



**FCC OET BULLETIN 65 SUPPLEMENT C**

**SAR EVALUATION REPORT**

*For*

**Medical Telemetry Transmitter**

**MODEL: ZM-541PA**

**FCC ID: B6BZM-541PA**

**REPORT NUMBER: 09J12558-2**

**ISSUE DATE: June 12, 2009**

*Prepared for*

**NIHON KOHDEN CORPORATION  
1-31-4 NISHIOCHIAI, SHINJUKU-KU  
TOKYO 161-8560, JAPAN**

*Prepared by*

**COMPLIANCE CERTIFICATION SERVICES  
47173 BENICIA STREET  
FREMONT, CA 94538, U.S.A.  
TEL: (510) 771-1000  
FAX: (510) 661-0888**



**NVLAP LAB CODE 200065-0**

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	June 12, 2009	Initial Issue	--

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** NIHON KOHDEN CORPORATION  
1-31-4, NISHIOCHIAI SHINJUKU-KU  
TOKYO 161-8560, JAPAN

**EUT DESCRIPTION:** TRANSMITTER FOR MEDICAL

**MODEL NUMBER:** ZM-541PA

**DEVICE CATEGORY:** Portable

**EXPOSURE CATEGORY:** General Population/Uncontrolled Exposure

**DATE TESTED:** June 11, 2009

## THE HIGHEST SAR VALUES:

FCC / IC Rule Parts	Frequency Range [MHz]	The Highest SAR Values (1g_mW/g)	Limit (mW/g)
95 H	1395 - 1400 MHz 1427 - 1432 MHz	0.00741	1.6

## APPLICABLE STANDARDS AND TEST PROCEDURES:

STANDARD	TEST RESULTS
FCC OET BULLETIN 65 SUPPLEMENT C	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

Tested By:

*Sunny Shih*

*Chao-Yen Lin*

SUNNY SHIH  
ENGINEERING SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

CHAO YEN LIN  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
Robot - Six Axes	Stäubli	RX90BL	N/A	N/A		
Robot Remote Control	Stäubli	CS7MB	3403-91535	N/A		
DASY4 Measurement Server	SPEAG	SEUMS001BA	1041	N/A		
Probe Alignment Unit	SPEAG	LB (V2)	261	N/A		
SAM Phantom (SAM1)	SPEAG	QD000P40CA	1185	N/A		
SAM Phantom (SAM2)	SPEAG	QD000P40CA	1050	N/A		
Oval Flat Phantom (ELI 4.0)	SPEAG	QD OVA001 B	1003	N/A		
Electronic Probe kit	HP	85070C	N/A	N/A		
S-Parameter Network Analyzer	Agilent	8753ES-6	MY40001647	11	14	2009
Signal Generator	Agilent	8753ES-6	MY40001647	11	14	2009
E-Field Probe	SPEAG	EX3DV4	3686	3	23	1010
Thermometer	ERTCO	639-1S	1718	5	1	2010
Data Acquisition Electronics	SPEAG	DAE3 V1	427	10	20	2009
System Validation Dipole	SPEAG	D835V2	4d002	6	22	2009
System Validation Dipole	SPEAG	D900V2	108	1	21	2010
System Validation Dipole	SPEAG	D1800V2	294	1	29	2010
System Validation Dipole	SPEAG	D1900V2	5d043	1	29	2010
System Validation Dipole	SPEAG	D2450V2	748	4	14	2010
System Validation Dipole	SPEAG	D5GHzV2	1003	11	21	2009
MXA Signal Analyzer	Agilent	N9020A	US48350984	10	23	2009
ESG Vector Signal Generator	Agilent	E4438C	US44271090	9	17	2010
Power Meter	Giga-tronics	8651A	8651404	1	11	2010
Power Sensor	Giga-tronics	80701A	1834588	1	11	2010
Amplifier	Mini-Circuits	ZVE-8G	90606	N/A		
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
Simulating Liquid	SPAEG	H2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	M2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	M5800	N/A	Within 24 hrs of first test		

