

**April 22, 2005**

**Celltech Labs Inc. hereby certifies that this device has been calibrated on the date indicated above.**

Calibrated by:



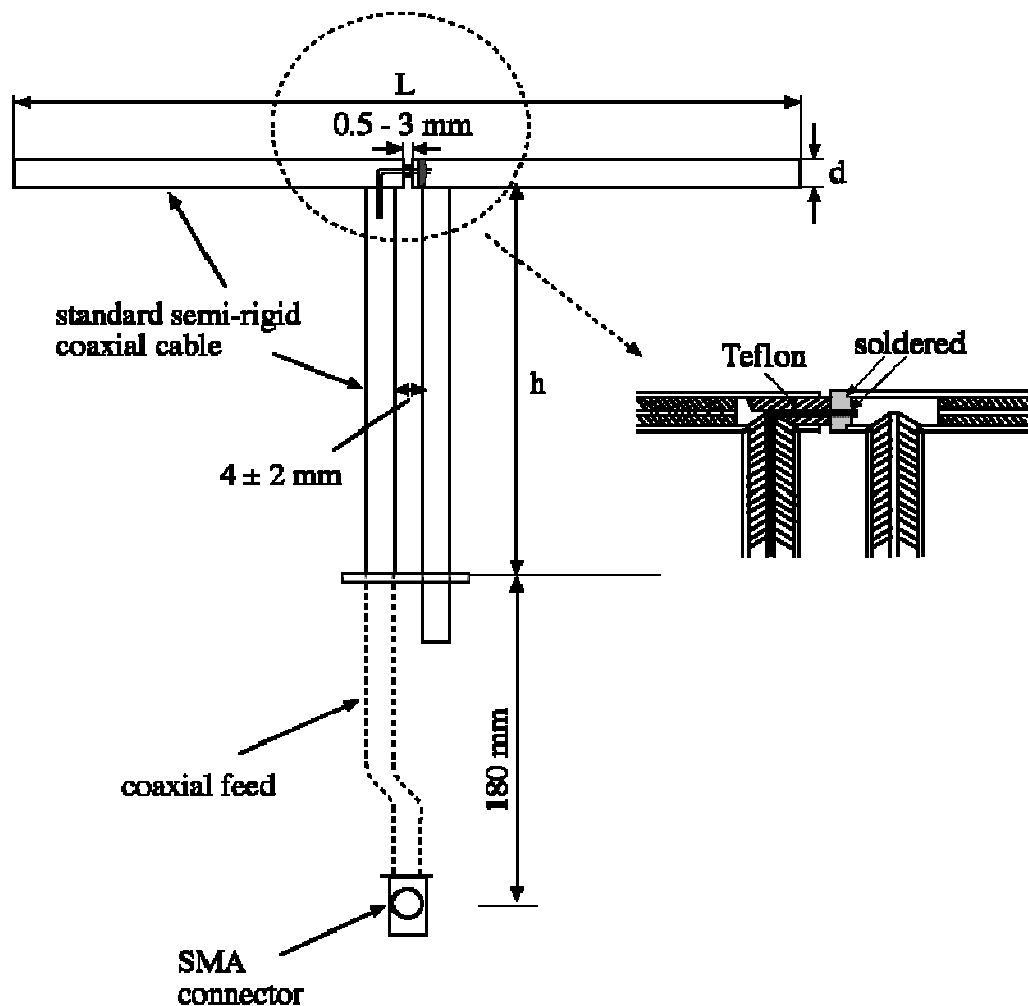
Approved by:



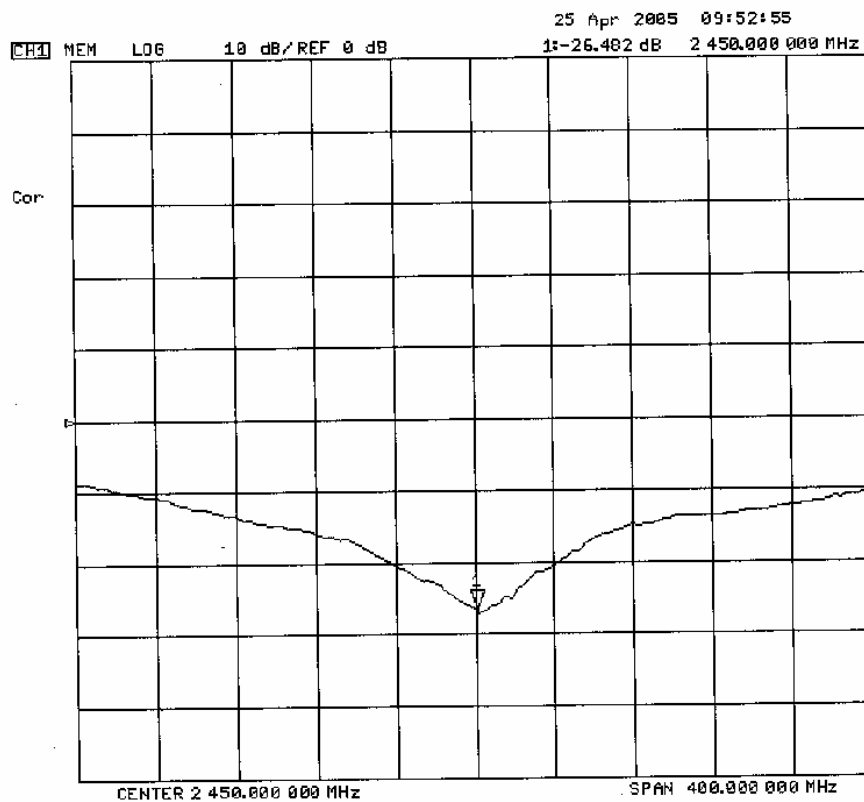
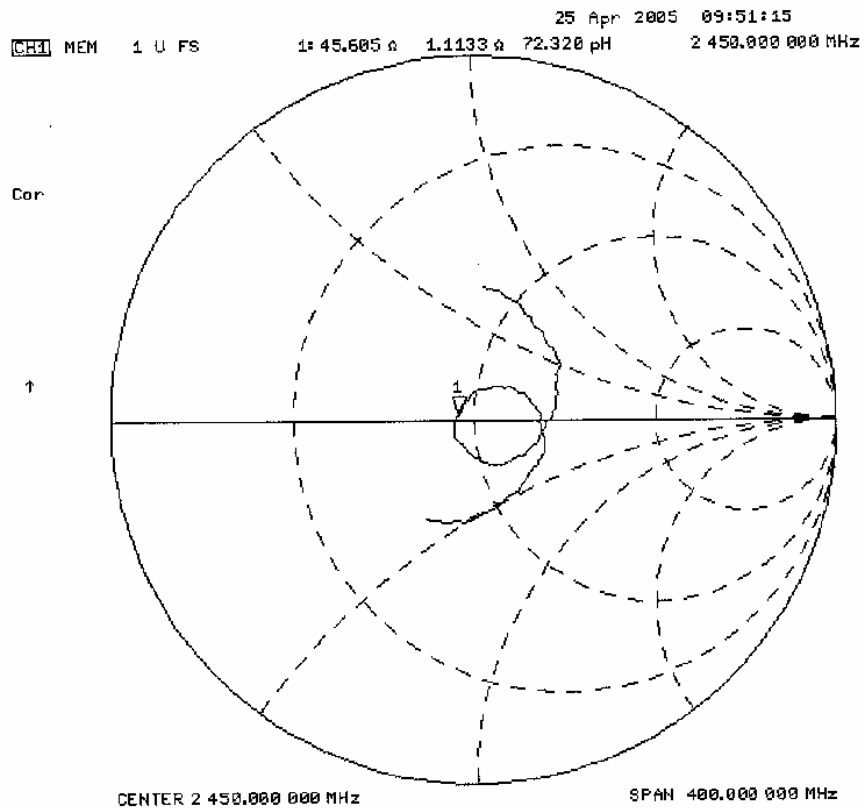
## 1. Dipole Construction & Electrical Characteristics

