




	<u>Date(s) of Evaluation</u> June 16, 2008	<u>Test Report Serial No.</u> 061608WD2-T913-S15S	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	
	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

SAR TEST REPORT (FCC/IC)

RF EXPOSURE EVALUATION		SPECIFIC ABSORPTION RATE	
APPLICANT	BRACE AUDIO CORPORATION		
DEVICE UNDER TEST (DUT)	2.4 GHz FHSS BODY-WORN WIRELESS GUITAR TRANSMITTER		
DEVICE MODEL(S)	DWG-1000		
DEVICE IDENTIFIER(S)	FCC ID:	WD2-DWG-1000	IC: 7786A-DWG-1000
APPLICATION TYPE	Certification		
STANDARD(S) APPLIED	FCC 47 CFR §2.1093		
	Health Canada Safety Code 6		
PROCEDURE(S) APPLIED	FCC OET Bulletin 65, Supplement C (01-01)		
	Industry Canada RSS-102 Issue 2		
	IEEE 1528-2003		
FCC DEVICE CLASSIFICATION	Part 15 Spread Spectrum Transmitter (DSS) - §15C		
IC DEVICE CLASSIFICATION	Low Power License-Exempt Radiocommunication Device (RSS-210)		
RF EXPOSURE CATEGORY	General Population / Uncontrolled		
RF EXPOSURE EVALUATION(S)	Body-worn		
DATE(S) OF EVALUATION(S)	June 16, 2008		
TEST REPORT SERIAL NO.	061608WD2-T913-S15S		
TEST REPORT REVISION NO.	Revision 1.1	Applicant Address Correction	July 10, 2008
	Revision 1.0	Initial Release	July 02, 2008
TEST REPORT SIGNATORIES	Testing Performed By		Test Report Prepared By
	Josh Schlenker Celltech Labs Inc.		Jonathan Hughes Celltech Labs Inc.
TEST LAB AND LOCATION	Celltech Compliance Testing and Engineering Lab		
	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada		
TEST LAB CONTACT INFO.	Tel.: 250-765-7650		Fax: 250-765-7645
	info@celltechlabs.com		www.celltechlabs.com
TEST LAB ACCREDITATION(S)	<div></div> <div>Test Lab Certificate No. 2470.01</div>		


Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 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, British Columbia V1X 7R8 Canada			
Applicant Information	Name	BRACE AUDIO CORPORATION			
	Address	29732 130th Way SE, Auburn, WA 98092 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)			
	IC	RSS-102 Issue 2			
	IEEE	1528-2003			
Device Classification(s)	FCC	Part 15 Spread Spectrum Transmitter (DSS)			
	IC	Low Power License-Exempt Radiocommunication Device (RSS-210)			
Device RF Exposure Category	Portable	General Population / Uncontrolled Exposure			
Device Identifier(s)	FCC ID:	WD2-DWG-1000			
	IC:	7786A-DWG-1000			
	Model	DWG-1000			
	Serial No.	TX#1 (Pre-production)			
Device Description	2.4 GHz Body-worn Wireless Guitar Transmitter				
Mode(s) of Operation	Frequency Hopping Spread Spectrum (FHSS)				
Transmit Frequency Range(s)	2403.33 - 2479.10 MHz (ISM Band)				
Max. Duty Cycle Tested	100%				
Max. RF Output Power Tested	13.7 dBm	23.44 mW	2403.33 MHz	Low Channel	Average Conducted
	14.4 dBm	27.54 mW	2442.24 MHz	Mid Channel	Average Conducted
	14.7 dBm	29.51 mW	2479.10 MHz	High Channel	Average Conducted
Antenna Type(s) Tested	Internal (P/N : 1513151-1)				
Battery Type(s) Tested	1.5V Alkaline AA (x2)				
Body-worn Accessories Tested	Plastic Belt-Clip				
Audio Accessories Connected	Audio Cable				
Max. SAR Level(s) Evaluated	Body-worn	0.017 W/kg	1 gram average	General Population / Uncontrolled Exposure	
FCC/IC Spatial Peak SAR Limit	Head/Body	1.6 W/kg	1 gram average		
<p>Celltech Labs Inc. declares under its sole responsibility that this wireless portable device was compliant 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 General Population / Uncontrolled Exposure environment. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 2 and IEEE 1528-2003. 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.	




Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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Test Lab Certificate No. 2470.01

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Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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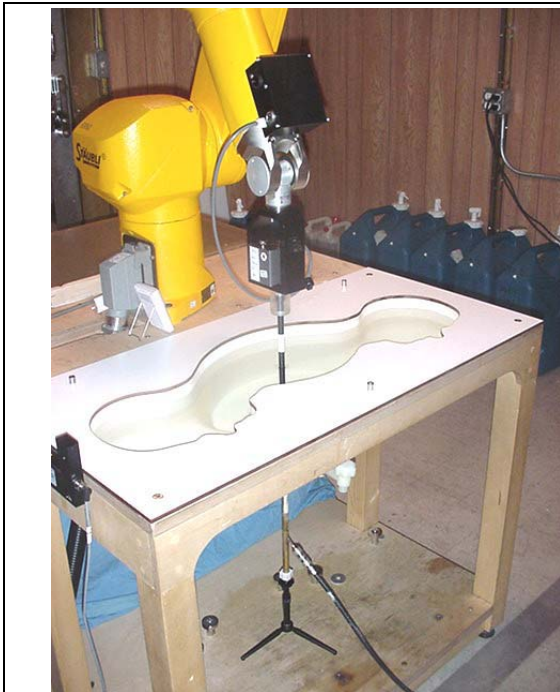
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1.0 INTRODUCTION

This measurement report demonstrates that the Brace Audio Corporation Model: DWG-1000 2.4GHz FHSS Body-worn Wireless Guitar Transmitter 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 General Population / Uncontrolled 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]) and IEEE 1528-2003 (see reference [5]) 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 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 SAR System with SAM Twin Phantom V4.0C



DASY4 Measurement Server


Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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3.0 MEASUREMENT SUMMARY

BODY-WORN SAR EVALUATION RESULTS

BODY-WORN SAR EVALUATION RESULTS											
Freq.	Chan.	Test Mode	Battery Type	DUT Position To Planar Section of Phantom	Body-worn Accessory	DUT Spacing To Planar Section of Phantom	Audio Accessory	DUT Power Before Test		Measured SAR Levels	
								Average Conducted			
MHz								dBm	mW	W/kg	
2403.33	Low	Modulated Fixed Frequency	Alkaline	Back Side	Belt-Clip	1.1 cm	Audio Cable	13.7	23.44	0.017	1g
2442.24	Mid	Modulated Fixed Frequency	Alkaline	Back Side	Belt-Clip	1.1 cm	Audio Cable	14.4	27.54	0.012	1g
2479.10	High	Modulated Fixed Frequency	Alkaline	Back Side	Belt-Clip	1.1 cm	Audio Cable	14.7	29.51	0.00922	1g
SAR LIMIT(S)			BODY		SPATIAL PEAK		RF EXPOSURE CATEGORY				
FCC 47 CFR 2.1093		Health Canada Safety Code 6		1.6 W/kg		averaged over 1 gram		General Population / Uncontrolled			
Test Date(s)		June 16, 2008				Relative Humidity		31		%	
Measured Fluid Type		2450 MHz Body				Atmospheric Pressure		100.1		kPa	
Dielectric Constant ϵ		IEEE Target		Measured	Deviation	Ambient Temperature		24.3		°C	
		52.7	±5%	50.6	-4.0%	Fluid Temperature		23.4		°C	
Conductivity σ (mho/m)		IEEE Target		Measured	Deviation	Fluid Depth		≥ 15		cm	
		1.95	±5%	1.99	+2.1%	ρ (Kg/m ³)		1000			
Note(s)											
1.	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.										
2.	The power drift of the DUT was measured by the DASY4 system during the SAR evaluations at the reference point of the phantom with low SAR. The measured drift levels were inaccurate due to the SAR value at the reference point is close to the measurement noise floor and are therefore not reported.										
3.	The SAR evaluations were performed with fully charged batteries installed in the DUT.										
4.	The fluid temperature was measured prior to and after the SAR evaluations to ensure the temperature remained within +/-2°C of the fluid temperature reported during the dielectric parameter measurements.										
5.	The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).										
6.	The SAR evaluations were performed within 24 hours of the system performance check.										

Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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4.0 DETAILS OF SAR EVALUATION

The Brace Audio Corporation Model: DWG-1000 2.4GHz FHSS Body-worn Wireless Guitar Transmitter was compliant for localized Specific Absorption Rate (Uncontrolled Exposure) based on the test provisions and conditions described below. The SAR test setup photographs are shown in Appendix D.

Test Configuration(s)

1. The DUT was tested for body-worn SAR with the back side placed parallel to the outer surface of the SAM phantom (planar section). The attached plastic belt-clip accessory provided a 1.1 cm spacing between the back of the DUT and the SAM phantom (planar section).

Test Mode(s) & Power Level(s)


2. The DUT was placed into the appropriate test mode by the customer (continuous transmit at 100% duty cycle).
3. The DUT was tested at maximum power with a modulated signal on a fixed frequency (frequency hopping disabled).
4. The average conducted output power levels of the DUT referenced in this report were measured by MiCom Labs Inc.
5. The DUT battery was fully charged prior to the SAR evaluations.
6. The power drift of the DUT during the SAR evaluations was measured by the DASY4 system.



Test Conditions

7. 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.
8. The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).

5.0 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 determine the values between the dipole center of the probe and the surface of the phantom. This data cannot be measured because the center of the dipole sensors is 1.0 mm away from the probe tip and the distance between the probe and the boundary must be larger than 25% of the probe diameter. The probe diameter is 2.4 mm. In the DASY4 software, the distance between the sensor center and phantom surface is set to 2.0 mm. This provides a distance of 1.0 mm between the probe tip and the surface. The extrapolation of the values between the dipole center and the surface of the phantom 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 1 mm grid (42875 interpolated points).
- A zoom scan volume of 24 mm x 24 mm x 20 mm (7x7x9 points) centered at the peak SAR location determined from the area scan was used and a zoom scan resolution of 4 mm x 4 mm x 2.5 mm was used.

