Test Report Serial Number:	45461908 R3.0
Test Report Date:	11 April 2024
Project Number:	1666

SAR Test Report - New Application

Applicant:

GARMIN.

Garmin International Inc.
1200 East 151 St.
Olathe, KS, 66062
USA

Maximum *reported* SAR		
Body (1g) - DTS:	0.18	W/kg
Body (1g) - DSS:	<0.1	
General Pop. Limit:	1.60	

Maximum *reported* SAR		
Extremity (10g) - DTS:	<0.1	W/kg
Extremity (10g) - DSS:	<0.1	
General Pop. Limit:	4.00	

FCC ID: **IPH-04741**

IC Registration Number:

Product Model Number / HVIN: **A04741**

Product Name / PMN: **A04741**

In Accordance With:

FCC 47 CFR §2.1093

Radiofrequency Radiation Exposure Evaluation: Portable Devices

Approved By:

Ben Hewson, President
Celltech Labs Inc.
21-364 Lougheed Rd.
Kelowna, BC, V1X 7R8
Canada

Test Lab Certificate: 2470.01

IC Registration 3874A

FCC Registration: CA3874

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1.0 REVISION HISTORY

Revision History				
Samples Tested By:	Ben Hewson/ Trevor Whillock	**Date(s) of Evaluation:**		22, 23 Feb 2024
Report Prepared By:	Ben Hewson	**Report Reviewed By:**		Art Voss
Report Revision	**Description of Revision**	**Revised Section**	**Revised By**	**Revision Date**
0.1	Draft	n/a	Ben Hewson	15 March 2024
1.0	Initial Release	n/a	Ben Hewson	15 March 2024
2.0	revise to display Area Scan 1g, 10g	APP. A	Ben Hewson	18 March 2024
3.0	Revised reporting of DTS/DSS	Cover	Art Voss	11 April 2024
	Added Exemption Calculations for NFC	8		

2.0 CLIENT AND DEVICE INFORMATION

Client Information		
Applicant Name	**Garmin International Inc.**	
Applicant Address	1200 East 151 St	
	Olathe, KS, 66062	
	USA	
DUT Information		
Device Identifier(s):	**FCC ID:**	**IPH-04741**
	ISED ID:	
Device Model(s) / HVIN:	A04741	
Device Marketing Name / PMN:	A04741	
Test Sample Serial No.:	Conducted: 345355486 OTA: 3457910423	
Device Type:	Low Power Digital Device Transmitter	
FCC Equipment Class:	Digital Transmission System (DTS), Part 15 Spread Spectrum Transmitter (DSS), Unlicensed National Information Infrastructure TX (NII)	
	Short Range Devices (SRD)	
Transmit Frequency Range:	WiFi (DTS): 2412-2462MHz	
	BT/BLE (DTS, DSS): 2402-2480MHz	
	U-NII-1: 5180 - 5240, U-NII-3: 5745-5825	
Manuf. Max. Rated Output Power:	BT (DSS): 6.2mW (7.94dBm)	
	BLE (DXX) 2.4mW (3.76dBm)	
	ANT (DXX): 2.4mW (3.77dBm)	
	802.11 (DTS): 27mW (14.33dBm)	
Modulation:	WiFi: DSSS, OFDM, CCK, MCS0-7	
Modulation:	BLE: GMSK	
Modulation:	ANT: GFSK:	
DUT Power Source:	4.35 VDC Internal Li-Ion Battery	
DUT Dimensions [LxWxH]	L x W x H:113mm x 60mm x 20mm	
Deviation(s) from standard/procedure:	None	
Modification of DUT:	None	

3.0 SCOPE OF EVALUATION

This Certification Report was prepared on behalf of:

Garmin International Inc.

The A04741 is a Low Power Digital Transmitter that may be mounted or handheld, with a Wi-Fi transceiver that is capable of operating in the 2.4GHz WiFi/ BT/BLE/ANT frequency bands. The device is intended for General Population Use. The product operates from an internal proprietary Li-ion rechargeable battery which can be connected to a compliant USB interface port, AC or DC adapter for charging. Test samples provided by the manufacturer were capable of transmitting at select frequencies and modulations preset by the manufacturer. An additional antenna modification was prepared for one sample allowing the ability to connect test equipment for antenna port conducted power analysis.

Application:

This is an application for a new device certification.

Scope:

The scope of this evaluation limited to the evaluation of SAR for intended and non-intended applications. It will include evaluation of the 2.4 GHz WiFi/BT/BLE/ANT transmitters for all required RF exposure configurations including Extremity and Body Configuration as the device may be operational while in hand or on person.

The Test Plan developed for this evaluation is based on the required test channels and configurations which produced the highest worst case SAR and where applicable, SAR test reduction and/or SAR test exclusion may be utilized. The DUT was evaluated for SAR at the maximum tune up tolerance and conducted output power level, preset by the manufacturer and in accordance with the procedures described in IEC/IEEE 62209-1528, FCC KDB 447498 and FCC KDB 248227.