## 4.2. MEASUREMENT UNCERTAINTY

Measurement uncertainty for 300 MHz – 3000 MHz

Uncertainty component	Tol. (±%)	Probe Dist.	Div.	Ci (1g)	Ci (10g)	Std. Unc.(±%)	
						Ui (1g)	Ui(10g)
Measurement System							
Probe Calibration	4.80	N	1	1	1	4.80	4.80
Axial Isotropy	4.70	R	1.732	0.707	0.707	1.92	1.92
Hemispherical Isotropy	9.60	R	1.732	0.707	0.707	3.92	3.92
Boundary Effects	1.00	R	1.732	1	1	0.58	0.58
Linearity	4.70	R	1.732	1	1	2.71	2.71
System Detection Limits	1.00	R	1.732	1	1	0.58	0.58
Readout Electronics	1.00	N	1	1	1	1.00	1.00
Response Time	0.80	R	1.732	1	1	0.46	0.46
Integration Time	2.60	R	1.732	1	1	1.50	1.50
RF Ambient Conditions - Noise	1.59	R	1.732	1	1	0.92	0.92
RF Ambient Conditions - Reflections	0.00	R	1.732	1	1	0.00	0.00
Probe Positioner Mechanical Tolerance	0.40	R	1.732	1	1	0.23	0.23
Probe Positioning With Respect to Phantom Shell	2.90	R	1.732	1	1	1.67	1.67
algorithms for max. SAR evaluation	3.90	R	1.732	1	1	2.25	2.25
Test sample Related							
Test Sample Positioning	1.10	N	1	1	1	1.10	1.10
Device Holder Uncertainty	3.60	N	1	1	1	3.60	3.60
Power and SAR Drift Measurement	5.00	R	1.732	1	1	2.89	2.89
Phantom and Tissue Parameters							
Phantom Uncertainty	4.00	R	1.732	1	1	2.31	2.31
Liquid Conductivity - Target	5.00	R	1.732	0.64	0.43	1.85	1.24
Liquid Conductivity - Meas.	8.60	N	1	0.64	0.43	5.50	3.70
Liquid Permittivity - Target	5.00	R	1.732	0.6	0.49	1.73	1.41
Liquid Permittivity - Meas.	3.30	N	1	0.6	0.49	1.98	1.62
Combined Standard Uncertainty	RSS					11.44	10.49
Expanded Uncertainty (95% Confidence Interval)	K=2					22.87	20.98
Notesfor table							
1. Tol. - tolerance in influence quaitity							
2. N - Nomal							
3. R - Rectangular							
4. Div. - Divisor used to obtain standard uncertainty							
5. Ci - is te sensitivity coefficient							