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Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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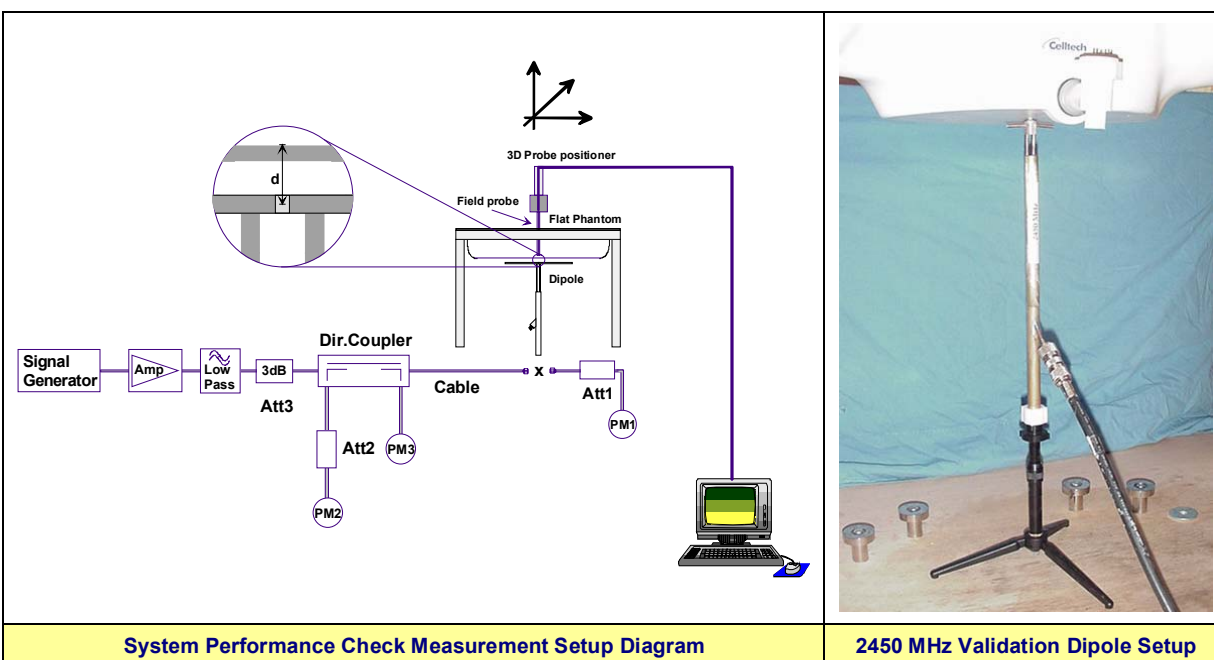
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6.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations a system check was performed at the planar section of the SAM twin phantom with a 2450 MHz validation dipole (see Appendix B for system performance check test plot). 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). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of $\pm 10\%$ from the system validation target SAR value (see Appendix E for system validation procedures).

SYSTEM PERFORMANCE CHECK 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
		Sys. Val. Target	Meas.	Dev.	Sys. Val. Target	Meas.	Dev.	Sys. Val. Target	Meas.	Dev.						
Jun 16	Body 2450	13.8 $\pm 10\%$	13.8	0.0%	50.6 $\pm 5\%$	50.6	0.0%	1.99 $\pm 5\%$	1.99	0.0%	1000	24.3	23.4	≥ 15	31	100.1
Note(s)		1.	The target SAR values are referenced from the System Validation procedures performed by Celltech Labs Inc. (see Appendix E).													
		2.	The target dielectric parameters are referenced from the System Validation procedures performed by Celltech Labs Inc. (see Appendix E).													
		3.	The fluid temperature was measured prior to and after the system performance check. The fluid temperature remained within $\pm 2^\circ\text{C}$ of the fluid temperature from the dielectric parameter measurements.													
		4.	The SAR evaluations were performed within 24 hours of the system performance check.													



Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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7.0 SIMULATED EQUIVALENT TISSUES

The simulated tissue mixture consisted of Glycol-monobutyl, water and salt. The tissue mixtures 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 %


8.0 SAR LIMITS




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

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9.0 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	EX3DV4
Serial No.	3600
Construction	Symmetrical design with triangular core
Frequency	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 GHz)
<u>Phantom(s)</u>	
Type	SAM V4.0C
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 25 liters

Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
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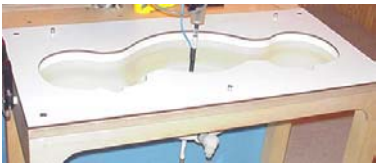
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10.0 PROBE SPECIFICATION (EX3DV4)

<p>Construction: Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. DGBE)</p> <p>Calibration: Basic Broadband Calibration in air: 10-3000 MHz Conversion Factors (CF) for HSL 900 and HSL 1750</p> <p>Frequency: 10 MHz to >6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)</p> <p>Directivity: ± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)</p> <p>Dynamic Range: 10 μW/g to >100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 μW/g)</p> <p>Dimensions: Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1.0 mm</p> <p>Application: High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better than 30%.</p>	
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EX3DV4 E-Field Probe

11.0 SAM TWIN PHANTOM V4.0C


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

12.0 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>	
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Device Holder


Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Test Lab Certificate No. 2470.01

13.0 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	NA		NA
x	-Robot		00046	599396-01	NA		NA
x	-DAE4		00019	353	22Apr08		22Apr09
x	-EX3DV4 E-Field Probe		00213	3600	19Apr08		19Apr09
	-ET3DV6 E-Field Probe		00016	1387	22Apr08		22Apr09
	-300 MHz Validation Dipole		00023	135	30Apr08		30Apr09
	-450 MHz Validation Dipole		00024	136	01May08		01May09
	-835 MHz Validation Dipole		00022	411	Body	02May08	02May09
	-900 MHz Validation Dipole		00020	054	Body	20May08	20May09
	-1800 MHz Validation Dipole		00021	247	Body	22May08	22May09
	-1900 MHz Validation Dipole		00032	151	Body	14May08	14May09
x	-2450 MHz Validation Dipole		00025	150	Body	16Jun08	16Jun09
	5GHz Validation Dipole	-5200 MHz	00126	1031	Body	21Apr08	21Apr09
		-5500 MHz			Body	21Apr08	21Apr09
		-5800 MHz			Brain	21Apr08	21Apr09
					Body	21Apr08	21Apr09
x	-SAM Phantom V4.0C		00154	1033	NA		NA
	-Barski Planar Phantom		00155	03-01	NA		NA
	-Plexiglas Side Planar Phantom		00156	161	NA		NA
	-Plexiglas Validation Planar Phantom		00157	137	NA		NA
	ALS-PR-DIEL Dielectric Probe Kit		00160	260-00953	NA		NA
x	HP 85070C Dielectric Probe Kit		00033	US39240170	NA		NA
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	Rohde & Schwarz SMR20 Signal Generator		00006	100104	23Apr08		23Apr09
x	Amplifier Research 5S1G4 Power Amplifier		00106	26235	NR		NR
	Amplifier Research 10W 1000C Power Amplifier		00041	27887	NR		NR
	Nextec NB00383 Microwave Amplifier		00151	0535	NR		NR
Notes	NA = Not Applicable						
	NR = Not Required						


Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Test Lab Certificate No. 2470.01

14.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V _i or V _{eff}
Measurement System						
Probe calibration (2450 MHz)	5.5	Normal	1	1	5.5	∞
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	0.2	Rectangular	1.732050808	1	0.1	∞
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	∞
Test Sample Related						
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	∞
Phantom and Setup						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.1	Normal	1	0.64	1.3	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	4	Normal	1	0.6	2.4	∞
Combined Standard Uncertainty					10.70	
Expanded Uncertainty (k=2)					21.39	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])						


Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Test Lab Certificate No. 2470.01

MEASUREMENT UNCERTAINTIES (Cont.)


UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V _i or V _{eff}
Measurement System						
Probe calibration (2450 MHz)	5.5	Normal	1	1	5.5	∞
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	0.2	Rectangular	1.732050808	1	0.1	∞
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	∞
Dipole						
Dipole Positioning	2	Normal	1.732050808	1	1.2	∞
Power & Power Drift	4.7	Normal	1.732050808	1	2.7	∞
Phantom and Setup						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	0	Normal	1	0.64	0.0	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	0	Normal	1	0.6	0.0	∞
Combined Standard Uncertainty					8.49	
Expanded Uncertainty (k=2)					16.98	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])						



Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter			2403.33 - 2479.10 MHz	
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	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	


15.0 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.

Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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APPENDIX A - SAR MEASUREMENT DATA

Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Test Lab Certificate No. 2470.01

Date Tested: 06/16/2008

Body-worn SAR - Back Side of DUT with Belt-Clip - Low Channel - 2403.33 MHz

DUT: Brace Audio DWG-1000; Type: Body-worn Wireless Guitar Transmitter (FHSS); Serial: TX#1

Ambient Temp: 24.3°C; Fluid Temp: 23.4°C; Barometric Pressure: 100.1 kPa; Humidity: 31%

Power Source: AA Alkaline Battery

Communication System: Modulated

Output Power: 13.7 dBm (Conducted)

Frequency: 2403.33 MHz; Duty Cycle: 1:1

Medium: M2450 Medium parameters used: $f = 2403.33 \text{ MHz}$; $\sigma = 1.99 \text{ mho/m}$; $\epsilon_r = 50.6$; $\rho = 1000 \text{ kg/m}^3$

- Probe: EX3DV4 - SN3600; ConvF(6.32, 6.32, 6.32); Calibrated: 19/04/2008
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.1 cm Belt-Clip Spacing from Back of DUT to SAM Phantom (Planar Section)

Area Scan (8x8x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.021 mW/g

Body-worn SAR - 1.1 cm Belt-Clip Spacing from Back of DUT to SAM Phantom (Planar Section)

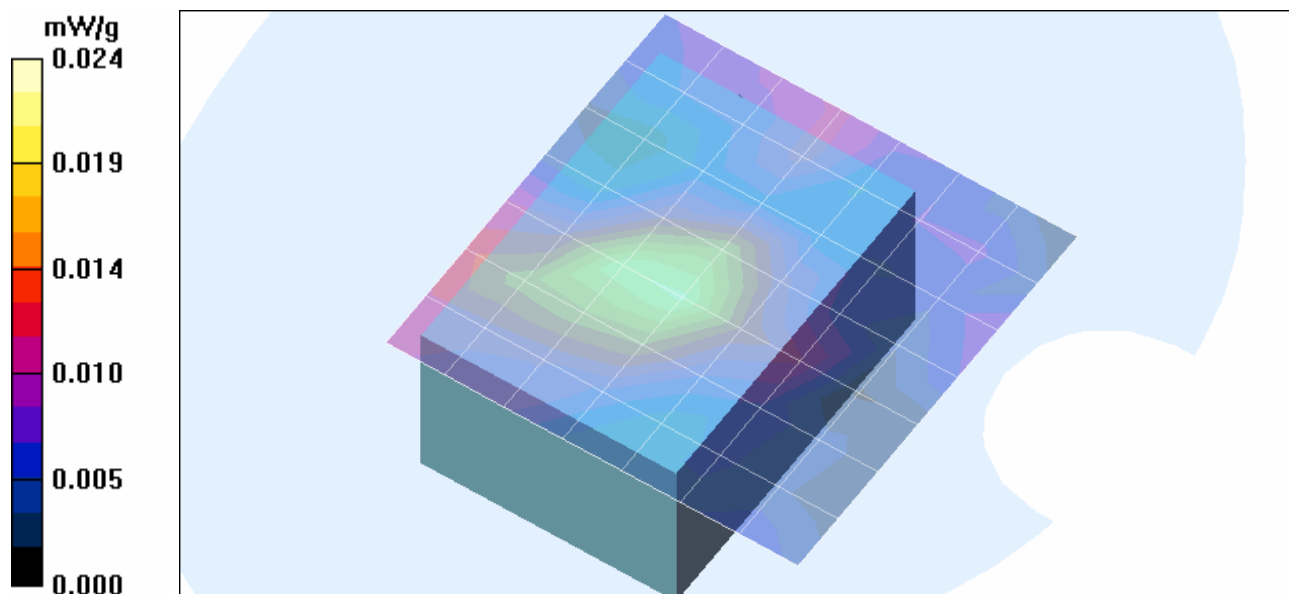
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$


Reference Value = 2.09 V/m



Peak SAR (extrapolated) = 0.031 W/kg

SAR(1 g) = 0.017 mW/g; SAR(10 g) = 0.0099 mW/g

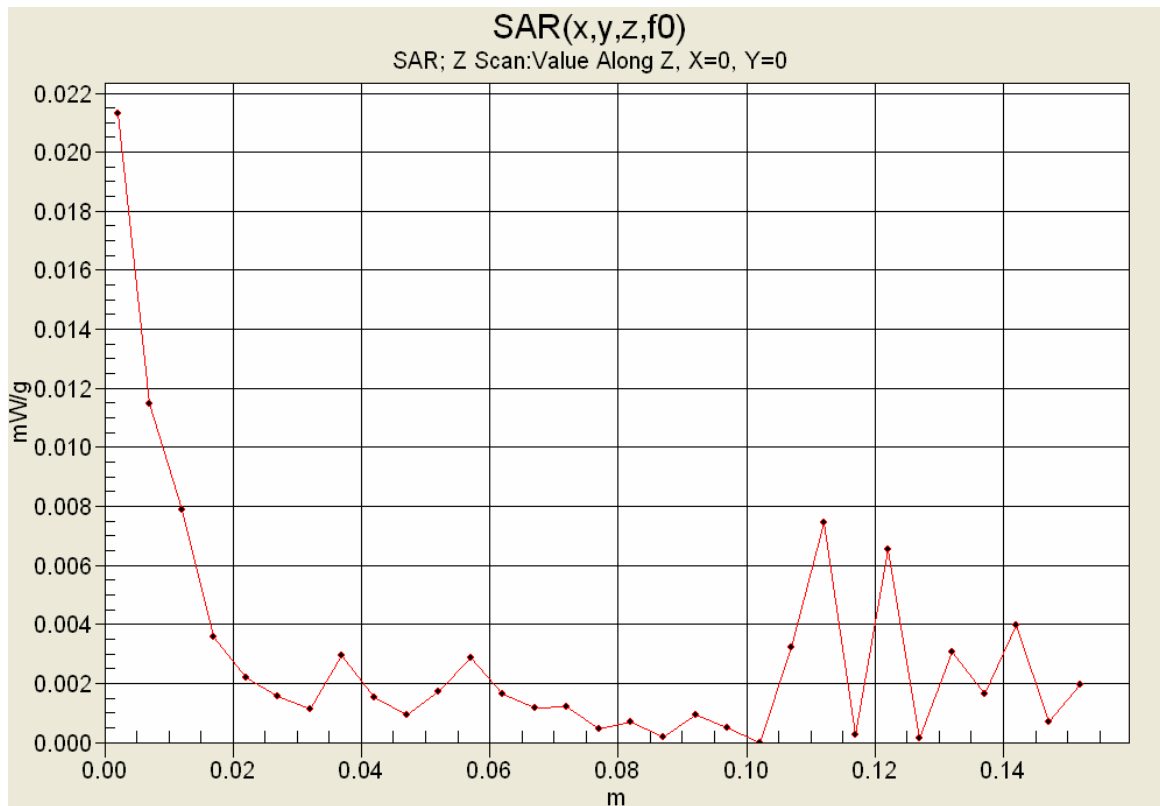
Maximum value of SAR (measured) = 0.024 mW/g




Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Z-Axis Scan



Due to the very low SAR level measured in this configuration the Z-axis scan is only reporting noise. The DASY4 software adjusts the scale according to the measured SAR level, which for this evaluation is close to the measurement noise floor.

Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Test Lab Certificate No. 2470.01

Date Tested: 06/16/2008

Body-worn SAR - Back Side of DUT with Belt-Clip - Mid Channel - 2442.24 MHz

DUT: Brace Audio DWG-1000; Type: Body-worn Wireless Guitar Transmitter (FHSS); Serial: TX#1

Ambient Temp: 24.3°C; Fluid Temp: 23.4°C; Barometric Pressure: 100.1 kPa; Humidity: 31%

Power Source: AA Alkaline Battery

Communication System: Modulated

Output Power: 14.4 dBm (Conducted)

Frequency: 2442.24 MHz; Duty Cycle: 1:1

Medium: M2450 Medium parameters used: $f = 2442.24 \text{ MHz}$; $\sigma = 1.99 \text{ mho/m}$; $\epsilon_r = 50.6$; $\rho = 1000 \text{ kg/m}^3$

- Probe: EX3DV4 - SN3600; ConvF(6.32, 6.32, 6.32); Calibrated: 19/04/2008
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.1 cm Belt-Clip Spacing from Back of DUT to SAM Phantom (Planar Section)

Area Scan (8x8x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.015 mW/g

Body-worn SAR - 1.1 cm Belt-Clip Spacing from Back of DUT to SAM Phantom (Planar Section)

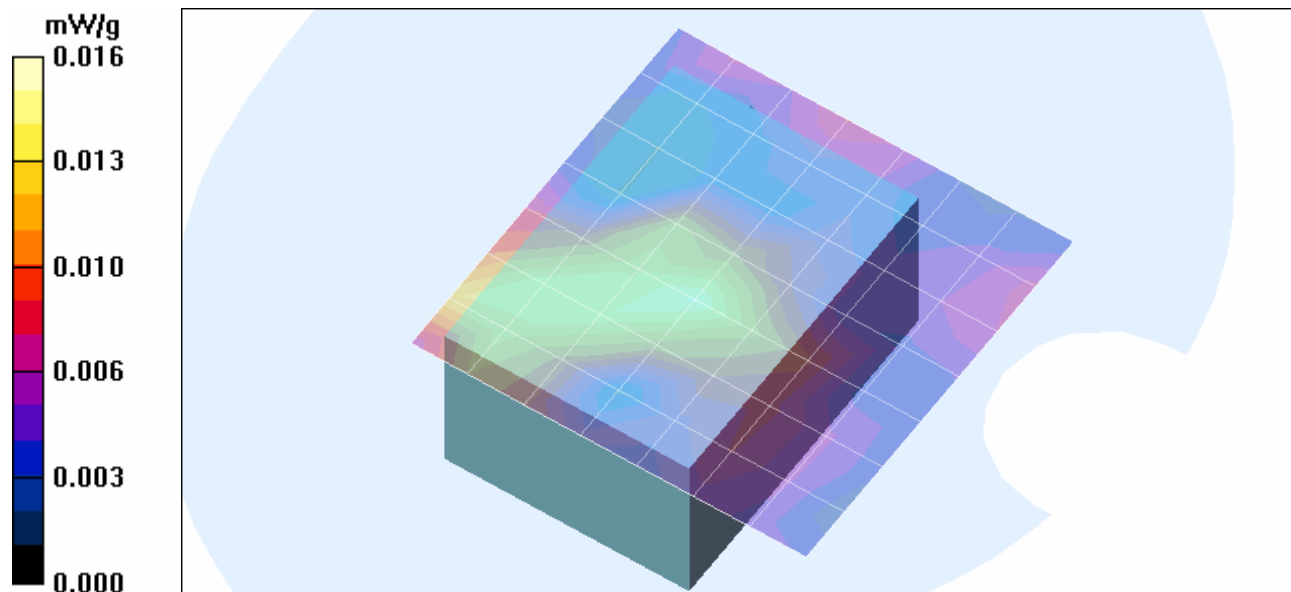
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$