4.0 NORMATIVE REFERENCES

Normative References*	
ANSI / ISO 17025:2017	General Requirements for competence of testing and calibration laboratories
FCC CFR Title 47 Part 2	Code of Federal Regulations
Title 47:	Telecommunication
Part 2.1093:	Radiofrequency Radiation Exposure Evaluation: Portable Devices
IEC International Standard /IEEE International Committee on Electromagnetic Safety	
IEC/IEEE 62209-1528	Measurement procudeure for the assessment of sepcific absorption rate of human expoure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 1528; Human models, insturmentation, and procedures (Frequency range of 4 MHz to 10 GHz)
FCC KDB	
KDB 865664 D01v01r04	SAR Measurement Requirements for 100MHz to 6GHz
KDB 865664 D02v01r02	RF Exposure Compliance Reporting and Documentation Considerations
FCC KDB	
KDB 447498 D04v01	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices Interim General RF Exposure Guidance
FCC KDB	
KDB 248227 D01v02r02	SAR Guidance for IEEE 802.11 (WiFi) Transmitters
* When the issue number or issue date is omitted, the latest version is assumed.	

RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices

5.0 STATEMENT OF COMPLIANCE

This measurement report demonstrates that samples of the product model(s) were evaluated for Specific Absorption Rate (SAR) on the date(s) shown, in accordance with the Measurement Procedures cited and were found to comply with the Standard(s) Applied based on the Exposure Limits of the Use Group indicated for which the product is intended to be used.

Applicant:	Model / HVIN:	
Garmin International Inc.	A04741	
Standard(s) Applied:	**Measurement Procedure(s):**	
FCC 47 CFR §2.1093	FCC KDB 865664, FCC KDB 447498, FCC KDB 248227 IEC/IEEE Standard 62209-1528	
Reason For Issue:	**Use Group:**	**Limits Applied:**
[x] New Certification	[x] General Population / Uncontrolled	[x] 1.6W/kg - 1g Volume
[ ] Class I Permissive Change		[ ] 8.0W/kg - 1g Volume
[ ] Class II Permissive Change	[ ] Occupational / Controlled	[x] 4.0W/kg - 10g Volume
Reason for Change:		**Date(s) Evaluated:**
		22-23 February 2024

The results of this investigation are based solely on the test sample(s) provided by the applicant which was not adjusted, modified or altered in any manner whatsoever except as required to carry out specific tests or measurements. A description of the device, operating configuration, detailed summary of the test results, methodologies and procedures used during this evaluation, the equipment used and the various provisions of the rules are included in this test report.

I attest that the data reported herein is true and accurate within the tolerance of the Measurement Instrument Uncertainty; that all tests and measurements were performed in accordance with accepted practices or procedures; and that all tests and measurements were performed by me or by trained personnel under my direct supervision. The results of this investigation are based solely on the test sample(s) provided by the client which were not adjusted, modified or altered in any manner whatsoever, except as required to carry out specific tests or measurements. This test report has been completed in accordance with ISO/IEC 17025.	Trevor Whillock Test Lab Engineer Celltech Labs Inc. 15 March 2024 Date

6.0 SAR MEASUREMENT SYSTEM

SAR Measurement System

Celltech Labs Inc. SAR measurement facility employs a Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY6 measurement system is comprised of the measurement server, a robot controller, a computer, a near-field probe, a probe alignment sensor, an Elliptical Planar Phantom (ELI) phantom and a specific anthropomorphic mannequin (SAM) phantom for Head and/or Body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller and a teach pendant (Joystick) to control the robot's servo 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 form the DAE to digital electronic signal and transfers data to the DASY6 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, a command decoder and a control logic unit. Transmission to the DASY6 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 utilizes a controller with built in VME-bus computer.

DASY 6 SAR System

DASY 6 Measurement Controller

7.0 RF CONDUCTED POWER MEASUREMENT

Table 7.1 Conducted Power Measurements, WiFi/BT

Conducted Power Measurements													
Band	Mode	Bandwidth (MHz)	Channel	Frequency (MHz)	Modulation	Bit Rate (Mbps)	Measured Power (dBm)	Rated Power (dBm)	Rated Power (W)	Delta (dB)	SAR Test Channel (Y/-)	Duty Cycle (%)	Crest Factor (1/DC)
WLAN 2.4G	802.11b	20	6	2437	CCK	1	13.91	14.33	0.027	-0.42	-	-	-
			6	2437	CCK	2	14.12	14.33	0.027	-0.21	-	-	-
			6	2437	DSSS	5.5	14.13	14.33	0.027	-0.20	-	-	-
			6	2437		11	14.00	14.33	0.027	-0.33	-	-	-
			1	**2412**		5.5	**13.40**	14.33	**0.027**	**-0.93**	**Y**	**100**	**1**
			2	2417			13.45	14.33	0.027	-0.88	-	-	-
			6	**2437**			**14.13**	14.33	**0.027**	**-0.20**	**Y**	**100**	**1**
			10	**2457**			**14.33**	14.33	0.027	0.00	**Y**	**100**	**1**
			11	2462			6.56	6.56	0.005	0.00	-	-	-
			13	**2472**			**6.56**	6.56	0.005	0.00	**Y**	**100**	**1**
WLAN 2.4G	802.11g	20	6	2437	OFDM	6	13.16	13.16	0.021	0.00	-	-	-
						9	13.11	13.16	0.021	-0.05	-	-	-
						12	13.15	13.16	0.021	-0.01	-	-	-
			1	2412		6	11.93	13.16	0.021	-1.23	-	-	-
			6	2437			13.15	13.16	0.021	-0.01	-	-	-
			11	2462			6.91	6.91	0.005	0.00	-	-	-