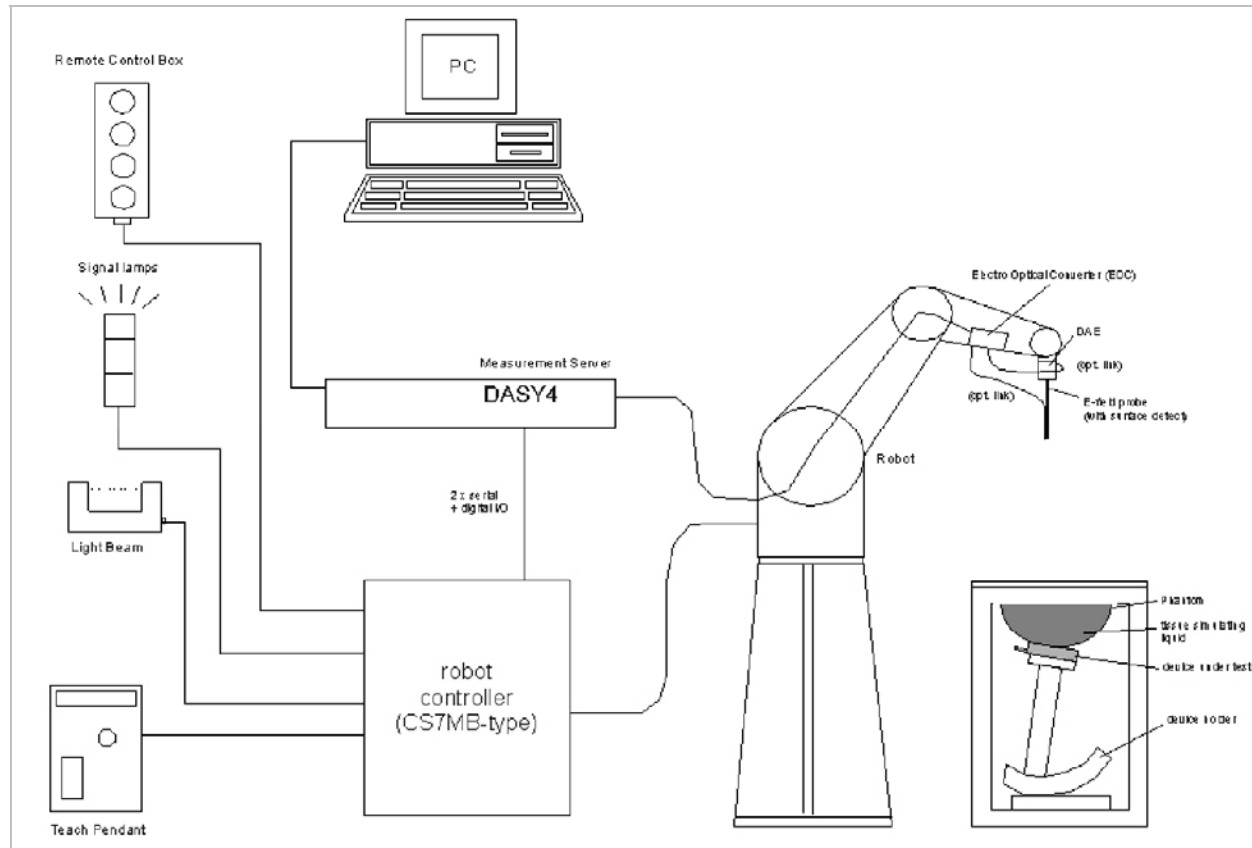
## 5. EQUIPMENT UNDER TEST

Medical Telemetry Transmitter

<b>Normal operation:</b>	Worn on body
<b>Battery:</b>	Three AA (R6)
<b>Frequency Bands:</b>	1395-1400 MHz and 1427-1432 MHz
<b>Channel Number:</b>	1395.0250 MHz (Ch. no E002) to 1399.9750 MHz (Ch. no E398) 1427.0250 MHz (Ch. no E502) to 1431.9750 MHz (Ch. no E898)



## 6. SYSTEM SPECIFICATIONS



**The DASY4 system for performing compliance tests consists of the following items:**

- A standard high precision 6-axis robot (Stäubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY4 software.
- Remote controls with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

## 7. COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99+% Pure Sodium Chloride

Sugar: 98+% Pure Sucrose

Water: De-ionized, 16 MΩ+ resistivity

HEC: Hydroxyethyl Cellulose

DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

## 8. LIQUID PARAMETERS CHECK

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine if the dielectric parameters are within the tolerances of the specified target values. The relative permittivity and conductivity of the tissue material should be within  $\pm 5\%$  of the values given in the table below.

### Reference Values of Tissue Dielectric Parameters for Head and Body Phantom (for 150 – 3000 MHz and 5800 MHz)

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in IEEE Standard 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations and extrapolated according to the head parameters specified in IEEE Standard 1528.

Target Frequency (MHz)	Head		Body	
	$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (S/m)
150	52.3	0.76	61.9	0.8
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.9	55.2	0.97
900	41.5	0.97	55	1.05
915	41.5	0.98	55	1.06
1450	40.5	1.2	54	1.3
1610	40.3	1.29	53.8	1.4
1800 – 2000	40	1.4	53.3	1.52
2450	39.2	1.8	52.7	1.95
3000	38.5	2.4	52	2.73
5800	35.3	5.27	48.2	6

( $\epsilon_r$  = relative permittivity,  $\sigma$  = conductivity and  $\rho = 1000 \text{ kg/m}^3$ )

## 8.1. LIQUID CHECK RESULTS FOR 1450 MHZ

Simulating Liquid Dielectric Parameters for Muscle 1450 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40%

Measured by: Chaoyen Lin

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1450	e'	52.18	Relative Permittivity ( $\epsilon_r$ ):	52.178	54.0	-3.37	± 5
	e''	16.86	Conductivity ( $\sigma$ ):	1.360	1.30	4.60	± 5

Liquid Check

Ambient temperature: 25 deg. C; Liquid temperature: 24 deg. C

June 11, 2009 01:53 PM

Frequency	e'	e''
1380000000.	52.0939	16.9372
1385000000.	52.1871	16.9880
1390000000.	52.3093	17.0203
1395000000.	52.3633	17.0699
1400000000.	52.3863	17.1064
1405000000.	52.3940	17.1047
1410000000.	52.4094	17.0703
1415000000.	52.4206	17.0227
1420000000.	52.3911	16.9850
1425000000.	52.3480	16.9130
1430000000.	52.3282	16.8775
1435000000.	52.3074	16.8585
1440000000.	52.2839	16.8530
1445000000.	52.2435	16.8507
<b>1450000000.</b>	<b>52.1779</b>	<b>16.8568</b>
1455000000.	52.0918	16.8300
1460000000.	52.0412	16.8271
1465000000.	51.9741	16.8159
1470000000.	51.9230	16.7986
1475000000.	51.9040	16.8300
1480000000.	51.8944	16.8629

The conductivity ( $\sigma$ ) can be given as:

$$\sigma = \omega \epsilon_0 e'' = 2 \pi f \epsilon_0 e''$$

where  $f = \text{target } f * 10^6$

$$\epsilon_0 = 8.854 * 10^{-12}$$

## 9. SYSTEM CHECK

The system performance check is performed prior to any usage of the system in order to guarantee reproducible results. The system performance check verifies that the system operates within its specifications of  $\pm 10\%$ .