The validation dipole was constructed in accordance with the IEEE Std "Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques". The electrical properties were measured using an HP 8753E Network Analyzer. The network analyzer was calibrated to the validation dipole N-type connector feed point using an HP85032E Type N calibration kit. The dipole was placed parallel to a planar phantom at a separation distance of 10.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:

Feed point impedance at 2450 MHz	$\text{Re}\{Z\} = 45.605\Omega$ $\text{Im}\{Z\} = 1.1133\Omega$
Return Loss at 2450 MHz	-26.482 dB



## 2. Validation Dipole VSWR Data



### 3. Validation Dipole Dimensions

Frequency (MHz)	L (mm)	H (mm)	D (mm)
300	420.0	250.0	6.2
450	288.0	167.0	6.2
835	161.0	89.8	3.6
900	149.0	83.3	3.6
1450	89.1	51.7	3.6
1800	72.0	41.7	3.6
1900	68.0	39.5	3.6
2000	64.5	37.5	3.6
2450	51.8	30.6	3.6
3000	41.5	25.0	3.6

### 4. Validation Phantom

The validation phantom is a Fiberglass shell planar phantom manufactured by Barski Industries Ltd. The phantom is in conformance with the requirements defined by IEEE SCC34-SC2 for the dosimetric evaluations of body-worn and lap-held operating configurations. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids.

**Shell Thickness:** 2.0 ± 0.2 mm  
**Filling Volume:** Approx. 55 liters  
**Dimensions:** 44 cm (W) x 94 cm (L)



### 5. 2450 MHz System Validation Setup



## 6. 2450 MHz Dipole Setup



## 7. Measurement Conditions

The phantom was filled with 2450 MHz Body simulating tissue:

Relative Permittivity: 50.2  
 Conductivity: 1.97 mho/m  
 Fluid Temperature: 23.9 °C  
 Fluid Depth:  $\geq 15.0$  cm

Environmental Conditions:

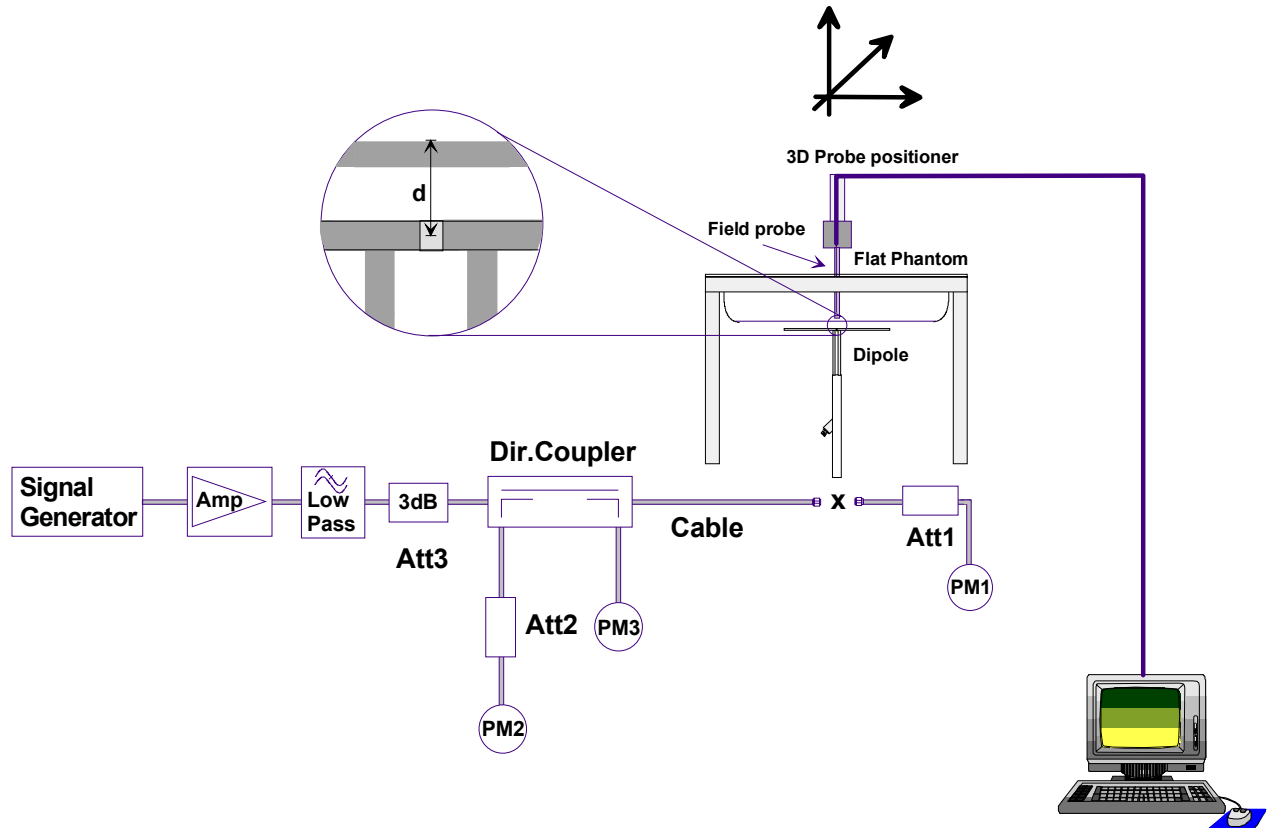
Ambient Temperature: 25.7 °C  
 Humidity: 30 %  
 Barometric Pressure: 102.6 kPa