Conducted Power Measurements												
Band	Mode	Bandwidth (MHz)	Channel	Frequency (MHz)	Modulation	Measured Power (dBm)	Rated Power (dBm)	Rated Power (W)	Delta (dB)	SAR Test Channel (Y/-)	Duty Cycle (%)	Crest Factor (1/DC)
WLAN 2.4G	802.11n	20	6	2437	MCS0	12.27	13.13	0.021	-0.86	-	-	-
					MCS3	13.26	13.26	0.021	0.00	-	-	-
					MCS7	10.48	11.90	0.015	-1.42	-	-	-
			1	2412	MCS3	8.61	8.61	0.007	0.00	-	-	-
			6	2437		13.30	13.30	0.021	0.00	-	-	-
			11	2462		9.36	9.36	0.009	0.00	-	-	-
			12	2467		7.90	7.90	0.006	0.00	-	-	-
			13	2472		4.15	4.15	0.003	0.00	-	-	-
BT	BR	1	2	2402	GFSK	6.05	6.41	0.004	-0.36	-	-	-
			41	2441		6.57	6.70	0.00	-0.13	-	-	-
			80	2480		7.88	7.88	0.006	0.00	-	-	-
	2EDR	1	2	2402	Pi/4-DQPSK	6.10	6.42	0.004	-0.32	-	-	-
			41	2441		6.60	6.74	0.005	-0.14	-	-	-
			80	2480		7.94	7.94	0.006	0.00	**Y**	**100**	**1**
	3EDR	1	2	2402	8DPSK	6.81	6.98	0.005	-0.17	-	-	-
			41	2441		7.35	7.37	0.005	-0.02	-	-	-
			80	2480		7.84	7.84	0.006	0.00	-	-	-
	LE	1	2	2404	GMSK	-0.48	3.40	0.002	-3.88	-	-	-
			17	2440		3.76	3.76	0.002	0.00	-	-	-
			39	2478		-4.56	0.02	0.001	-4.58	-	-	-
ANT	ANT	1	2	2402	GFSK		-0.04	0.001	0.04	-	-	-
			41	2441			3.77	0.002	-3.77	-	-	-
			80	2480			0.04	0.001	-0.04	-	-	-

The rated power and tolerance are stated for typical transmission modes and data rates. Some modes and data rates may produce lower than rated conducted power levels. Power measurements taken across the various channels, modes and data rates did not produce levels in excess of the Rated Power plus Tolerance. SAR was evaluated using the power level setting specified by the manufacture to be the max output power and produce the most conservative SAR. SAR was evaluated at the *maximum average* tune up tolerance. See section 2.0 Client and Device Information for details. The *reported* SAR was not scaled down.

8.0 MEASUREMENT METHOD

Table 8.1 Number of Test Channels and SAR test reduction

The intended use of the device is to be mounted on a handlebar; however, the device could transmit while held in hand or on person. As such the device was evaluated for both Body and Extremity, and based on the small size format was conservatively evaluated on all sides.

Wi-Fi SAR Evaluation:
SAR was evaluated in DSSS mode at the maximum duty cycle. The power level setting selected was specified by the manufacturer to be the max output power and produce the most conservative SAR.

The device supports channel 1 thru 13 for 2.5 GHz WLAN however channels 12 & 13 power levels are reduced. Per FCC KDB 248227, the required 802.11 test channels are Ch1, Ch 6 and Ch 11; The highest conducted output power was found on Channel 10. As a result, this channel was added and selected for initial SAR evaluation.

SAR test reduction methodology was applied to reduce the total number of required test channels from the SAR test evaluation.

When applicable, SAR test reduction methods may be utilized.

802.11b DSSS SAR test reduction is determined according to the following:

a) When the reported SAR of the highest measured maximum output power channel is ≤ to 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

b) When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest output power channel. When any reported SAR is > 1.2 W/Kg, SAR is required for the third channel.

2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements

a) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.

b) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

The initial test configuration for 2.4 GHz is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band.

When the same maximum output power was specified for multiple transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwith, lowest order modulation and lowest data rate. When the maximum ouput power are the same for multiple test channels, SAR is measured using the channel closest to the middle frequency band. When all the channels have the same maximum output power use the higher number channel.

When the reported SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for subsequent next highest measured output power channel(s) in the initial test configuration until reported SAR is ≤ 1.2 W/kg or all required channels are tested.

1-g SAR Estimates Based on Area Scans per KDB 447498 - the SAR measurements in 2.4Ghz met the conditions and were evaluated using the provisions of 447498 , with SAR measurements below 1.0W/kg and no warning messages.

Table 8.2 Exemptions for Single RF Source

Per FCC KDB 447498 D04 Appendix B Exemptions for Single RF Sources

B.4 SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the available maximum time averaged power may be used if the device antenna or radiating structure does not exceed an electrical length of λ/4.

The separation distance is the smallest distance from any part of the antenna or radiating structure to all persons, and for portable or mobile devices this is from the device outer housing to the closest antenna.