### System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the SAM twin phantom filled with Head or Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV3 was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.  
For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 fine cube was chosen for cube
- Distance between probe sensors and phantom surface was set to 3 mm.  
For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 250 mW $\pm 3\%$ .
- The results are normalized to 1 W input power.

Reference SAR Values for BODY-tissue from calibration certificate of SPEAG. Certificate no: D2450V2-748\_Apr08

Dipole Type	Distance	Frequency	SAR (1g)	SAR (10g)	SAR (peak)
	(mm)	(MHz)	[W/kg]	[W/kg]	[W/kg]
D1450V2	10	2450	29.7	17	97.6

### 9.1. SYSTEM CHECK RESULTS FOR D1450V2

System Validation Dipole: D1450V2 SN: 1020

Date: June 11, 2009

Ambient Temperature = 24°C; Relative humidity = 40%

Measured by: Chaoyen Lin

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	1450	250	1g SAR:	32.2	29.7	8.42	$\pm 10$
			10g SAR:	18	17.0	5.88	

## 10. OUTPUT POWER VERIFICATION

The cable assembly insertion loss of 10.2dB (including 10dB pad and 0.2dB cable) was entered as an offset in the power meter to allow for direct reading of power.

### RESULTS

Channel	Frequency (MHz)	Average Conducted Output Power (dBm)
E002	1395.025	6.40
E390	1399.975	6.60
E502	1427.025	7.00
E898	1431.975	7.07

## 11. SUMMARY OF TEST RESULTS

### 11.1. FACE UP LEFT SIDE POSITION

Band	Channel	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Low	E002	1395.025	0.00571	1.6
	E390	1399.975	0.00741	
High	E502	1427.025	0.000109	
	E898	1431.975	0.00721	

### 11.2. FACE UP RIGHT SIDE POSITION

This position was skipped due to low SAR values.

## 12. WORST-CASE SAR TEST PLOTS

### SAR Plots & Data (Ch no E002 / 1395.025 MHz)

Date/Time: 6/11/2009 4:09:53 PM

Test Laboratory: Compliance Certification Services

### Body Worn Face Up Low Band

DUT: Nihon Kohden; Type: Medical Telemetry Transmitter; Serial: ZM-541PA

Communication System: 1400 Low Band; Frequency: 1395.03 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 1395.03$  MHz;  $\sigma = 1.32$  mho/m;  $\epsilon_r = 52.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY4 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(7.13, 7.13, 7.13); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Low Band Ch E002/Area Scan (9x9x1): Measurement grid: dx=15mm, dy=15mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.007 mW/g

### Low Band Ch E002/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm

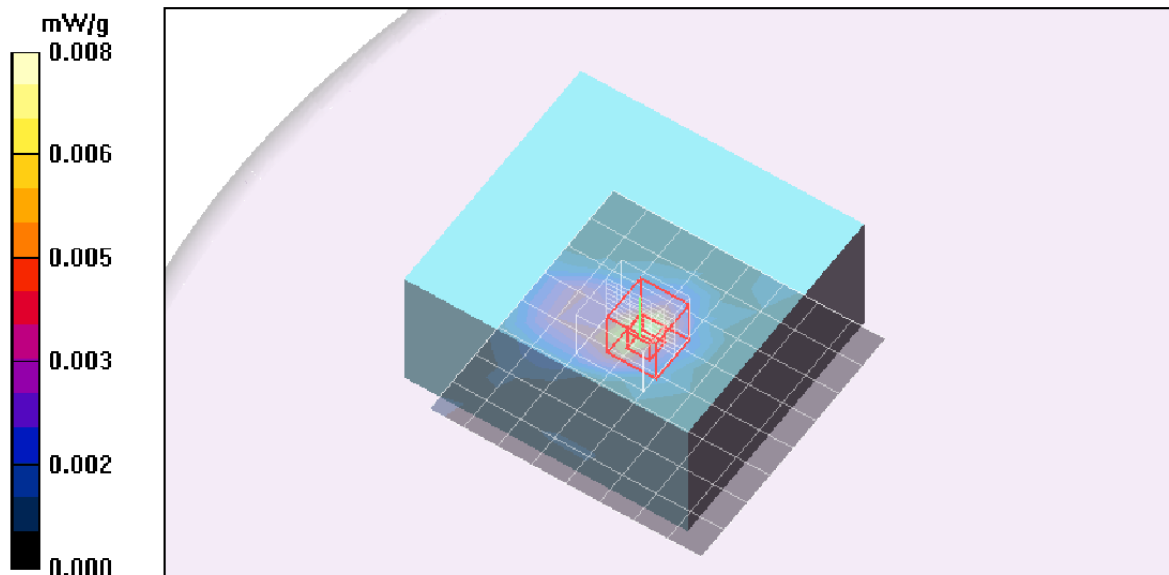
Reference Value = 0.000 V/m; Power Drift = 0.000 dB