The 2450 MHz simulated Body tissue mixture consists of the following ingredients:

Ingredient	Percentage by weight
Water	69.98%
Glycol Monobutyl	30.00%
Salt	0.02%
Target Dielectric Parameters at 22°C	$\epsilon_r = 52.7$ (+/-5%) $\sigma = 1.95$ S/m (+/-5%)

## 8. SAR Measurement

The SAR measurement was performed with the E-field probe in mechanical detection mode only. The setup and determination of the forward power into the dipole was performed using the following procedures.



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

## 9. Validation Dipole SAR Test Results

Ten SAR measurements were performed in order to achieve repeatability and to establish an average target value.

Validation Measurement	SAR @ 0.25W Input averaged over 1g	SAR @ 1W Input averaged over 1g	SAR @ 0.25W Input averaged over 10g	SAR @ 1W Input averaged over 10g	Peak SAR @ 0.25W Input
Test 1	12.6	50.4	5.86	23.44	27.7
Test 2	12.6	50.4	5.86	23.44	27.4
Test 3	12.6	50.4	5.87	23.48	27.4
Test 4	12.6	50.4	5.86	23.44	27.3
Test 5	12.6	50.4	5.86	23.44	27.4
Test 6	12.6	50.4	5.87	23.48	27.8
Test 7	12.7	50.8	5.88	23.52	27.7
Test 8	12.7	50.8	5.88	23.52	27.8
Test 9	12.6	50.4	5.87	23.48	27.6
Test10	12.7	50.8	5.88	23.52	27.7
Average Value	12.63	50.52	5.869	23.48	27.58

The results have been normalized to 1W (forward power) into the dipole.

Target SAR @ 1 Watt Input averaged over 1 gram (W/kg)		Measured SAR @ 1 Watt Input averaged over 1 gram (W/kg)	Deviation from Target (%)	Target SAR @ 1 Watt Input averaged over 10 grams (W/kg)		Measured SAR @ 1 Watt Input averaged over 10 grams (W/kg)	Deviation from Target (%)
51.2	+/- 10%	50.52	- 1.3	23.7	+/- 10%	23.48	- 0.93

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

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

## 2450 MHz System Validation - April 22, 2005

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 150; Calibrated: 04/22/2005  
 Ambient Temp: 25.7 °C; Fluid Temp: 23.9 °C; Barometric Pressure: 102.6 kPa; Humidity: 30%  
 Communication System: CW  
 Frequency: 2450 MHz; Duty Cycle: 1:1  
 Medium: M2450 Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.97$  mho/m;  $\epsilon_r = 50.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 - Probe: ET3DV6 - SN1590; ConvF(4.22, 4.22, 4.22); Calibrated: 24/05/2004  
 - Sensor-Surface: 4mm (Mechanical Surface Detection)  
 - Electronics: DAE3 Sn353; Calibrated: 06/07/2004  
 - Phantom: Barski Industries; Type: Fiberglass Planar; Serial: 03-01  
 - Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

**2450 MHz System Validation/Area Scan (6x10x1):** Measurement grid: dx=10mm, dy=10mm

**2450 MHz System Validation/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 88.7 V/m; Power Drift = -0.010 dB  
 Peak SAR (extrapolated) = 27.7 W/kg  
**SAR(1 g) = 12.6 mW/g; SAR(10 g) = 5.86 mW/g**

**2450 MHz System Validation/Zoom Scan 2 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 89.1 V/m; Power Drift = 0.00 dB  
 Peak SAR (extrapolated) = 27.4 W/kg  
**SAR(1 g) = 12.6 mW/g; SAR(10 g) = 5.86 mW/g**

**2450 MHz System Validation/Zoom Scan 3 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 89.0 V/m; Power Drift = 0.015 dB  
 Peak SAR (extrapolated) = 27.4 W/kg  
**SAR(1 g) = 12.6 mW/g; SAR(10 g) = 5.87 mW/g**

**2450 MHz System Validation/Zoom Scan 4 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 89.9 V/m; Power Drift = 0.00 dB  
 Peak SAR (extrapolated) = 27.3 W/kg  
**SAR(1 g) = 12.6 mW/g; SAR(10 g) = 5.86 mW/g**

**2450 MHz System Validation/Zoom Scan 5 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 89.5 V/m; Power Drift = 0.010 dB  
 Peak SAR (extrapolated) = 27.4 W/kg  
**SAR(1 g) = 12.6 mW/g; SAR(10 g) = 5.86 mW/g**

**2450 MHz System Validation/Zoom Scan 6 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 89.0 V/m; Power Drift = -0.042 dB  
 Peak SAR (extrapolated) = 27.8 W/kg  
**SAR(1 g) = 12.6 mW/g; SAR(10 g) = 5.87 mW/g**