P_{th} (mW) = ERP_{20cm}(mW) = 2040f **for 0.3GHz ≤ f < 1.5GHz (B.1)**

P_{th} (mW) = ERP_{20cm}(mW) = 3060 **for 1.5GHz ≤ f ≤ 6GHz (B.1)**

P_{th} (mW) = $(ERP_{20cm})(d/20cm)^x$ **for d ≤ 20cm (B.2)**

P_{th} (mW) = (ERP_{20cm}) **for 20cm < d ≤ 40cm (B.2)**

$x = -\log_{10} (60/(ERP_{20cm})(\sqrt{f})$

where **f** is in GHz, **d** is separation distance (cm), **ERP_{20cm}** is per Formula (B.1).

BLE and ANT Test Exclusion

The BLE and ANT transmitters have a maximum frequency of 2480MHz. The BLE and ANT power was measured by the client and has a maximum average transmission power of 2.4mW and a minimum antenna separation distance of 5 mm, per the above, Pth = 2.72mW.

Based on 447498 D04 Appendix B the BLE and ANT transmitters are exempt from further evaluation.

NFC Test Exclusion

The field strength of NFC Transmitter was measured and found to be 52.5dBuV/m @3m. The conversion of field strength to EIRP is given by:

EIRP = FS - 104.7 + 20*Log10(d) where FS = field strength, d = measurement distance (3m)
EIRP = 52.5 - 104.7 + 20*Log10(3)
EIRP = -43dBm = -0.054mW
The test exclusion threshold from the equations above, at 13.56MHz is 3W.
The NFC Transmitter qualifies for SAR Test Exclusion.

9.0 ACCESSORIES EVALUATED

Table 9.1 Manufacturer's Accessory List

There are no manufacturer's accessories available when used in a portable application.

10.0 SAR MEASUREMENT SUMMARY

Table 10.1: Measured Results – BODY

Measured 1g SAR Results - BODY Configuration																		
Date	Plot ID	Test Frequency (MHz)	DUT Configuration					Accessories	Spacing		Measured SAR (W/kg)	SAR Drift (dB)	Delta Power (dB)	Crest Factor (n)	Fluid Sensitivity (n)	Duty Factor (%)	reported SAR (W/kg)
			Pos	Mode	BW	Mod	BR		DUT (mm)	Antenna (mm)							
Area Scan *																	
2/22/2024	B1	2457	Front	802.11b	20	DSSS	5.5		0	0	0.164	2.370	0.000	1.000	1.000	100.000	0.164
2/22/2024	B2	2457	Back	802.11b	20	DSSS	5.5		0	0	0.059	-0.050	0.000	1.000	1.000	100.000	0.060
2/23/2024	B3	2457	Left	802.11b	20	DSSS	5.5		0	0	0.128	0.200	0.000	1.000	1.000	100.000	0.128
2/23/2024	B4	2457	Right	802.11b	20	DSSS	5.5		0	0	0.028	1.660	0.000	1.000	1.000	100.000	0.028
2/23/2024	B5	2457	Top End	802.11b	20	DSSS	5.5		0	0	0.067	0.130	0.000	1.000	1.000	100.000	0.067
2/23/2024	B6	2457	Bottom End	802.11b	20	DSSS	5.5		0	0	0.034	2.540	0.000	1.000	1.000	100.000	0.034
2/23/2024	B7	2412	w/c - Front	802.11b	20	DSSS	5.5		0	0	0.119	0.810	-0.930	1.000	1.000	100.000	0.147
2/23/2024	B8	2437	w/c - Front	802.11b	20	DSSS	5.5		0	0	0.130	3.870	-0.200	1.000	1.000	100.000	0.136
2/23/2024	B9	2472	w/c - Front	802.11b	20	DSSS	5.5		0	0	0.037	5.260	0.000	1.000	1.000	100.000	0.037
2/23/2024	B10	2480	w/c - Front	802.15	20	BT EDR2	2		0	0	0.067	4.200	0.000	1.000	1.000	100.000	0.067
Zoom Scan																	
2/23/2024	B1Z	2457	w/c - Front	802.11b	20	DSSS	5.5		0	0	0.184	0.150	0.000	1.000	1.000	100.000	0.184
2/23/2024	B10Z	2480	w/c - Front	802.15	20	BT EDR2	2		0	0	0.074	1.250	0.000	1.000	1.000	100.000	0.074
Applicable SAR Limit								Use Group					Limit				
FCC CFR 2.1093			Health Canada Safety Code 6					General Population/User Unaware					1.6 W/kg				

*447498 D01v07 sec. 3.3.2, 865664 D02V01r02 sec 2.3a)2)c)