Peak SAR (extrapolated) = 0.014 W/kg

SAR(1 g) = 0.00571 mW/g; SAR(10 g) = 0.00189 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.008 mW/g





**SAR Plots & Data (Ch no E390 / 1399.975 MHz)**

Date/Time: 6/11/2009 5:22:05 PM

Test Laboratory: Compliance Certification Services

**Body Worn Face Up Low Band**

DUT: Nihon Kohden; Type: Medical Telemetry Transmitter; Serial: ZM-541PA

Communication System: 1400 Low Band; Frequency: 1399.97 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 1400$  MHz;  $\sigma = 1.33$  mho/m;  $\epsilon_r = 52.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY4 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(7.13, 7.13, 7.13); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**Low Band Ch E390/Area Scan (9x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.008 mW/g

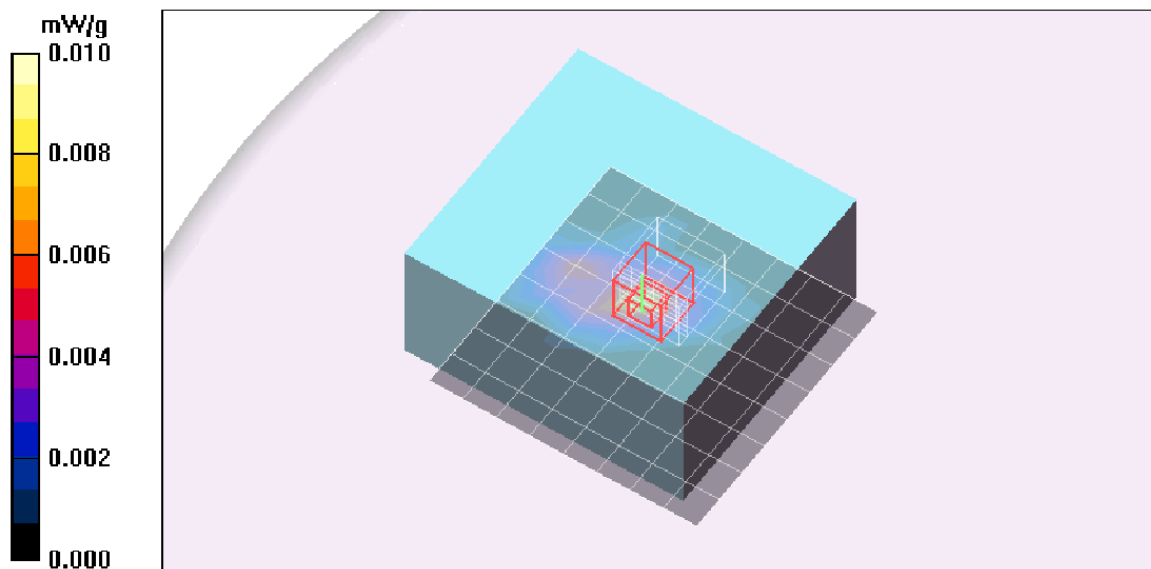
**Low Band Ch E390/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 0.535 V/m; Power Drift = -2.12 dB

Peak SAR (extrapolated) = 0.052 W/kg

SAR(1 g) = 0.00741 mW/g; SAR(10 g) = 0.00201 mW/g

Maximum value of SAR (measured) = 0.010 mW/g



**SAR Plots & Data (Ch no E502 / 1427.025 MHz)**

Date/Time: 6/11/2009 5:53:18 PM

Test Laboratory: Compliance Certification Services

**Body Worn Face Up High Band**

DUT: Nihon Kohden; Type: Medical Telemetry Transmitter; Serial: ZM-541PA

Communication System: 1400 High Band; Frequency: 1427.03 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 1427.03$  MHz;  $\sigma = 1.34$  mho/m;  $\epsilon_r = 52.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY4 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(7.13, 7.13, 7.13); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**High Band - Ch E502/Area Scan (9x9x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.013 mW/g