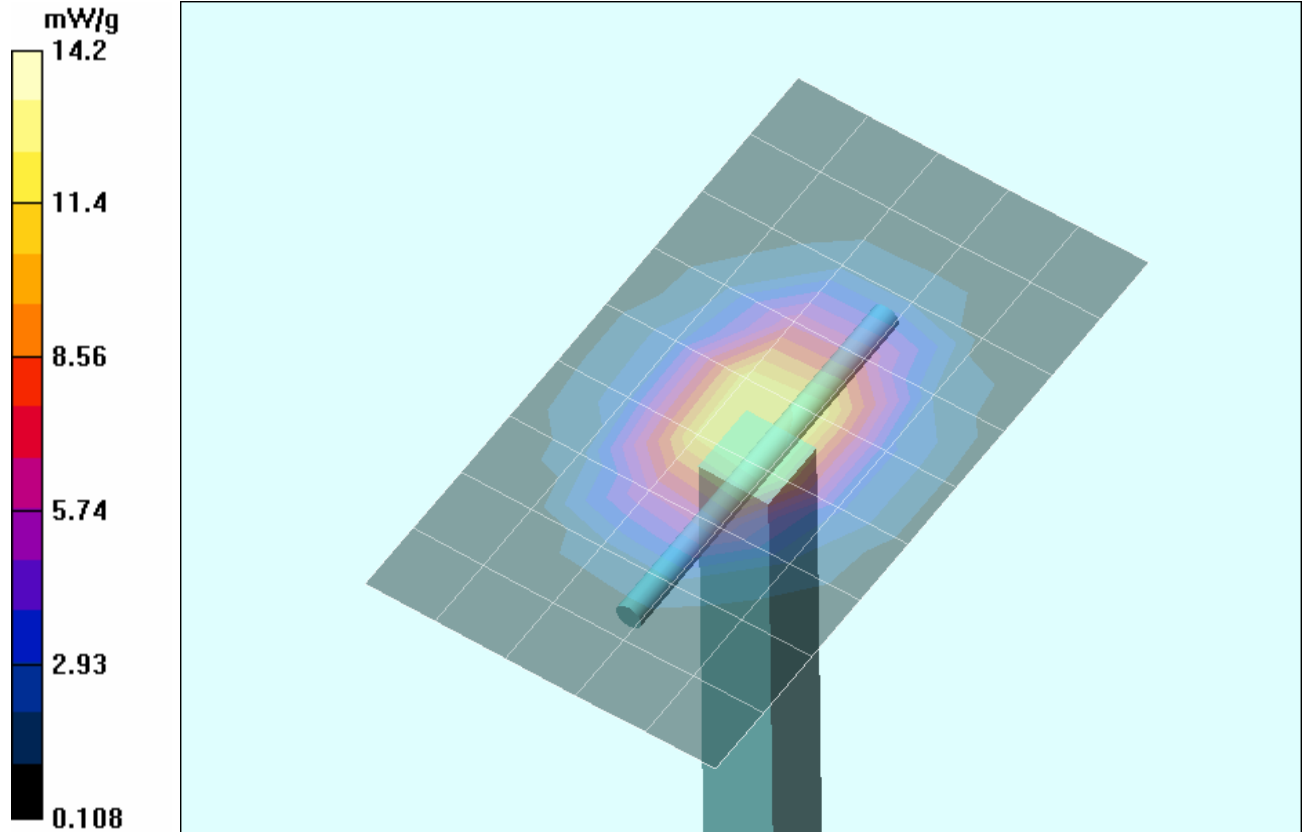
**2450 MHz System Validation/Zoom Scan 7 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 89.7 V/m; Power Drift = 0.01 dB  
 Peak SAR (extrapolated) = 27.7 W/kg  
**SAR(1 g) = 12.7 mW/g; SAR(10 g) = 5.88 mW/g**

**2450 MHz System Validation/Zoom Scan 8 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 89.4 V/m; Power Drift = -0.01 dB  
 Peak SAR (extrapolated) = 27.8 W/kg  
**SAR(1 g) = 12.7 mW/g; SAR(10 g) = 5.88 mW/g**

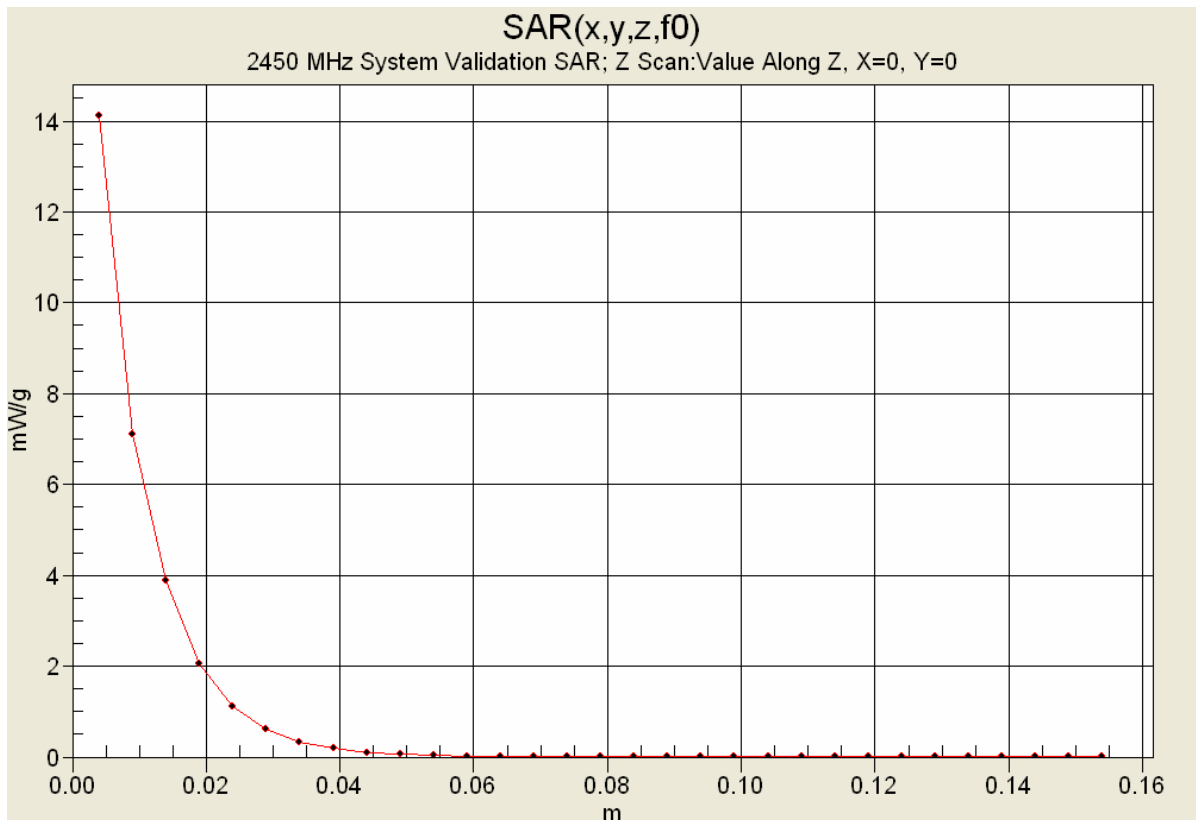
**2450 MHz System Validation/Zoom Scan 9 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 89.3 V/m; Power Drift = -0.00 dB  
 Peak SAR (extrapolated) = 27.6 W/kg  
**SAR(1 g) = 12.6 mW/g; SAR(10 g) = 5.87 mW/g**