Table 10.2: Measured Results – Extremity

Measured 10g SAR Results - EXTREMITY Configuration																		
Date	Plot ID	Test Frequency (MHz)	DUT Configuration					Accessories	Spacing		Measured SAR (W/kg)	SAR Drift (dB)	Delta Power (dB)	Crest Factor (n)	Fluid Sensitivity (n)	Duty Factor (%)	reported SAR (W/kg)
			Pos	Mode	BW	Mod	BR		DUT (mm)	Antenna (mm)							
Area Scan *																	
2/22/2024	E1	2457	Front	802.11b	20	DSSS	5.5		0	0	0.074	2.370	0.000	1.000	1.000	100.000	0.074
2/22/2024	E2	2457	Back	802.11b	20	DSSS	5.5		0	0	0.032	-0.050	0.000	1.000	1.000	100.000	0.032
2/23/2024	E3	2457	Left	802.11b	20	DSSS	5.5		0	0	0.060	0.200	0.000	1.000	1.000	100.000	0.060
2/23/2024	E4	2457	Right	802.11b	20	DSSS	5.5		0	0	0.014	1.660	0.000	1.000	1.000	100.000	0.014
2/23/2024	E5	2457	Top End	802.11b	20	DSSS	5.5		0	0	0.031	0.130	0.000	1.000	1.000	100.000	0.031
2/23/2024	E6	2457	Bottom End	802.11b	20	DSSS	5.5		0	0	0.016	2.540	0.000	1.000	1.000	100.000	0.016
2/23/2024	E7	2412	w/c - Front	802.11b	20	DSSS	5.5		0	0	0.058	0.810	-0.930	1.000	1.000	100.000	0.071
2/23/2024	E8	2437	w/c - Front	802.11b	20	DSSS	5.5		0	0	0.063	3.870	-0.200	1.000	1.000	100.000	0.066
2/23/2024	E9	2472	w/c - Front	802.11b	20	DSSS	5.5		0	0	0.018	5.260	0.000	1.000	1.000	100.000	0.018
2/23/2024	E10	2480	w/c - Front	802.15	20	BT EDR2	2		0	0	0.032	4.200	0.000	1.000	1.000	100.000	0.032
Zoom Scan																	
2/23/2024	E1Z	2457	w/c - Front	802.11b	20	DSSS	5.5		0	0	0.075	0.150	0.000	1.000	1.000	100.000	0.075
2/23/2024	E10Z	2480	w/c - Front	802.15	20	BT EDR2	2		0	0	0.030	1.250	0.000	1.000	1.000	100.000	0.030
Applicable SAR Limit								Use Group					Limit				
FCC CFR 2.1093			Health Canada Safety Code 6					General Population/User Unaware					4 W/kg				

*447498 D01v07 sec. 3.3.2, 865664 D02V01r02 sec 2.3a)2)c)

11.0 SCALING OF MAXIMUM MEASURE SAR

Table 11.1 SAR Scaling 1g

Scaling of Maximum Measured SAR (1g)								
Measured Parameters		Configuration						
		Body	Body					
Plot ID		B1Z	B10Z					
Maximum Measured SAR_M		0.184	0.074					(W/kg)
Frequency		2457	2480					(MHz)
Drift	Power Drift	0.150 (3)	1.250 (8)					(dB)
Conducted Power		10.880	6.100					(dBm)
DC	Transmiter Duty Cycle	(4)	(9)					(%)
DF	Use Duty Factor	100.0 (5)	100.0 (10)					(%)
Fluid Deviation from Target								
Δe	Permitivity	-8.73%	-8.55%					
Δσ	Conductivity	4.21%	3.83%					

Fluid Sensitivity Calculation (1g) IEC/IEEE 62209-1528 7.8.2								
Delta SAR = Ce * Δe + Cσ * Δσ (8)								
$Ce = (-0.0007854*f^3) + (0.009402*f^2) - (0.02742*f) - 0.2026$ (9)								
$Cσ = (0.009804*f^3) - (0.08661*f^2) + (0.02981*f) + 0.7829$ (10)								
f	Frequency (GHz)	2.457	2.48					
Ce		-0.225	-0.225					
Cσ		0.479	0.474					
Ce * Δe		0.020	0.019					
Cσ * Δσ		0.020	0.018					
ΔSAR		0.040 (1)	0.037 (6)					(%)

Manufacturer's Tuneup Tolerance							
Measured Conducted Power	14.330	7.940					(dBm)
Rated Conducted Power	14.330	7.940					(dBm)
ΔP	0.000 (2)	0.000 (7)					(dB)

Transmitter Duty Cycle [Crest Factor]							
Transmiter Duty Cycle (DC)	100.0	100.0					(%)
CF (1/DC)	1.00 (4)	1.00 (9)					

SAR Adjustment for Fluid Sensitivity							
$SAR_1 = SAR_M$ X [ΔSAR]	0.184 (1)	0.074 (6)					(W/kg)

SAR Adjustment for Tuneup Tolerance							
$SAR_2 = SAR_1$ + [ΔP]	0.184 (2)	0.074 (7)					(W/kg)

SAR Adjustment for Drift							
$SAR_3 = SAR_2$ + [Drift]	0.184 (3)	0.074 (8)					(W/kg)

SAR Adjustment for Transmitter Duty Cycle [Crest Factor]							
$SAR_4 = SAR_3$ x [CF]	0.184 (4)	0.074 (9)					(W/kg)

SAR Adjustment for Use Duty Factor							
$SAR_5 = SAR_4$ x [DF]	0.184 (5)	0.074 (10)					(W/kg)

reported 1g SAR							
reported SAR	**0.18**	**0.07**					(W/kg)

Table 11.2 SAR Scaling 10g

Scaling of Maximum Measured SAR (10g)								
Measured Parameters		Configuration						
		Extremity	Extremity					
Plot ID		E1Z	E10Z					
Maximum Measured SAR_M		0.075	0.030					(W/kg)
Frequency		2457	2480					(MHz)
Drift	Power Drift	0.150 (3)	1.250 (8)					(dB)
Conducted Power		10.880	6.100					(dBm)
DC	Transmiter Duty Cycle	(4)	(9)					(%)
DF	Use Duty Factor	100.0 (5)	100.0 (10)					(%)
Fluid Deviation from Target								
Δe	Permitivity	-8.73%	-8.55%					
Δσ	Conductivity	4.21%	3.83%					