Reference Value = 1.21 V/m



Peak SAR (extrapolated) = 0.020 W/kg

SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.0068 mW/g

Maximum value of SAR (measured) = 0.016 mW/g



Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 06/16/2008

Body-worn SAR - Back Side of DUT with Belt-Clip - High Channel - 2479.10 MHz

DUT: Brace Audio DWG-1000; Type: Body-worn Wireless Guitar Transmitter (FHSS); Serial: TX#1

Ambient Temp: 24.3°C; Fluid Temp: 23.4°C; Barometric Pressure: 100.1 kPa; Humidity: 31%

Power Source: AA Alkaline Battery

Communication System: Modulated

Output Power: 14.7 dBm (Conducted)

Frequency: 2479.10 MHz; Duty Cycle: 1:1

Medium: M2450 Medium parameters used: $f = 2479.10 \text{ MHz}$; $\sigma = 1.99 \text{ mho/m}$; $\epsilon_r = 50.6$; $\rho = 1000 \text{ kg/m}^3$

- Probe: EX3DV4 - SN3600; ConvF(6.32, 6.32, 6.32); Calibrated: 19/04/2008
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 1.1 cm Belt-Clip Spacing from Back of DUT to SAM Phantom (Planar Section)

Area Scan (8x8x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.012 mW/g

Body-worn SAR - 1.1 cm Belt-Clip Spacing from Back of DUT to SAM Phantom (Planar Section)

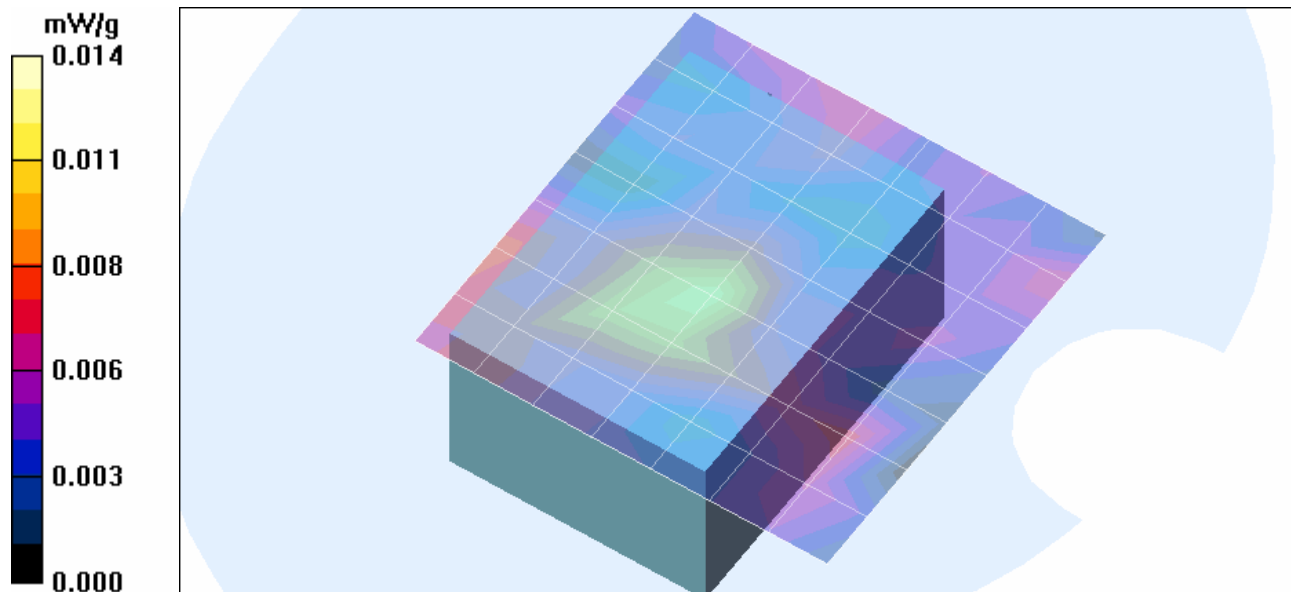
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$


Reference Value = 1.33 V/m



Peak SAR (extrapolated) = 0.016 W/kg

SAR(1 g) = 0.00922 mW/g; SAR(10 g) = 0.00489 mW/g


Maximum value of SAR (measured) = 0.014 mW/g





Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 06/16/2008

System Performance Check - 2450 MHz Dipole - MSL

DUT: Dipole 2450 MHz; Asset: 00025; Serial: 150; Validation: 06/16/2008

Ambient Temp: 24.3°C; Fluid Temp: 23.4°C; Barometric Pressure: 100.1 kPa; Humidity: 31%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: M2450 Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.99 \text{ mho/m}$; $\epsilon_r = 50.6$; $\rho = 1000 \text{ kg/m}^3$

- Probe: EX3DV4 - SN3600; ConvF(6.32, 6.32, 6.32); Calibrated: 19/04/2008
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

2450 MHz Dipole - System Performance Check

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

Maximum value of SAR (measured) = 17.2 mW/g

2450 MHz Dipole - System Performance Check

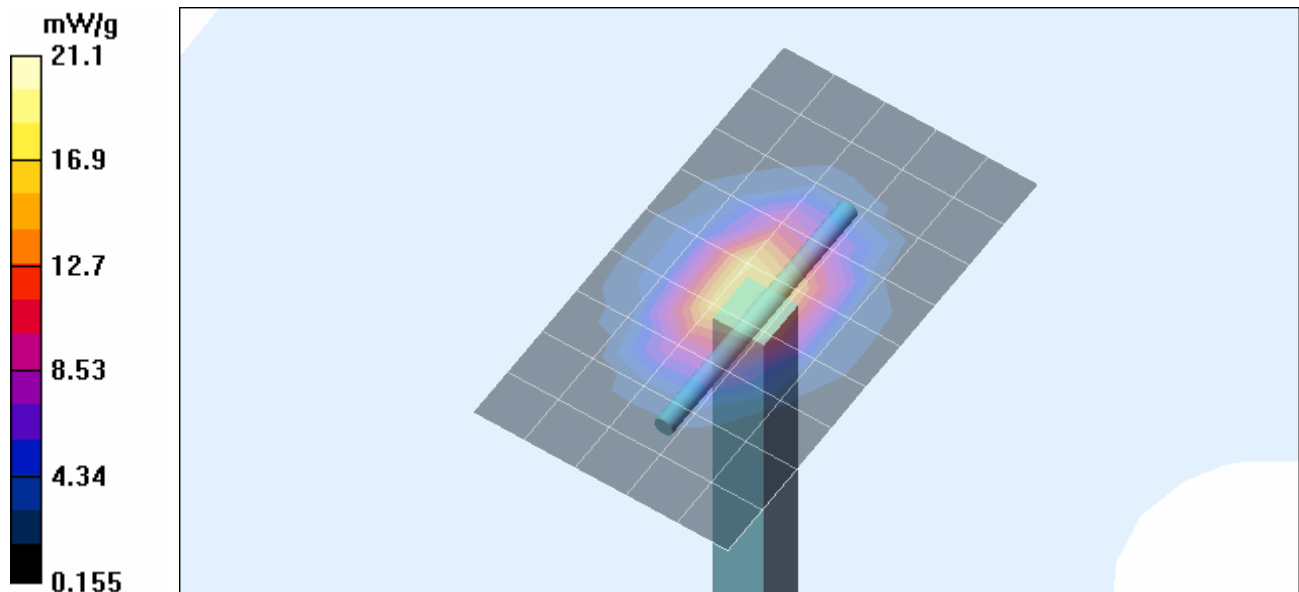
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$


Reference Value = 103.9 V/m; Power Drift = 0.079 dB



Peak SAR (extrapolated) = 28.3 W/kg

SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.38 mW/g

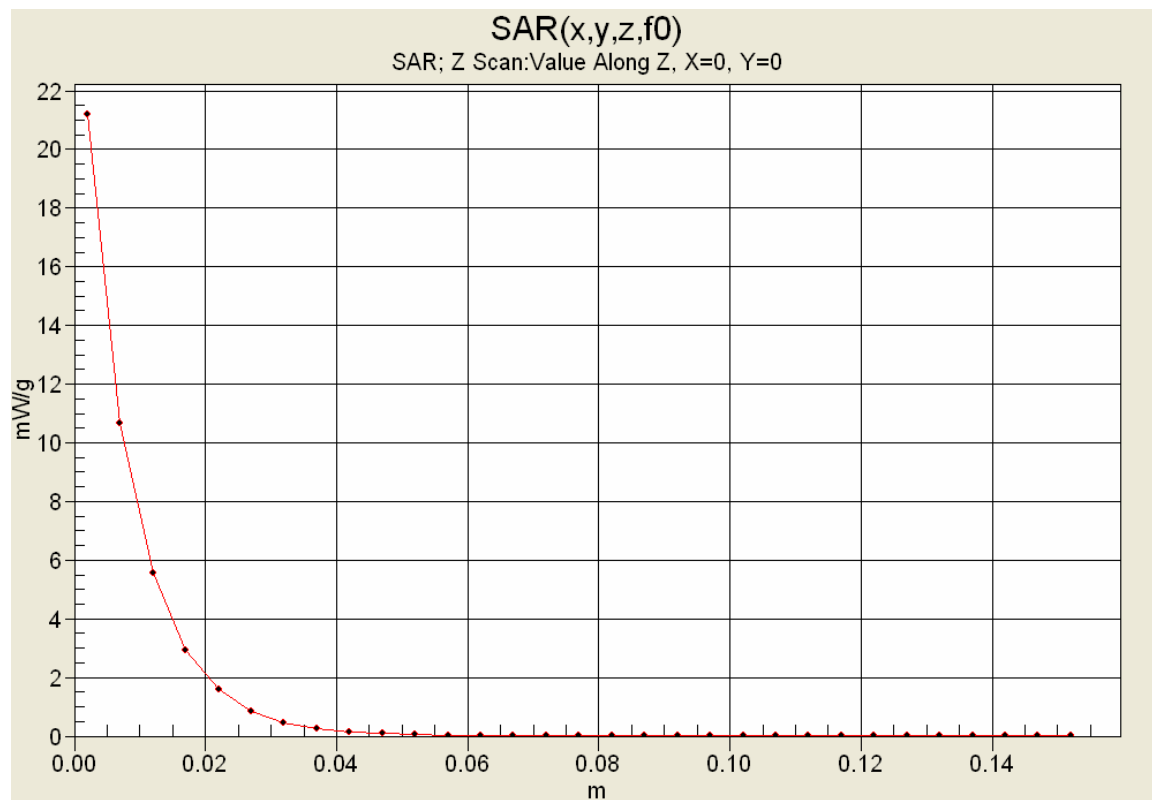
Maximum value of SAR (measured) = 21.1 mW/g






Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	


Z-Axis Scan





Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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	<u>Date(s) of Evaluation</u> June 16, 2008	<u>Test Report Serial No.</u> 061608WD2-T913-S15S	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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	<u>Date(s) of Evaluation</u> June 16, 2008	<u>Test Report Serial No.</u> 061608WD2-T913-S15S	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	
	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	



Test Lab Certificate No. 2470.01

2450 MHz System Performance Check & DUT Evaluation (Body)


Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
Mon 16/Jun/2008
Frequency (GHz)
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM



Freq	FCC_eB	FCC_sB	Test_e	Test_s
2.3500	52.83	1.85	50.86	1.85
2.3600	52.82	1.86	50.78	1.86
2.3700	52.81	1.87	50.75	1.86
2.3800	52.79	1.88	50.70	1.89
2.3900	52.78	1.89	50.51	1.92
2.4000	52.77	1.90	50.51	1.93
2.4100	52.75	1.91	50.66	1.93
2.4200	52.74	1.92	50.25	1.97
2.4300	52.73	1.93	50.39	1.98
2.4400	52.71	1.94	50.32	2.00
2.4500	52.70	1.95	50.63	1.99
2.4600	52.69	1.96	50.41	2.00
2.4700	52.67	1.98	50.46	2.03
2.4800	52.66	1.99	50.36	2.05
2.4900	52.65	2.01	50.07	2.05
2.5000	52.64	2.02	50.31	2.07
2.5100	52.62	2.04	50.03	2.08
2.5200	52.61	2.05	50.00	2.11
2.5300	52.60	2.06	49.98	2.11
2.5400	52.59	2.08	50.23	2.10
2.5500	52.57	2.09	50.16	2.15

Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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	<u>Date(s) of Evaluation</u> June 16, 2008	<u>Test Report Serial No.</u> 061608WD2-T913-S15S	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	


APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS



Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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	<u>Date(s) of Evaluation</u> June 16, 2008	<u>Test Report Serial No.</u> 061608WD2-T913-S15S	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

BODY SAR TEST SETUP PHOTOGRAPHS
1.1 cm Belt-Clip Spacing from Back Side of DUT to SAM Phantom (Planar Section)






Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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	<u>Date(s) of Evaluation</u> June 16, 2008	<u>Test Report Serial No.</u> 061608WD2-T913-S15S	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

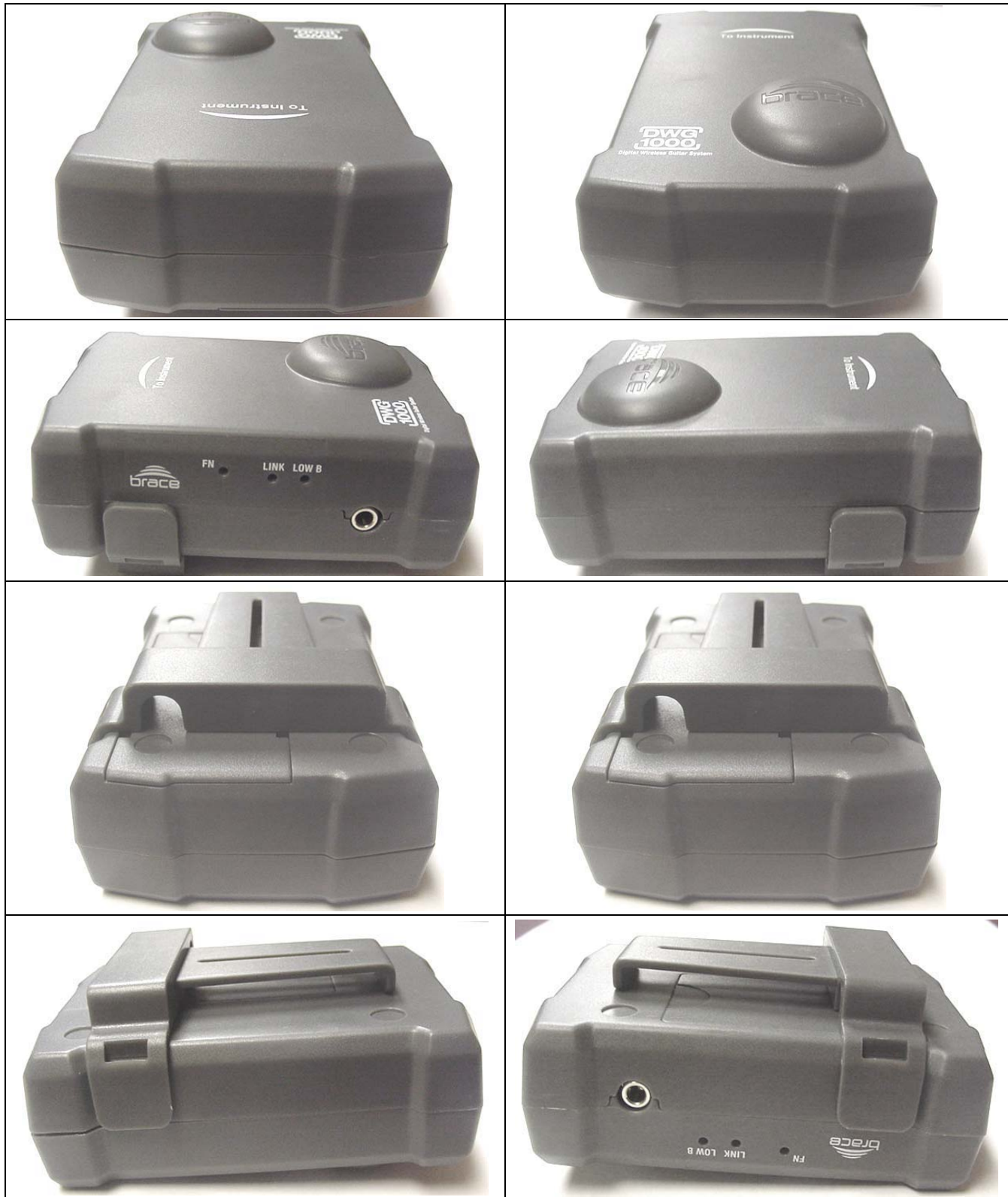
DUT PHOTOGRAPHS


		
Front Side of DUT	Internal Antenna Location	Back Side of DUT with Plastic Belt-Clip
		
Back Side of DUT		DUT Battery Housing



Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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	<u>Date(s) of Evaluation</u> June 16, 2008	<u>Test Report Serial No.</u> 061608WD2-T913-S15S	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

DUT PHOTOGRAPHS

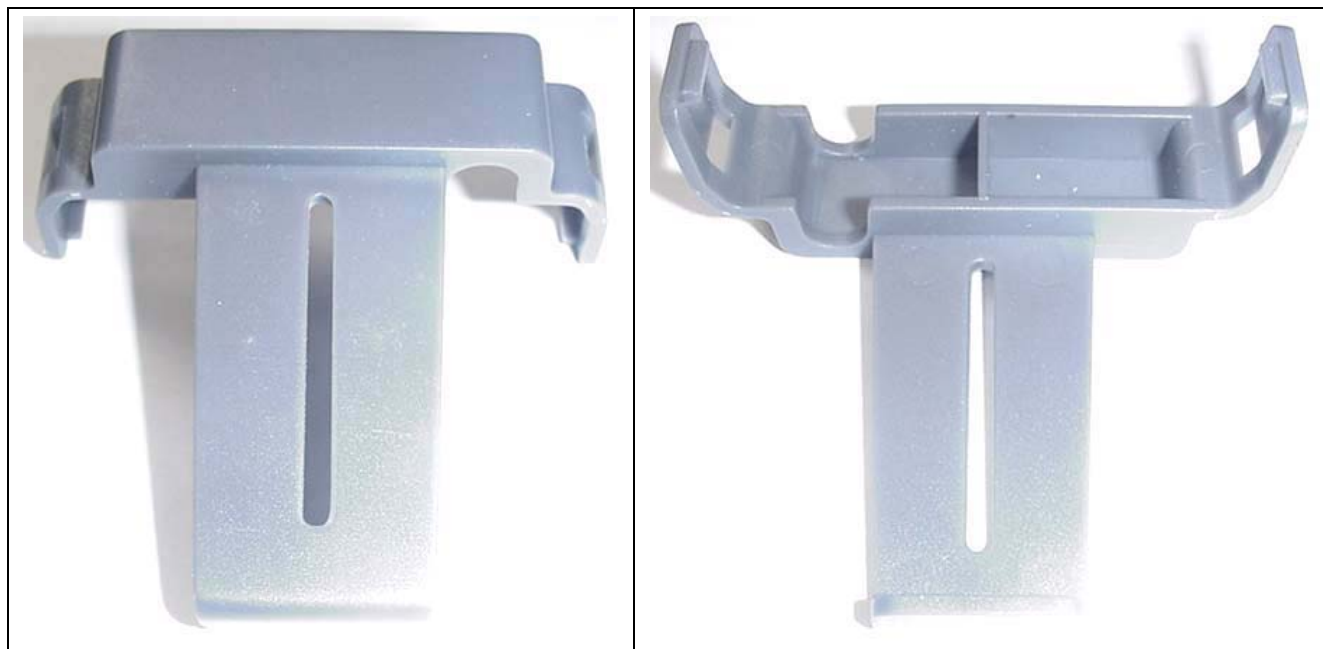


Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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	<u>Date(s) of Evaluation</u> June 16, 2008	<u>Test Report Serial No.</u> 061608WD2-T913-S15S	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	
	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Test Lab Certificate No. 2470.01