**High Band - Ch E502/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm

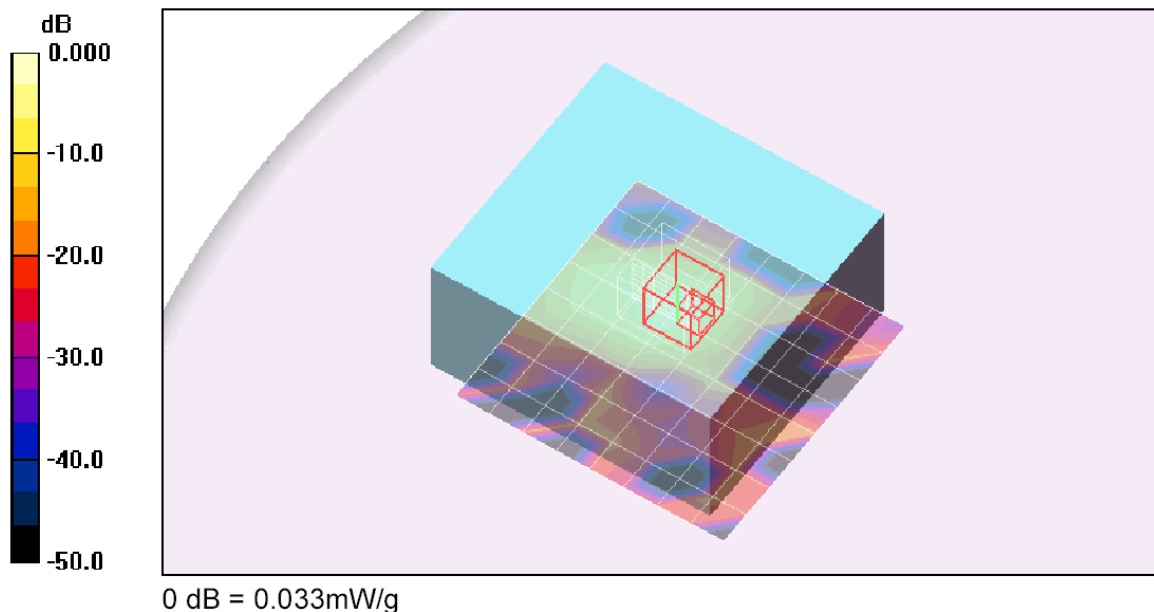
Reference Value = 0.248 V/m; Power Drift = 5.85 dB

Peak SAR (extrapolated) = 0.012 W/kg

SAR(1 g) = 0.000109 mW/g; SAR(10 g) = 1.12e-005 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.033 mW/g



**SAR Plots & Data (Ch no E898 / 1431.975 MHz)**

Date/Time: 6/11/2009 6:23:00 PM

Test Laboratory: Compliance Certification Services

**Body Worn Face Up High Band**

DUT: Nihon Kohden; Type: Medical Telemetry Transmitter; Serial: ZM-541PA

Communication System: 1400 High Band; Frequency: 1431.97 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 1431.97$  MHz;  $\sigma = 1.34$  mho/m;  $\epsilon_r = 52.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY4 Configuration:

- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(7.13, 7.13, 7.13); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