Fluid Sensitivity Calculation (1g)		IEC/IEEE 62209-1528 7.8.2						
Delta SAR = Ce * Δe + Cσ * Δσ								(8)
$Ce = (0.003456*f^3) - (0.03531*f^2) + (0.07675*f) - 0.186$								(11)
$Cσ = (0.004479*f^3) - (0.01586*f^2) - (0.1972*f) + 0.7717$								(12)
f	Frequency (GHz)	2.457	2.48					
Ce		-0.159	-0.160					
Cσ		0.258	0.253					
Ce * Δe		0.014	0.014					
Cσ * Δσ		0.011	0.010					
ΔSAR		0.025 (1)	0.023 (6)					(%)

Manufacturer's Tuneup Tolerance							
Measured Conducted Power	14.330	7.940					(dBm)
Rated Conducted Power	14.330	7.940					(dBm)
ΔP	0.000 (2)	0.000 (7)					(dB)

Transmitter Duty Cycle [Crest Factor]							
Transmiter Duty Cycle (DC)	100.0	100.0					(%)
CF (1/DC)	1.00 (4)	1.00 (9)					

SAR Adjustment for Fluid Sensitivity							
$SAR_1 = SAR_M$ X [ΔSAR]	0.075 (1)	0.030 (6)					(W/kg)

SAR Adjustment for Tuneup Tolerance							
$SAR_2 = SAR_1 + [ΔP]$	0.075 (2)	0.030 (7)					(W/kg)

SAR Adjustment for Drift							
$SAR_3 = SAR_2 + [Drift]$	0.075 (3)	0.030 (8)					(W/kg)

SAR Adjustment for Transmitter Duty Cycle [Crest Factor]							
$SAR_4 = SAR_3$ x [CF]	0.075 (4)	0.030 (9)					(W/kg)

SAR Adjustment for Use Duty Factor							
$SAR_5 = SAR_4$ x [DF]	0.075 (5)	0.030 (10)					(W/kg)

reported 1g SAR							
reported SAR	**0.07**	**0.03**					(W/kg)

Table 11.2 SAR Scaling 10g (Cont.)

NOTES to Table
Scaling of the Maximum Measured SAR is based on the highest Face, Body and/or Head SAR measured of ALL test channels, configurations and accessories used during THIS evaluation. The Measured Fluid Deviation parameters apply only to deviation of the tissue equivalent fluids used at the frequencies which produced the highest measured SAR. The Measured Conducted Power applies to the Conducted Power measured at the frequencies producing the highest Face, Body and/or Head SAR. The Measured Drift is the SAR drift associated with that specific SAR measurement. The Reported SAR is the accumulation of all SAR Adjustments from the applicable Steps 1 through 4. The Plot ID is for indentification of the SAR Measurement Plots in the Annexes of this report. NOTE: Some of the scaling factors in Steps 1 through 4may not apply and are identified by grayed fields.
Step 1
Per IEC/IEEE 62209-1528, FCC KDB 865664, ISED RSS-102 and ISED Notice 2012-DRS0529 . Scaling required only when Measured Fluid Deviation is greater than 5%. If the Measured Fluid Deviation is greater than 5%, Table 10.1 will be shown and will indicate the SAR scaling factor in percent (%). SAR is MULTIPLIED by this scaling factor only when the scaling factor is positive (+).
Step 2
Per IEC/IEEE 62209-1528, FCC KDB 865664 and ISED RSS-102. Scaling required only when the difference (Delta) between the Measured Conducted Power and the Manufacturer's Rated Conducted Power is (-) Negative. The absolute value of Delta is ADDED to the SAR.
Step 3
Per IEC/IEEE 62209-1528, FCC KDB 865664 and ISED RSS-102. Scaling required only when Measured Drift is (-) Negative. The absolute value of Measured Drift is added to Reported.
Step 4
Per IEC/IEEE 62209-1528, FCC KDB 865664 and ISED RSS-102. When the transmit Duty Cyle (DC) is less than 100%, the *reported* SAR must be scaled to 100% by the Crest Factor (CF). CF = 1/DC where DC is in decimal.
Step 5
The Reported SAR is the Maximum Final Adjusted SAR from the applicable Steps 1 through 4and are reported on Page 1 of this report.

12.0 SAR EXPOSURE LIMITS

Table 12.1 Exposure Limits

SAR RF EXPOSURE LIMITS			
FCC 47 CFR§2.1093	Health Canada Safety Code 6	General Population / Uncontrolled Exposure(4)	Occupational / Controlled Exposure(5)
Spatial Average(1) (averaged over the whole body)		0.08 W/kg	0.4 W/kg
Spatial Peak(2) (Head and Trunk averaged over any 1 g of tissue)		**1.6 W/kg**	8.0 W/kg
Spatial Peak(3) (Hands/Wrists/Feet/Ankles averaged over 10 g)		**4.0 W/kg**	20.0 W/kg
(1) The Spatial Average value of the SAR averaged over the whole body.			
(2) 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.			
(3) 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.			
(4) Uncontrolled environments are defined as locations where there is potential exposure to individuals who have no knowledge or control of their potential exposure.			
(5) Controlled environments are defined as locations where there is potential exposure to individuals who have knowledge of their potential exposure and can exercise control over their exposure.			