DUT PHOTOGRAPHS





DUT Plastic Belt-Clip



DUT with Audio Cable

Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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	<u>Date(s) of Evaluation</u> June 16, 2008	<u>Test Report Serial No.</u> 061608WD2-T913-S15S	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	
	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	



Test Lab Certificate No. 2470.01

DUT PHOTOGRAPHS





Internal Antenna

Applicant Name:	Brace Audio Corporation		FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter		2403.33 - 2479.10 MHz		
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	<u>Date(s) of Evaluation</u> June 16, 2008	<u>Test Report Serial No.</u> 061608WD2-T913-S15S	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX E - SYSTEM VALIDATION

Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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	Date of Evaluation:	June 16, 2008	Document Serial No.:	SV2450M-061608-R1.0
	Evaluation Type:	System Validation	Validation Dipole:	2450 MHz
			Fluid Type:	Body

2450 MHz SYSTEM VALIDATION

Type:

2450 MHz Validation Dipole

Asset Number:

00025

Serial Number:

150

Place of Validation:

Celltech Labs Inc.

Date of Validation:

June 16, 2008


Celltech Labs Inc. certifies that the 2450 MHz System Validation was performed on the date indicated above.

Performed by:

Sean Johnston

Signature:



	Date of Evaluation:	June 16, 2008	Document Serial No.:	SV2450M-061608-R1.0
	Evaluation Type:	System Validation	Validation Dipole:	2450 MHz
			Fluid Type:	Body

1. Dipole Construction & Electrical Characteristics

The validation dipole was constructed in accordance with the requirements specified in IEEE Standard 1528-2003 and International Standard IEC 62209-1:2005. The electrical properties were measured using an HP 8753ET Network Analyzer. The network analyzer was calibrated to the validation dipole N-type connector feed point using an HP85032E Type N calibration kit. The dipole was placed parallel to a planar phantom at a separation distance of 10.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:

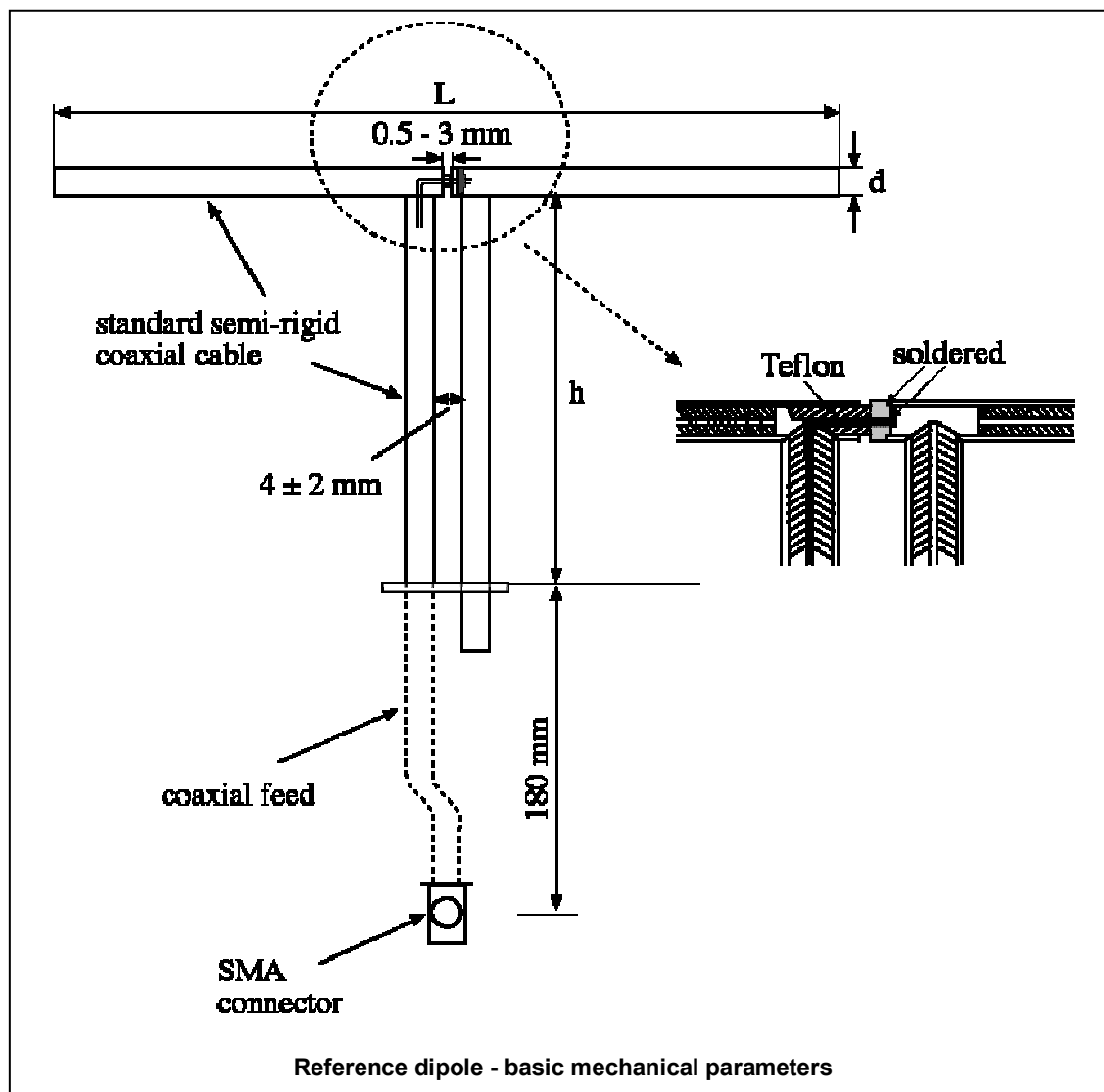
Feed point impedance at 2450 MHz

$$\text{Re}\{Z\} = 45.135\Omega$$

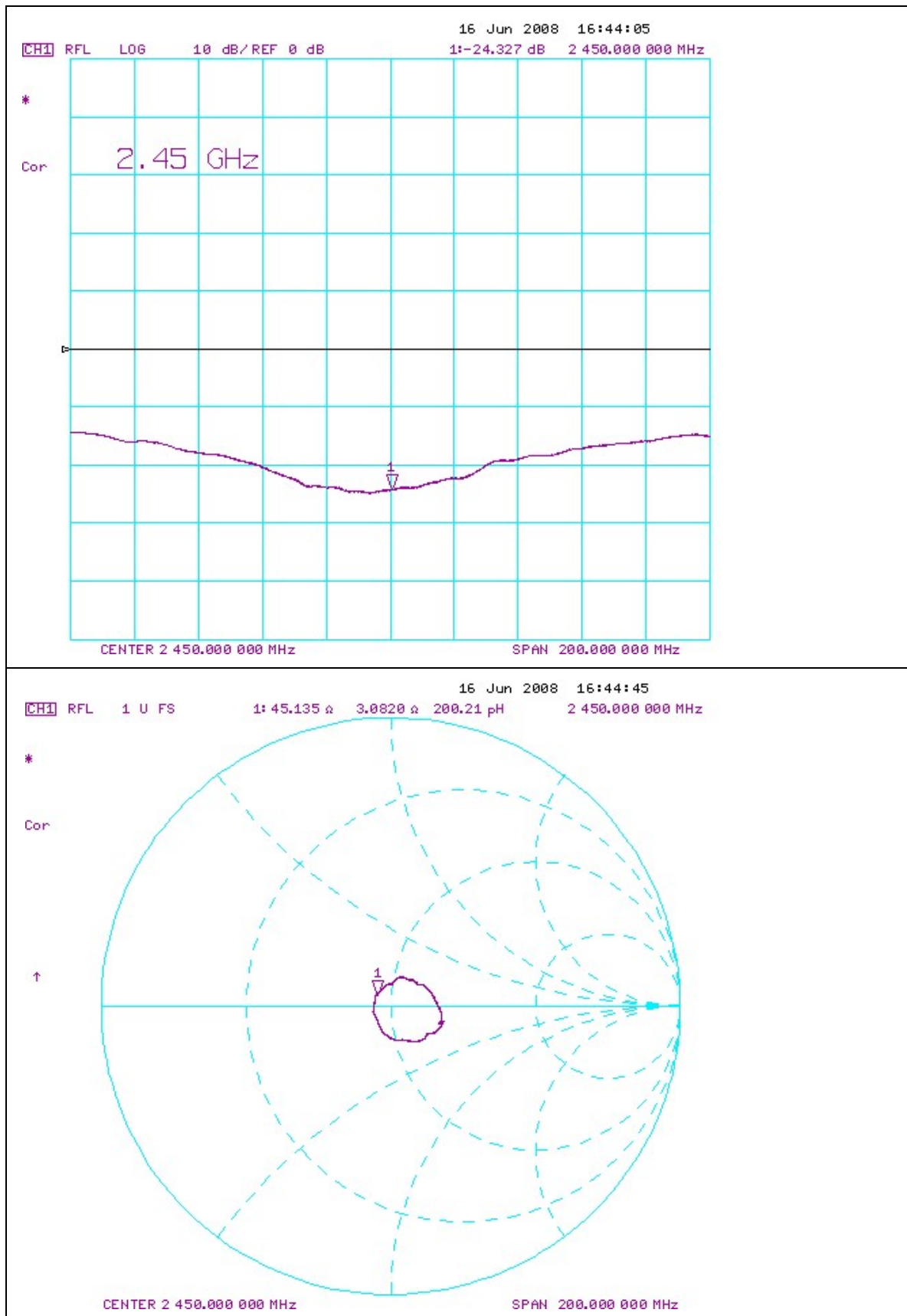
$$\text{Im}\{Z\} = 3.0820\Omega$$

Return Loss at 2450 MHz

$$-24.327\text{dB}$$



2. Validation Dipole VSWR Data



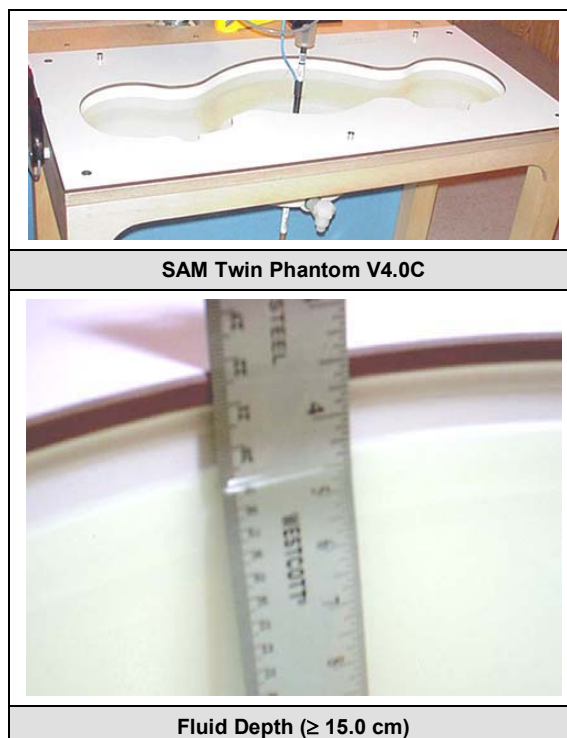
3. Validation Dipole Dimensions


Frequency (MHz)	L (mm)	H (mm)	D (mm)
300	396.0	250.0	6.0
450	270.0	167.0	6.0
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	51.5	30.4	3.6
3000	41.5	25.0	3.6

4. Validation Phantom

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


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



	Date of Evaluation:	June 16, 2008	Document Serial No.:	SV2450M-061608-R1.0
	Evaluation Type:	System Validation	Validation Dipole:	2450 MHz
			Fluid Type:	Body


5. 2450 MHz System Validation Setup



	Date of Evaluation:	June 16, 2008	Document Serial No.:	SV2450M-061608-R1.0
	Evaluation Type:	System Validation	Validation Dipole:	2450 MHz
			Fluid Type:	Body

6. 2450 MHz Validation Dipole Setup

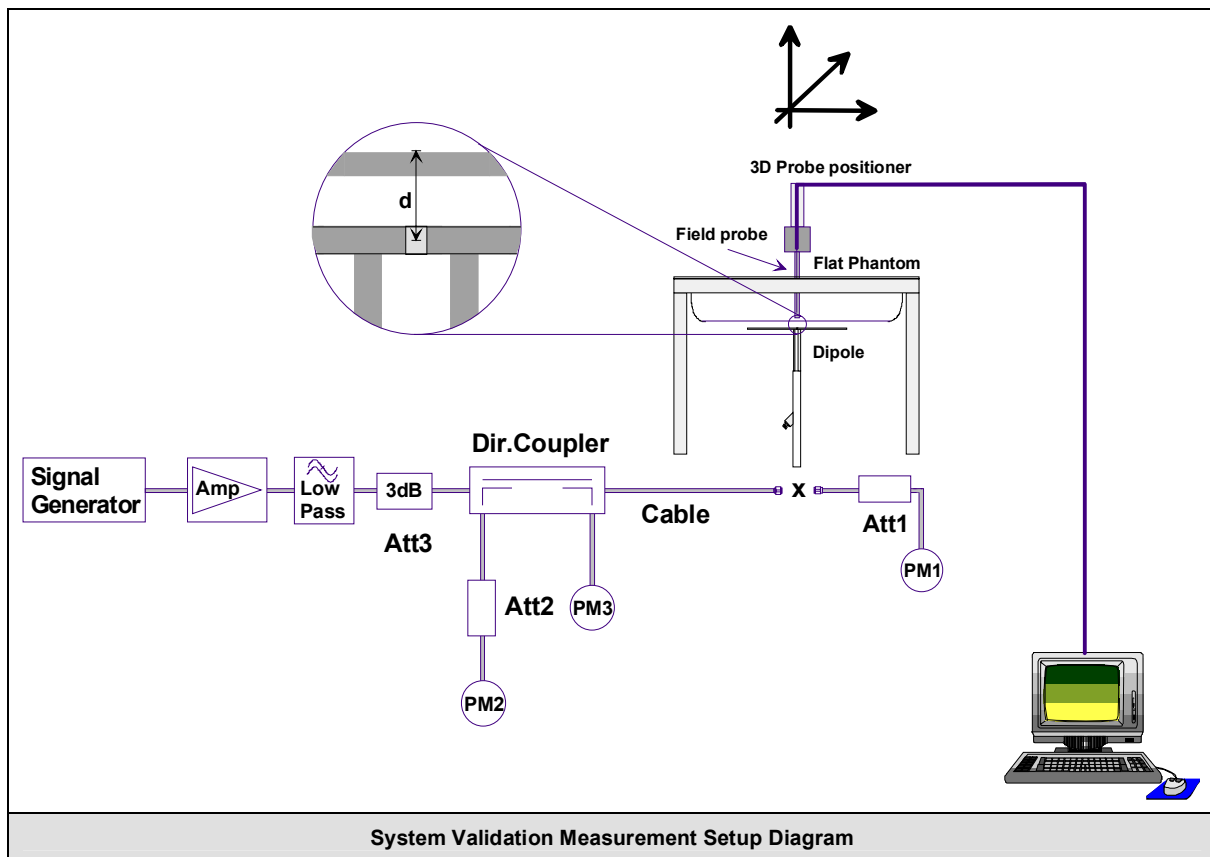



	Date of Evaluation:	June 16, 2008	Document Serial No.:	SV2450M-061608-R1.0
	Evaluation Type:	System Validation	Validation Dipole:	2450 MHz
			Fluid Type:	Body

7. SAR Measurement

Measurements were made at the planar section of the SAM phantom using a dosimetric E-field probe EX3DV4 (S/N: 3600, conversion factor 6.32). 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 procedures described below.

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



	Date of Evaluation:	June 16, 2008	Document Serial No.:	SV2450M-061608-R1.0
	Evaluation Type:	System Validation	Validation Dipole:	2450 MHz
			Fluid Type:	Body

8. Measurement Conditions

The SAM phantom was filled with 2450 MHz Body tissue simulant.

Relative Permittivity: 50.6 (-4.0% deviation from target)
Conductivity: 1.99 mho/m (+2.1% deviation from target)
Fluid Temperature: 23.4 °C (Start of Test) / 23.5 °C (End of Test)
Fluid Depth: ≥ 15.0 cm

Environmental Conditions:

Ambient Temperature: 24.3 °C
Barometric Pressure: 100.1 kPa
Humidity: 31 %

The 2450 MHz Body tissue simulant consisted of the following ingredients:


Ingredient	Percentage by weight
Water	69.98%
Glycol Monobutyl	30.00%
Salt	0.02%
IEEE/IEC Target Dielectric Parameters (2450 MHz):	$\epsilon_r = 52.7$ (+/-5%) $\sigma = 1.95$ S/m (+/-5%)

9. System Validation SAR Results

SAR @ 0.25W Input averaged over 1g (W/kg)				SAR @ 1W Input averaged over 1g (W/kg)			
SPEAG Target		Measured	Deviation	SPEAG Target		Measured	Deviation
12.8	+/- 10%	13.8	+7.8%	51.2	+/- 10%	55.2	+7.8%
SAR @ 0.25W Input averaged over 10g (W/kg)				SAR @ 1W Input averaged over 10g (W/kg)			
SPEAG Target		Measured	Deviation	SPEAG Target		Measured	Deviation
5.93	+/- 10%	6.38	+7.6%	23.7	+/- 10%	25.5	+7.6%

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

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

	Date of Evaluation:	June 16, 2008	Document Serial No.:	SV2450M-061608-R1.0
	Evaluation Type:	System Validation	Validation Dipole:	2450 MHz
			Fluid Type:	Body

Date Tested: 06/16/2008

System Validation - 2450 MHz Dipole - MSL

DUT: Dipole 2450 MHz; Asset: 00025; Serial: 150; Validation: 06/16/2008

Ambient Temp: 24.3°C; Fluid Temp: 23.4°C; Barometric Pressure: 100.1 kPa; Humidity: 31%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: M2450 Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.99 \text{ mho/m}$; $\epsilon_r = 50.6$; $\rho = 1000 \text{ kg/m}^3$

- Probe: EX3DV4 - SN3600; ConvF(6.32, 6.32, 6.32); Calibrated: 19/04/2008
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: SAM 4.0; Type: Fiberglass; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