**2450 MHz System Validation/Zoom Scan 10 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 89.6 V/m; Power Drift = -0.025 dB  
 Peak SAR (extrapolated) = 27.7 W/kg  
**SAR(1 g) = 12.7 mW/g; SAR(10 g) = 5.88 mW/g**





1 g average of 10 measurements: 12.63 mW/g  
10 g average of 10 measurements: 5.869 mW/g



## 10. Measured Fluid Dielectric Parameters

### System Validation - 2450 MHz Dipole


#### Measured Fluid Dielectric Parameters (Muscle)

April 22, 2005

Frequency	$\epsilon'$	$\epsilon''$
2.350000000 GHz	50.4884	14.1016
2.360000000 GHz	50.4542	14.1475
2.370000000 GHz	50.4295	14.1756
2.380000000 GHz	50.4094	14.2063
2.390000000 GHz	50.3750	14.2541
2.400000000 GHz	50.3395	14.2965
2.410000000 GHz	50.2961	14.3310
2.420000000 GHz	50.2408	14.3481
2.430000000 GHz	50.2047	14.3861
2.440000000 GHz	50.1822	14.4193
2.450000000 GHz	50.1500	14.4611
2.460000000 GHz	50.1035	14.5137
2.470000000 GHz	50.0825	14.5504
2.480000000 GHz	50.0515	14.6073
2.490000000 GHz	50.0191	14.6410
2.500000000 GHz	49.9867	14.6647
2.510000000 GHz	49.9442	14.7231
2.520000000 GHz	49.9042	14.7502
2.530000000 GHz	49.8769	14.7804
2.540000000 GHz	49.8259	14.8081
2.550000000 GHz	49.7900	14.8467

	Test Report Serial No.:		010406B5D-T711-S15W	Report Issue No.:		S711-012106-R0
	Date(s) of Evaluation:		January 17-18, 2006	Report Issue Date:		January 21, 2006
	Description of Test(s):		RF Exposure    SAR	FCC 47 CFR §2.1093		IC RSS-102 Issue 2

## APPENDIX F - PROBE CALIBRATION

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>		<b>Freq.:</b>	<b>2412-2462 MHz</b>		
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Accredited by the Swiss Federal Office of Metrology and Accreditation  
 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Celltech Labs**

Certificate No: **ET3-1387\_Mar05**

## CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1387**

Calibration procedure(s) **QA CAL-01.v5**  
**Calibration procedure for dosimetric E-field probes**

Calibration date: **March 18, 2005**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ES3DV2	SN: 3013	7-Jan-05 (SPEAG, No. ES3-3013_Jan05)	Jan-06
DAE4	SN: 617	19-Jan-05 (SPEAG, No. DAE4-617_Jan05)	Jan-06
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 18, 2005

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



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

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

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

### Methods Applied and Interpretation of Parameters:

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

# Probe ET3DV6

## SN:1387

Manufactured:	September 21, 1999
Last calibrated:	March 18, 2004
Recalibrated:	March 18, 2005

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)



## DASY - Parameters of Probe: ET3DV6 SN:1387

### Sensitivity in Free Space<sup>A</sup>

### Diode Compression<sup>B</sup>

NormX	1.61 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	92 mV
NormY	1.70 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	92 mV
NormZ	1.70 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	92 mV

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

Please see Page 8.

### Boundary Effect

**TSL**                      **900 MHz**      **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		<b>3.7 mm</b>	<b>4.7 mm</b>
SAR <sub>be</sub> [%]	Without Correction Algorithm	9.4	4.9
SAR <sub>be</sub> [%]	With Correction Algorithm	0.1	0.3

**TSL**                      **1810 MHz**      **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		<b>3.7 mm</b>	<b>4.7 mm</b>
SAR <sub>be</sub> [%]	Without Correction Algorithm	14.3	9.6
SAR <sub>be</sub> [%]	With Correction Algorithm	0.6	0.1

### Sensor Offset

Probe Tip to Sensor Center                      **2.7 mm**

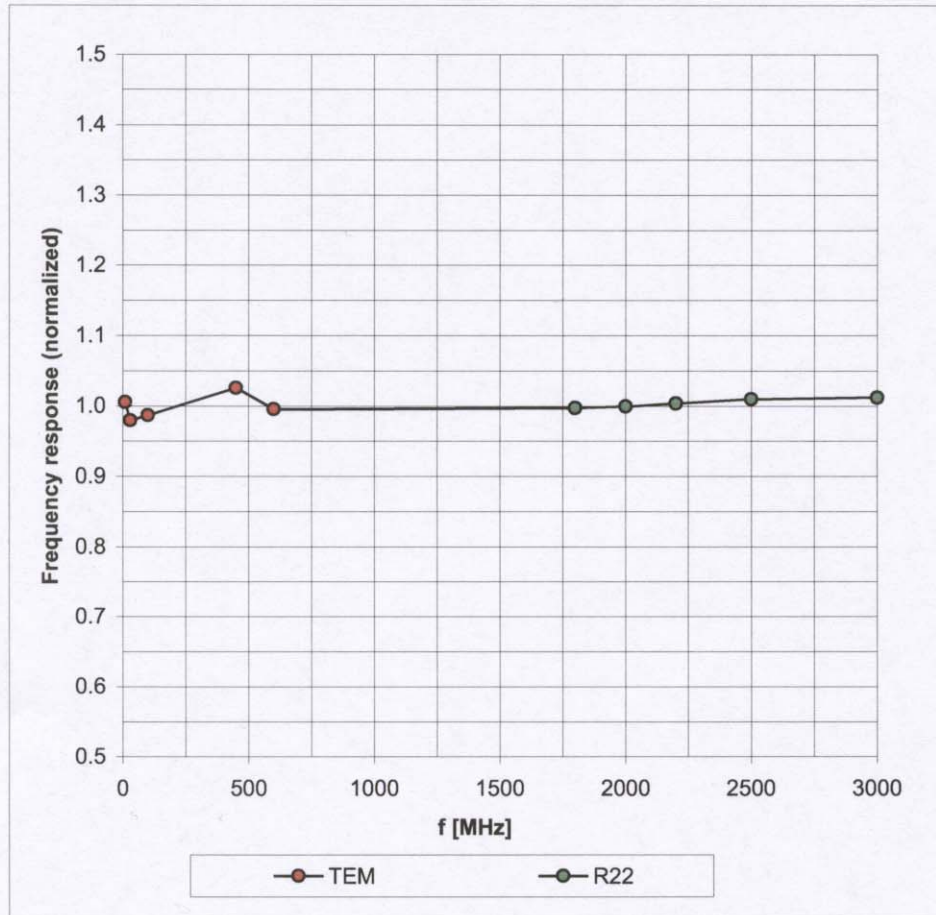
**The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.**