**High Band - Ch E898/Area Scan (9x9x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

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

**High Band - Ch E898/Zoom Scan (7x7x9)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=3mm

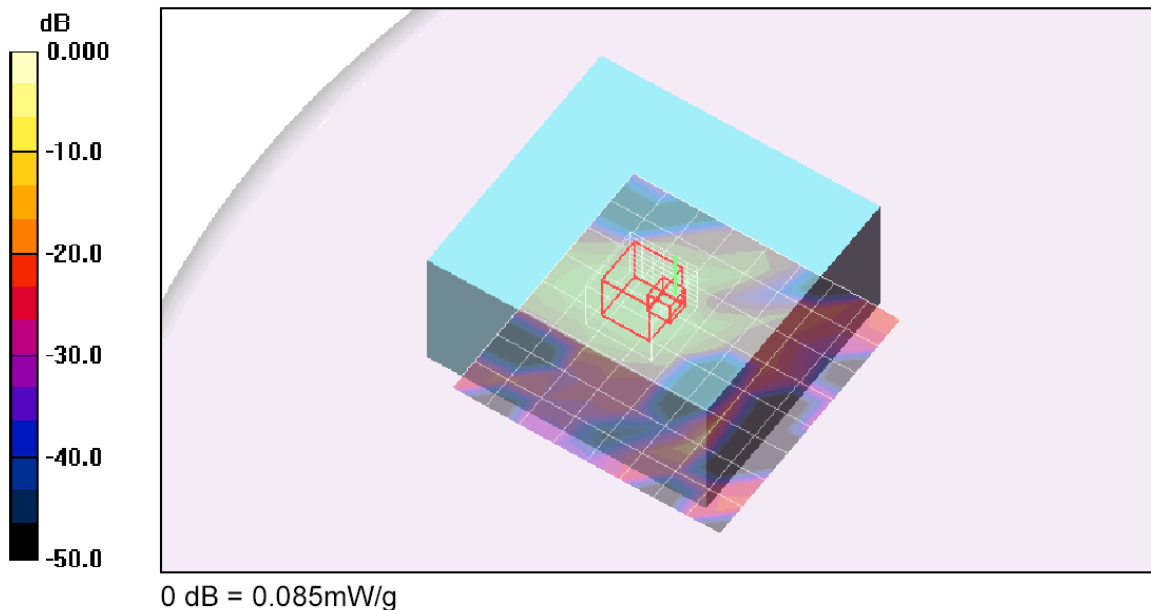
Reference Value = 0.522 V/m; Power Drift = -3.37 dB

Peak SAR (extrapolated) = 0.085 W/kg

SAR(1 g) = 0.00721 mW/g; SAR(10 g) = 0.00184 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.085 mW/g

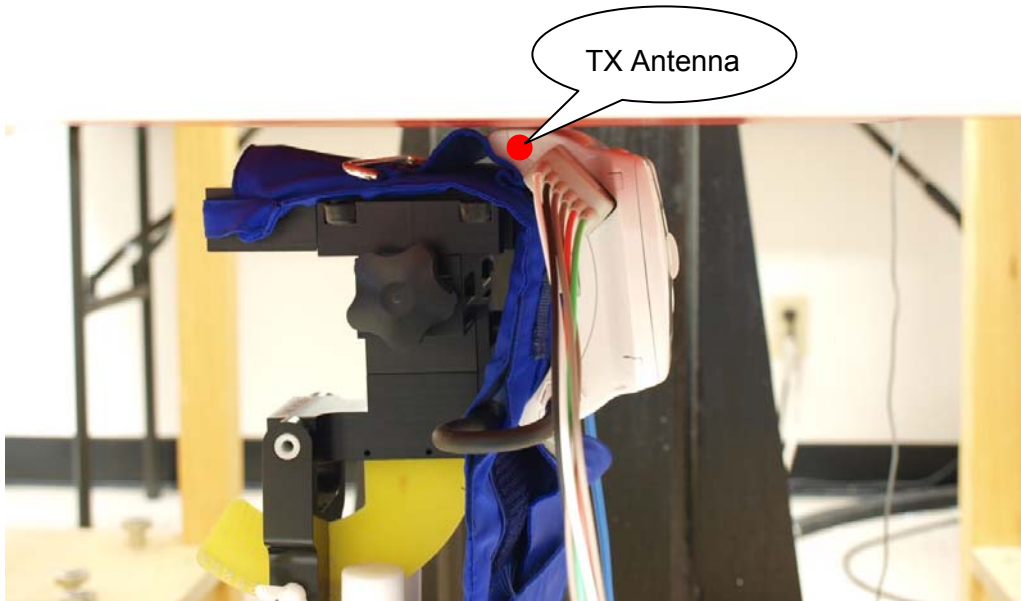


### 13. ATTACHMENTS

No.	Contents	No. of page (s)
1	System Performance Check Plots	2
2	Certificate of E-Field Probe – EX3DV4 SN 3686	10
3	Certificate of System Validation Dipole - D1450 SN:1020	9