13.0 DETAILS OF SAR EVALUATION

13.1 Day Log

DAY LOG Export Day Log

Date	Ambient Temp (° C)	Fluid Temp (° C)	Relative Humidity (%)	Barometric Pressure (kPa)	Fluid Dielectric	SPC	Test	Task
22 Feb 2024	26.6	23.6	24%	102.7	X	X	X	2450H Fluids, SPC & SAR Testing
23 Feb 2024	26.6	23.6	24%	102.7			X	2450H Fluids SAR Testing

13.2 DUT Setup and Configuration

DUT Setup and Configuration
Overview
The A04741 was evaluated for Body and Extremity SAR at the maximum conducted output power level, preset by the manufacturer, with a fully charged battery in unmodulated continuous transmit operation (Maximum duty cycle), as provided by the manufacturer with a unit set up and pre-installed with Compliance Test Mode.

13.3 DUT Positioning

DUT Positioning
Positioning
The DUT Positioner was securely fastened to the Phantom Platform to ensure consistent positioning of the DUT for each test evaluation.
FACE Configuration
This device is not capable of voice communication and was not tested in the FACE configuration.
BODY Configuration
There are no Body-Worn and Audio Accessories for this device, however it may transmit when placed in a pocket and was therefore evaluated for BODY configuration at 0 mm.
HEAD Configuration
This device is not intended to be held to the ear and was not tested in the HEAD configuration.
EXTREMITY Configuration
The DUT, was securely clamped into the device holder with the surface of the DUT normally in contact with the body (hand) in direct contact with the bottom of the phantom, or 0mm separation from the DUT to the phantom resembling that for which it was intended to be used.

13.4 General Procedures and Report

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General Procedures and Reporting
General Procedures
The fluid dielectric parameters of the Active Tissue Simulating Liquid (TSL) were measured as described in this Section, recorded and entered into the DASY Measurement Server. Active meaning the TSL used during the SAR evaluation of the DUT. The temperature of the Active TSL was measured and recorded prior to performing a System Performance Check (SPC). An SPC was performed with the Active TSL prior to the start of the test series. The temperature of the Active TSL was measured throughout the day and the Active TSL temperature was maintained to ± 0.5°C. The Active TSL temperature was maintained to within ±1.0°C throughout the test series. TSL analysis and SPC were repeated when the Active TSL use exceeded 84 hours. An Area Scan exceeding the length and width of the DUT projection was performed and the locations of all maximas within 2dB of the Peak SAR recorded. A Zoom Scan centered over the Peak SAR location(s) was performed and the 1g and 10g SAR values recorded. The resolutions of the Area Scan and Zoom Scan are described in the Scan Resolution table(s) in this Section. A Power Reference Measurement was taken at the phantom reference point immediately prior to the Area Scan. A Power Drift measurement was taken at the phantom reference point immediately following the Zoom Scan to determine the power drift. A Z-Scan from the *Maximum Distance to Phantom Surface* to the fluid surface was performed following the power drift measurement. When 1-g SAR Estimates Based on Area Scans in accordance with KDB 447498 are udertaken, the 1-g SAR is estimated using an area scan and the SAR is ≤ 1.0 W/kg, then zoom scan is not requred for that test condition. A Zoom scan is required for the highest estimated SAR test configuration. For estimated 1-g SAR to be acceptable the test system has been validated by the manufacturer to obtain estimated SAR with an accuracy of ±10% and there shall be no warning messages from the SAR measurement system during the scan. For occupational exposure, zoom scan measurement are not required when the estimated 1-g SAR is ≤ 6.0 W/kg. When supported by the SAR measuring system, the 1-g SAR estimation procedures may also be used for 10-g SAR measurements by scaling the results according to the ratio of general population to occupational SAR limit.
Reporting
Where appropriate the 1g SAR, 10g SAR and power drift measurements are recorded in the SAR Measurement Summary tables in the SAR Measurement Summary Section of this report. The SAR values shown in the 100% DC (Duty Cycle) column are the SAR values reported by the SAR Measurement Server with the DUT operating at or compensated for a 100% transmit duty cycle. A duty cycle compensation (crest factor) and fluid sensitivy scaling factor is shown, as well as other information such as transmit channel and frequency, modulation, accessories tested and DUT-phantom separation distance. When area based 1-g SAR estimation procedures are applied, the measurements are clearly identified in the tabulated SAR results and associated plots to distingauish these from measurements requiring zoom scans. In the Scaling of Maximum Measured SAR Section of this report, the highest measured SAR in the BODY and/or FACE and/or EXTREMITY (limb-worn) configurations, within the entire scope of this assessment, are, when applicable, scaled for Fluid Sensitivity, Manufacturer's Tune-Up Tolerance, Simultaneous Transmission and Drift. With the exception of Duty Cycle correction/compensation, SAR values are ONLY scaled up, not down. The final results of this scaling is the *reported SAR* which appears on the Cover Page of this report.