2450 MHz Dipole - System Validation

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

Maximum value of SAR (measured) = 17.2 mW/g

2450 MHz Dipole - System Validation

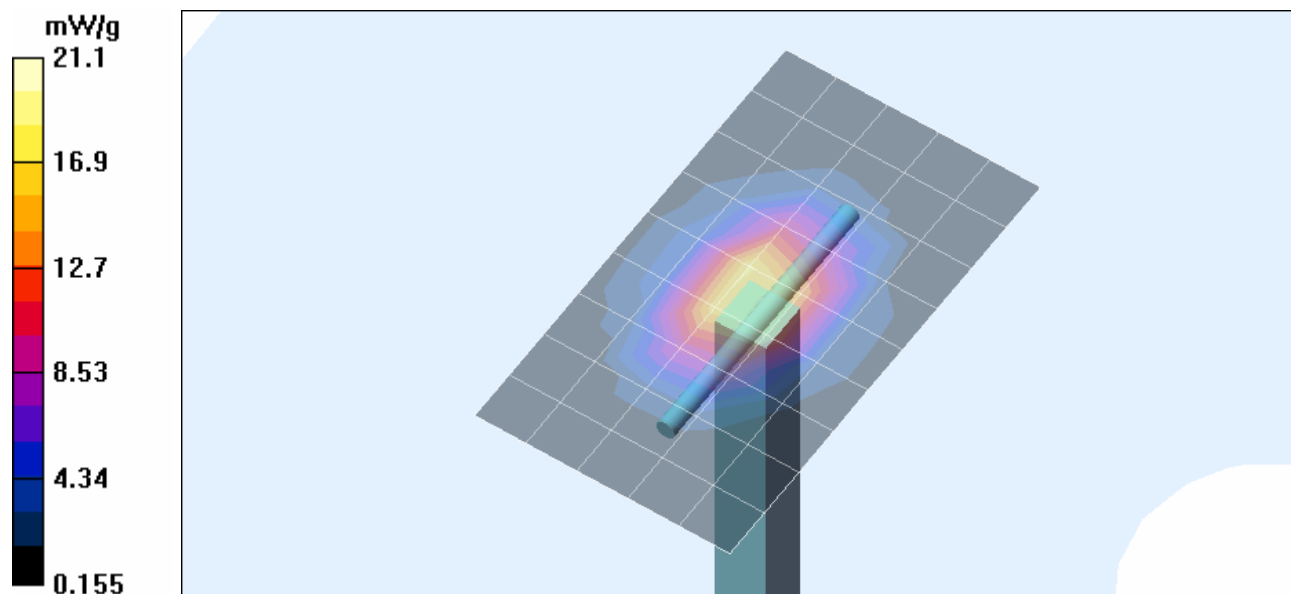
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 103.9 V/m; Power Drift = 0.079 dB

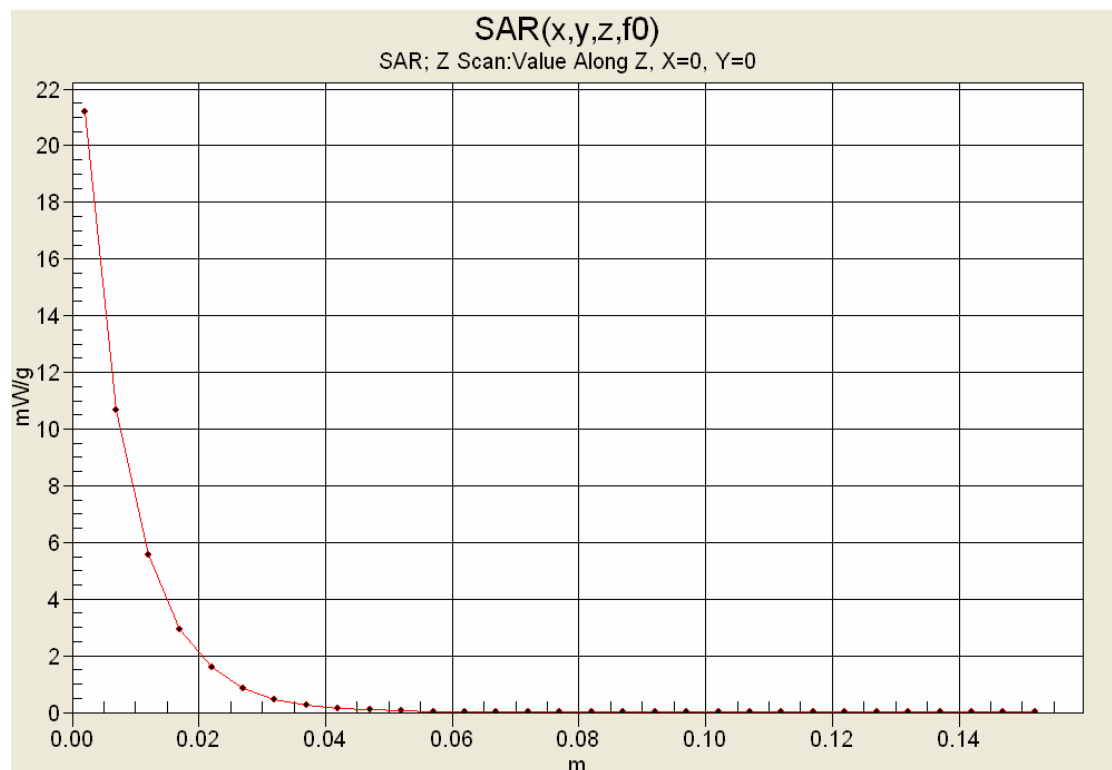
Peak SAR (extrapolated) = 28.3 W/kg

SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.38 mW/g

Maximum value of SAR (measured) = 21.1 mW/g



Z-Axis Scan



10. Measured Fluid Dielectric Parameters

System Validation - 2450 MHz (Body)

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

Mon 16/Jun/2008

Frequency (GHz)


FCC_eB FCC Limits for Body Epsilon

FCC_sB FCC Limits for Body Sigma

Test_e Epsilon of UIM

Test_s Sigma of UIM

Freq	FCC_eB	FCC_sB	Test_e	Test_s
2.3500	52.83	1.85	50.86	1.85
2.3600	52.82	1.86	50.78	1.86
2.3700	52.81	1.87	50.75	1.86
2.3800	52.79	1.88	50.70	1.89
2.3900	52.78	1.89	50.51	1.92
2.4000	52.77	1.90	50.51	1.93
2.4100	52.75	1.91	50.66	1.93
2.4200	52.74	1.92	50.25	1.97
2.4300	52.73	1.93	50.39	1.98
2.4400	52.71	1.94	50.32	2.00
2.4500	52.70	1.95	50.63	1.99
2.4600	52.69	1.96	50.41	2.00
2.4700	52.67	1.98	50.46	2.03
2.4800	52.66	1.99	50.36	2.05
2.4900	52.65	2.01	50.07	2.05
2.5000	52.64	2.02	50.31	2.07
2.5100	52.62	2.04	50.03	2.08
2.5200	52.61	2.05	50.00	2.11
2.5300	52.60	2.06	49.98	2.11
2.5400	52.59	2.08	50.23	2.10
2.5500	52.57	2.09	50.16	2.15



	Date of Evaluation:	June 16, 2008	Document Serial No.:	SV2450M-061608-R1.0
	Evaluation Type:	System Validation	Validation Dipole:	2450 MHz
			Fluid Type:	Body

11. Measurement Uncertainties


UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	Uncertainty Value ±% (1g)	V _i or V _{eff}
Measurement System						
Probe calibration (2450 MHz)	5.5	Normal	1	1	5.5	∞
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	0.2	Rectangular	1.732050808	1	0.1	∞
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	∞
Dipole						
Dipole Positioning	2	Normal	1.732050808	1	1.2	∞
Power & Power Drift	4.7	Normal	1.732050808	1	2.7	∞
Phantom and Setup						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.1	Normal	1	0.64	1.3	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	4	Normal	1	0.6	2.4	∞
Combined Standard Uncertainty					8.92	
Expanded Uncertainty (k=2)					17.85	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC Standard 62209-1:2005						

12. Test Equipment List

TEST EQUIPMENT	ASSET NO.	SERIAL NO.	DATE OF CAL.	CAL. DUE DATE
SPEAG DASY4 Measurement Server	00158	1078	N/A	N/A
SPEAG Robot	00046	599396-01	N/A	N/A
SPEAG DAE4	00019	353	22Apr08	22Apr09
EX3DV4 E-Field Probe	00213	3600	19Apr08	19Apr09
2450 MHz Validation Dipole	00025	150	16Jun08	16Jun09
SPEAG SAM Twin Phantom V4.0C	00154	1033	N/A	N/A
ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A	N/A
Gigatronics 8652A Power Meter	00007	1835272	23Apr08	23Apr09
Gigatronics 80701A Power Sensor	00014	1833699	23Apr08	23Apr09
HP 8753ET Network Analyzer	00134	US39170292	28Apr08	28Apr09
HP 8648D Signal Generator	00005	3847A00611	NCR	NCR
Amplifier Research 5S1G4 Power Amplifier	00106	26235	NCR	NCR

	<u>Date(s) of Evaluation</u> June 16, 2008	<u>Test Report Serial No.</u> 061608WD2-T913-S15S	<u>Test Report Revision No.</u> Rev. 1.1 (2nd Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> July 10, 2008	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX G - SAM PHANTOM CERTIFICATE OF CONFORMITY

Applicant Name:	Brace Audio Corporation	FCC ID:	WD2-DWG-1000	IC:	7786A-DWG-1000	
Device Model(s):	DWG-1000	DUT:	Body-worn Wireless Guitar Transmitter	2403.33 - 2479.10 MHz		
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Schmid & Partner Engineering AG

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

Certificate of conformity / First Article Inspection

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

Tests

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

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

Standards

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

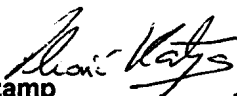
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

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

Date 18.11.2001

Signature / Stamp



**Schmid & Partner
Engineering AG**



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