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

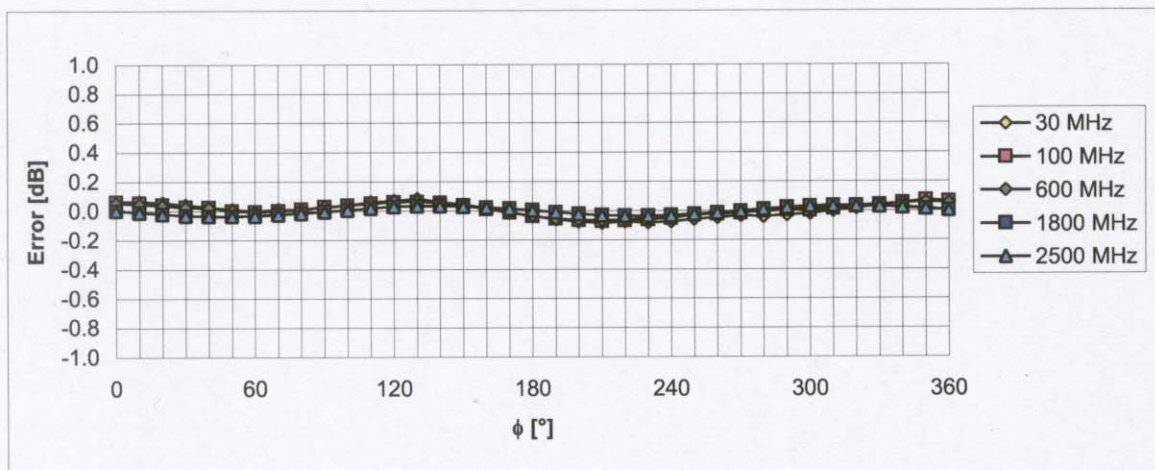
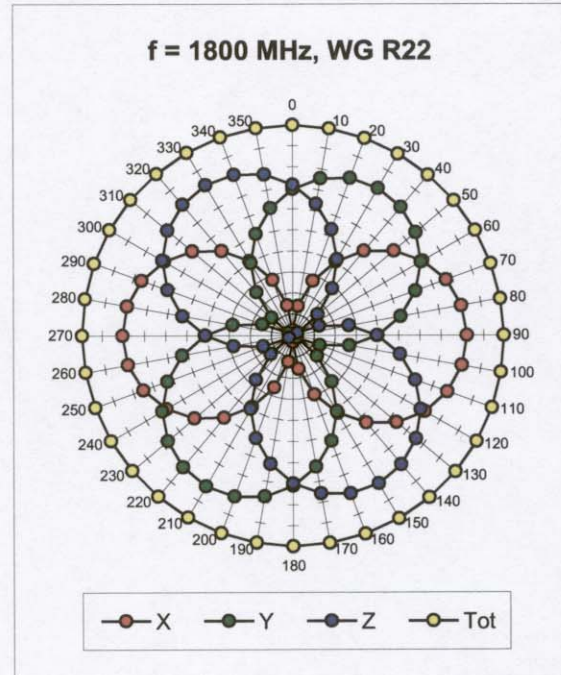
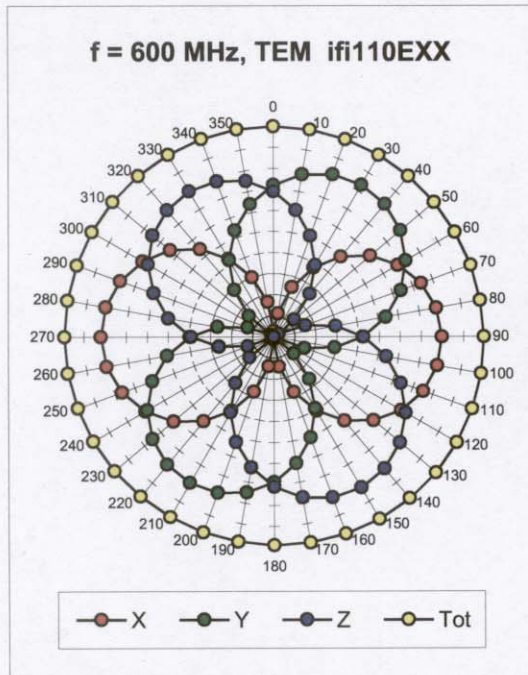
<sup>B</sup> Numerical linearization parameter: uncertainty not required.