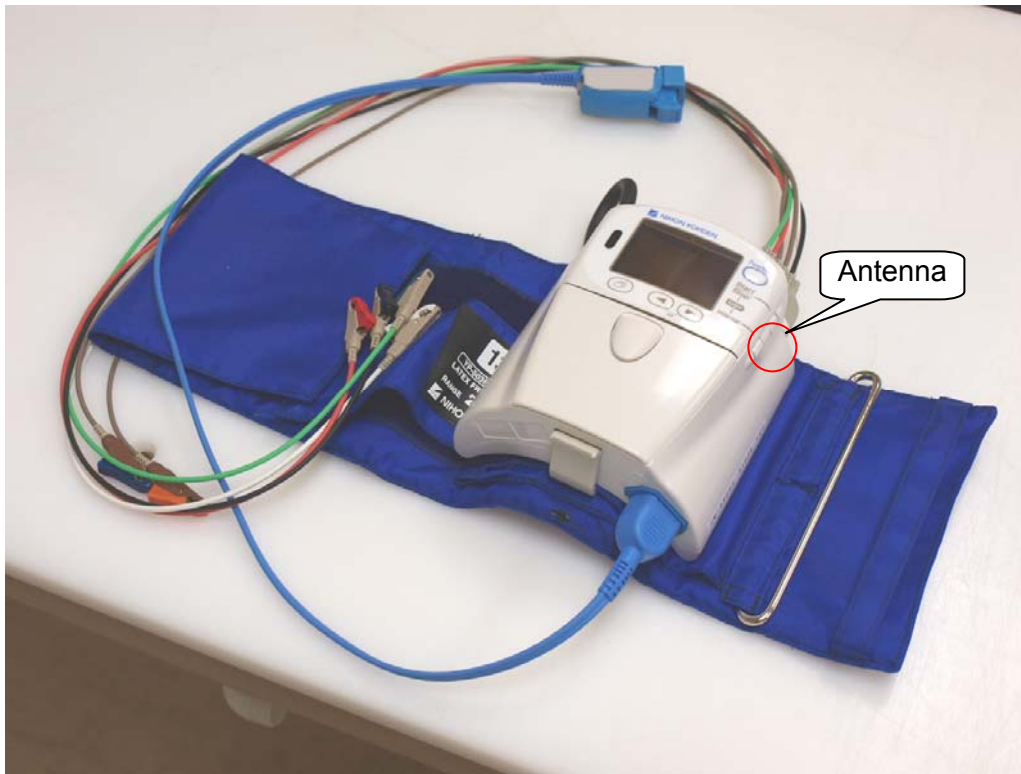
## 14. TEST SETUP PHOTO

FACE UP LEFT SIDE

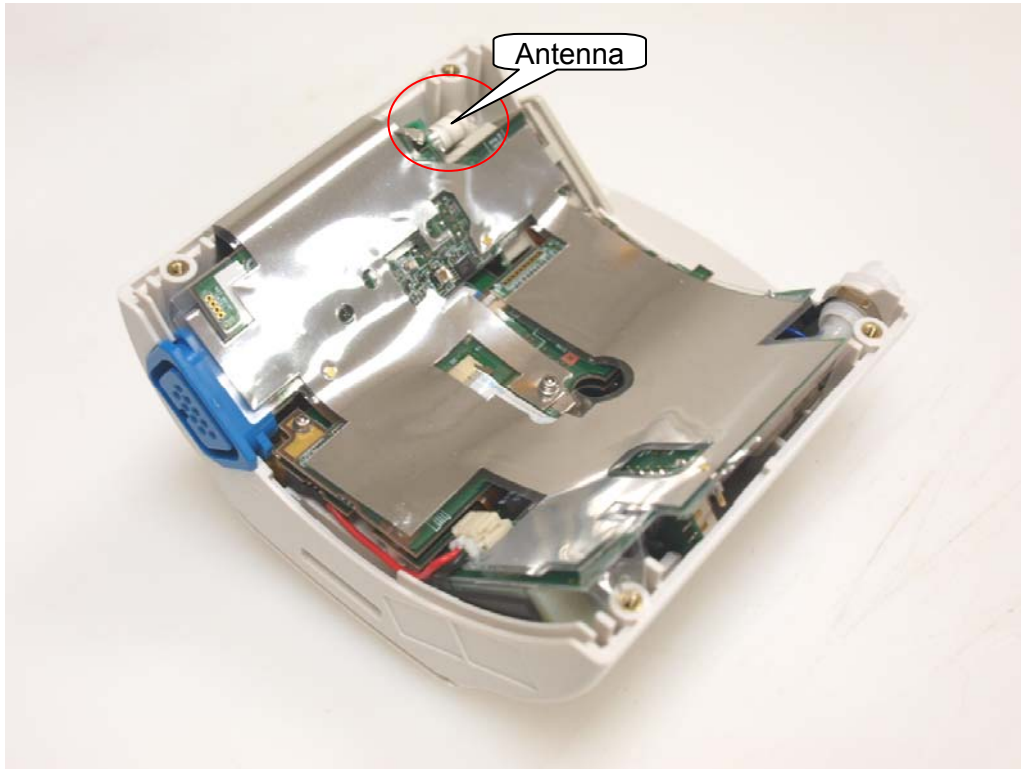


## 15. EUT PHOTO

### EXTERNAL PHOTO (FRONT)



### Antenna Location



**END OF REPORT**