## Frequency Response of E-Field

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

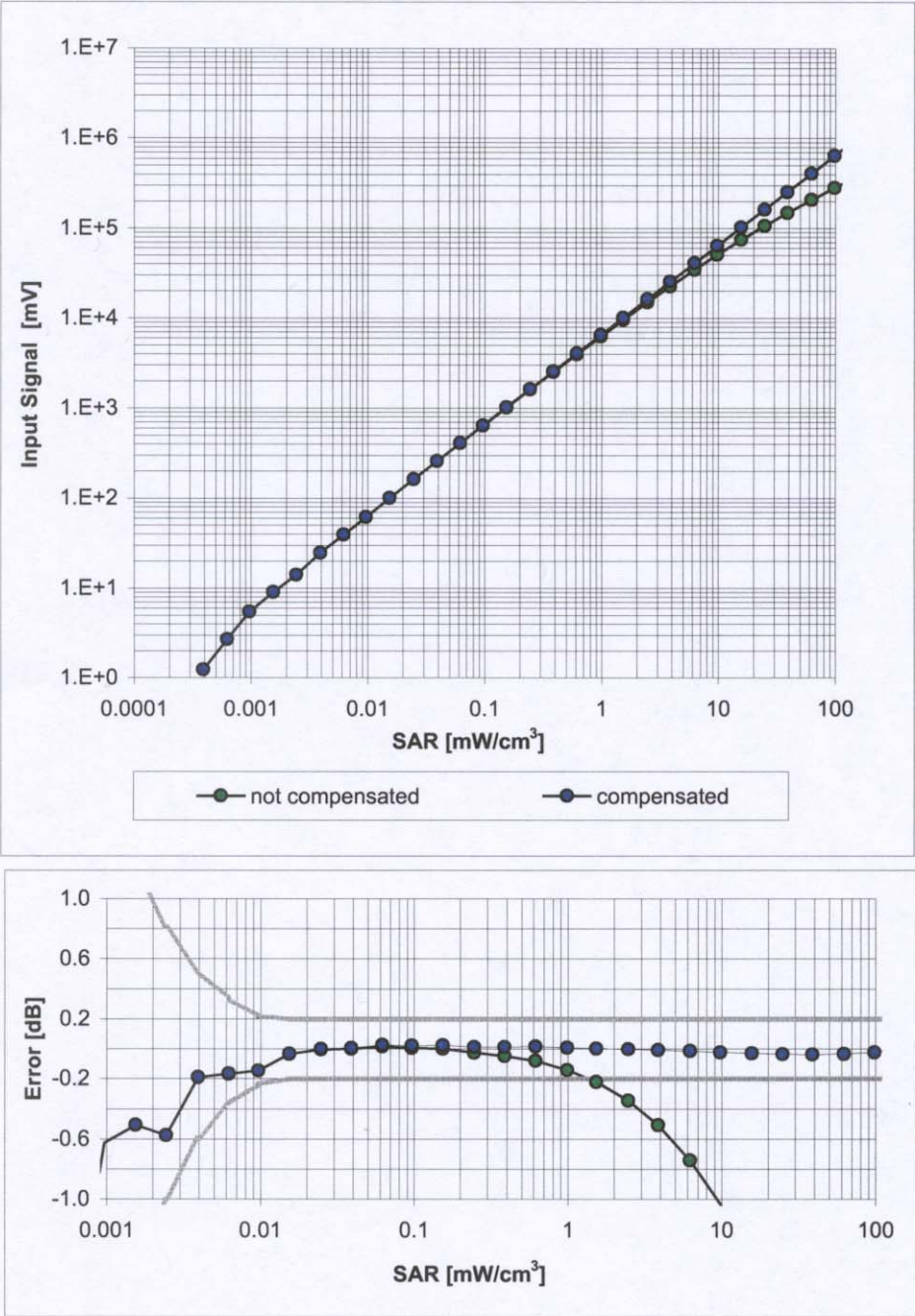


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

Receiving Pattern ( $\phi$ ),  $\vartheta = 0^\circ$ Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

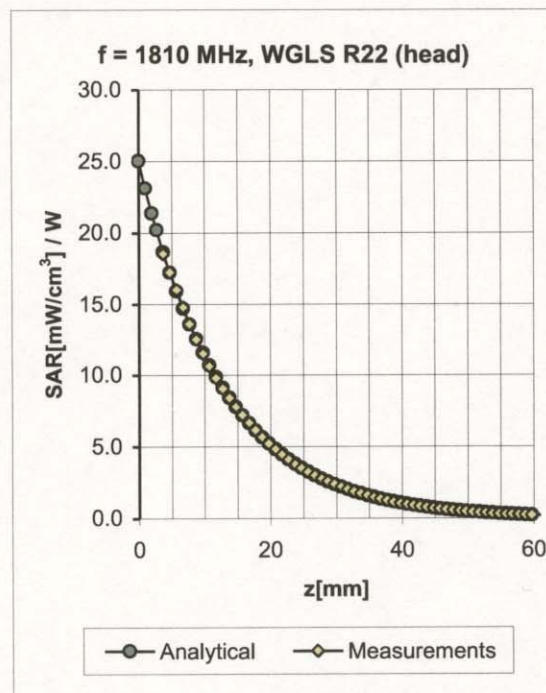
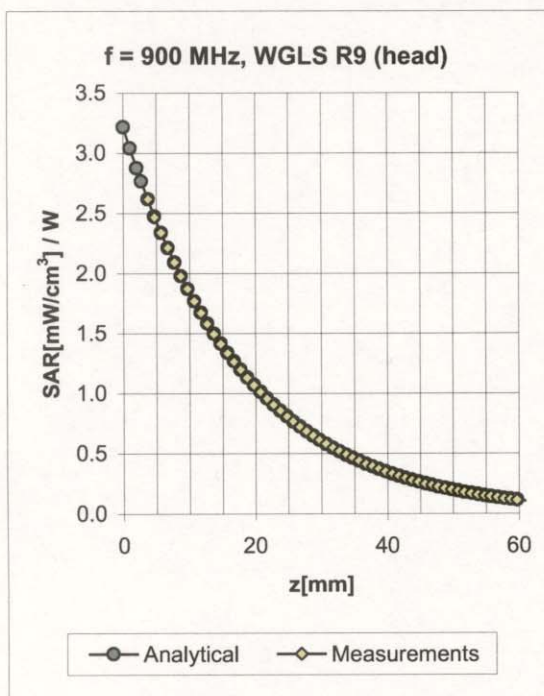


Dynamic Range f(SAR<sub>head</sub>)  
(Waveguide R22, f = 1800 MHz)



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

## Conversion Factor Assessment

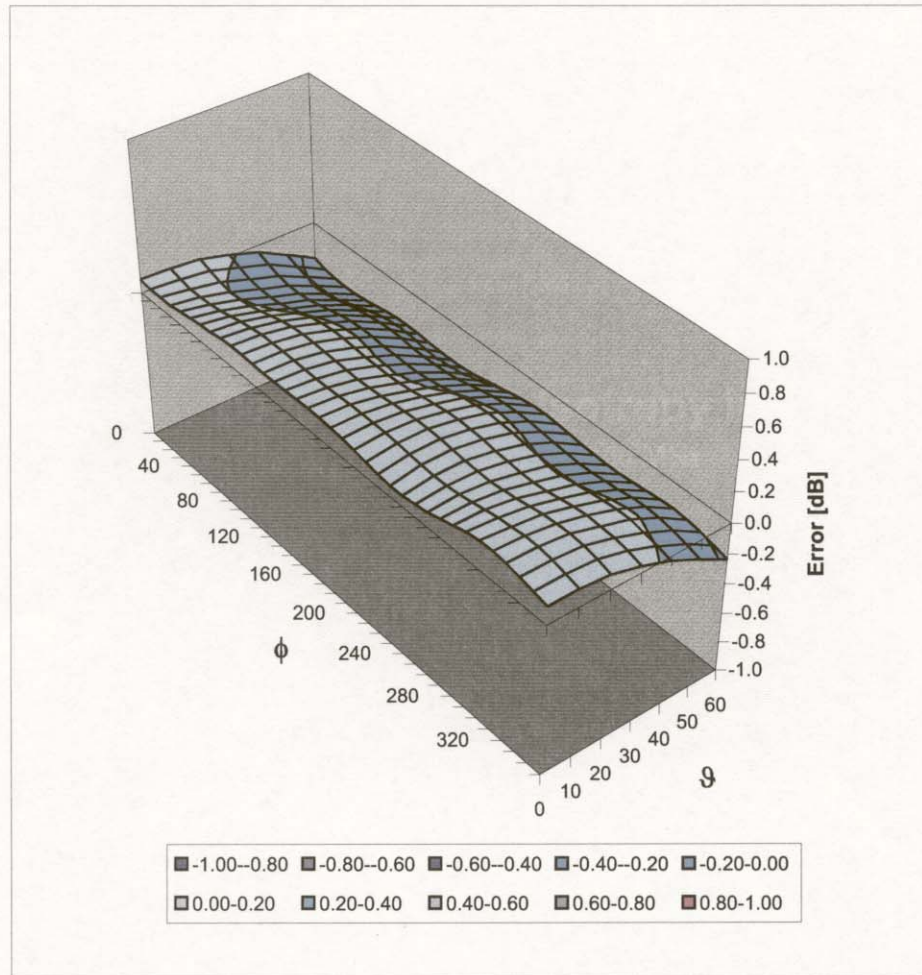


f [MHz]	Validity [MHz] <sup>c</sup>	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.65	1.81	6.47 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.62	2.39	5.18 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.76	2.09	4.56 ± 11.8% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.60	2.01	6.10 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.60	2.67	4.75 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.82	1.82	4.30 ± 11.8% (k=2)

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

## Deviation from Isotropy in HSL

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



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



## **Additional Conversion Factors**

**for Dosimetric E-Field Probe**

Type:

**ET3DV6**

Serial Number:

**1387**

Place of Assessment:

**Zurich**

Date of Assessment:

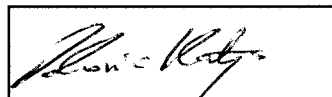
**March 21, 2005**

Probe Calibration Date:

**March 18, 2005**

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the re-calibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 900 MHz or at 1800 MHz.

Assessed by:



## Dosimetric E-Field Probe ET3DV6 SN:1387

Conversion factor ( $\pm$  standard deviation)

<b>f = 150 MHz</b>	ConvF	<b>8.8 <math>\pm</math> 10%</b>	$\epsilon_r = 52.3 \pm 5\%$ $\sigma = 0.76 \pm 5\%$ mho/m (head tissue)
<b>f = 300 MHz</b>	ConvF	<b>7.9 <math>\pm</math> 9%</b>	$\epsilon_r = 45.3 \pm 5\%$ $\sigma = 0.87 \pm 5\%$ mho/m (head tissue)
<b>f = 450 MHz</b>	ConvF	<b>7.5 <math>\pm</math> 8%</b>	$\epsilon_r = 43.5 \pm 5\%$ $\sigma = 0.87 \pm 5\%$ mho/m (head tissue)
<b>f = 150 MHz</b>	ConvF	<b>8.4 <math>\pm</math> 10%</b>	$\epsilon_r = 61.9 \pm 5\%$ $\sigma = 0.80 \pm 5\%$ mho/m (body tissue)
<b>f = 450 MHz</b>	ConvF	<b>7.5 <math>\pm</math> 8%</b>	$\epsilon_r = 56.7 \pm 5\%$ $\sigma = 0.94 \pm 5\%$ mho/m (body tissue)


### Important Note:

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

Please see also Section 4.7 of the DASY4 Manual.

	Test Report Serial No.:	010406B5D-T711-S15W		Report Issue No.:	S711-012106-R0
	Date(s) of Evaluation:	January 17-18, 2006		Report Issue Date:	January 21, 2006
	Description of Test(s):	RF Exposure	SAR	FCC 47 CFR §2.1093	IC RSS-102 Issue 2

## APPENDIX G - SAM PHANTOM CERTIFICATE OF CONFORMITY

<b>Applicant:</b>	<b>Telex Communications, Inc.</b>			<b>FCC ID:</b>	<b>B5DM526</b>	<b>IC ID:</b>	<b>1321A-XO1</b>	
<b>Model(s):</b>	<b>XO-1</b>	<b>DUT:</b>	<b>Body-worn Beltpack Transceiver with 802.11b</b>			<b>Freq.:</b>	<b>2412-2462 MHz</b>	
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# Schmid & Partner Engineering AG

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

## Certificate of conformity / First Article Inspection

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

### Tests

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

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

### Standards

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

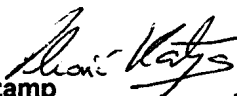
(\*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

### Conformity

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

Date 18.11.2001

Signature / Stamp



**Schmid & Partner  
Engineering AG**

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Tel. +41 1 245 97 00, Fax +41 1 245 97 79