13.5 Fluid Dielectric and Systems Performance Check

Fluid Dielectric and Systems Performance Check
Fluid Dielectric Measurement Procedure
The fluid dielectric parameters of the Tissue Simulating Liquid (TSL) are measured using the Open-Ended Coax Method connected to an Agilent 8753ET Network Analyzer connected to a measurement server running Aprel Dielectric Property Measurement System. A frequency range of ± 100MHz for frequencies > 300MHz and ± 50MHz for frequencies ≤ 300MHz with frequency step size of 10MHz is used. The center frequency is centered around the SAR measurement probe's calibration point for that TSL frequency range. A calibration of the setup is performed using a short-open-deionized water (at 23°C in a 300ml beaker) method. A sample of the TSL is placed in a 300ml beaker and the open-ended coax is submerged approximately 8mm below the fluid surface in the approximate center of the beaker. A check of the setup is made to ensure no air is trapped under the open-ended coax. The sample of TSL is measured and compared to the IEC/IEEE 62209-1528 targets for HEAD or BODY for the entire fluid measurement range. Fluid adjustment are made if the dielectric parameters are > 5% in range that the DUT is to be tested. If the adjustments fail to bring the parameters to ≤ 5% but are < 10%, the SAR Fluid Sensitivity as per IEC/IEEE 62209-1528 and FCC KDB 865664 are applied to the highest measured SAR. A TSL with dielectric parameters > 10% in the DUT test frequency range are not used.
Systems Performance Check
The fluid dielectric parameters of the Active TSL are entered into the DASY Measurement Server at each of the 10MHz step size intervals. Active meaning the TSL used during the SAR evaluation of the DUT. The DASY Measurement System will automatically interpolate the dielectric parameters for DUT test frequencies that fall between the 10MHz step intervals. A Systems Performance Check (SPC) is performed in accordance with IEC/IEEE 62209-1528 "System Check" and FCC KDB 865664 "System Verification". A validation source, dipole or Confined Loop Antenna (CLA), is placed under the geometric center of the phantom and separated from the phantom in accordance to the validation source's Calibration Certificate data. A CW signal set to the frequency of the validate source's and SAR measurement probe's calibration frequency with a forward power set to the validation source's Calibration Certificate data power setting is applied to the validation source. An Area Scan is centered over the projection of the validation source's feed point and an Area Scan is taken. A Zoom Scan centered over the Peak SAR measurement of the Area Scan and the 1g and 10g SAR is measured. The measured 1g and 10g SAR is compared to the 1g and 10g SAR measurements from the validation source's Calibration Certificate. When required, the measured SAR is normalized to 1.0W and compared to the normalized SAR indicated on the validation source's Calibration Certificate. The SPC is considered valid when the measured and normalized SAR is ≤ 10% of the measured and normalize SAR of the validation source's Calibration Certificate. The fluid dielectric parameters of the Active TSL and SPC are repeated when the Active TSL has been in use for greater than 84 hours or if the Active TSL temperature has exceed ± 1°C of the initial fluid analysis.

13.6 Scan Resolution 100MHz to 2GHz

Scan Resolution 100MHz to 2GHz	
Maximum distance from the closest measurement point to phantom surface: (Geometric Center of Probe Center)	**4 ± 1 mm**
Maximum probe angle normal to phantom surface. (Flat Section ELI Phantom)	**5° ± 1°**
Area Scan Spatial Resolution ΔX, ΔY	**15 mm**
Zoom Scan Spatial Resolution ΔX, ΔY	**7.5 mm**
Zoom Scan Spatial Resolution ΔZ (Uniform Grid)	**5 mm**
Zoom Scan Volume X, Y, Z	**30 mm**
Phantom	**ELI**
Fluid Depth	**150 ± 5 mm**
An Area Scan with an area extending beyond the device was used to locate the candidate maximas within 2dB of the global maxima.	
A Zoom Scan centered over the peak SAR location(s) determined by the Area Scan was used to determine the 1-gram and 10-gram peak spatial-average SAR	

13.7 Scan Resolution 2GHz to 3GHz

Scan Resolution 2GHz to 3GHz	
Maximum distance from the closest measurement point to phantom surface: (Geometric Center of Probe Center)	**4 ± 1 mm**
Maximum probe angle normal to phantom surface. (Flat Section ELI Phantom)	**5° ± 1°**
Area Scan Spatial Resolution ΔX, ΔY	**12 mm**
Zoom Scan Spatial Resolution ΔX, ΔY	**5 mm**
Zoom Scan Spatial Resolution ΔZ (Uniform Grid)	**5 mm**
Zoom Scan Volume X, Y, Z	**30 mm**
Phantom	**ELI**
Fluid Depth	**150 ± 5 mm**
An Area Scan with an area extending beyond the device was used to locate the candidate maximas within 2dB of the global maxima.	
A Zoom Scan centered over the peak SAR location(s) determined by the Area Scan was used to determine the 1-gram and 10-gram peak spatial-average SAR	

13.8 Scan Resolution 5GHz to 6GHz

Scan Resolution 5GHz to 6GHz	
Maximum distance from the closest measurement point to phantom surface: (Geometric Center of Probe Center)	**4 ± 1 mm**
Maximum probe angle normal to phantom surface. (Flat Section ELI Phantom)	**5° ± 1°**
Area Scan Spatial Resolution ΔX, ΔY	**10 mm**
Zoom Scan Spatial Resolution ΔX, ΔY	**4 mm**
Zoom Scan Spatial Resolution ΔZ (Uniform Grid)	**2 mm**
Zoom Scan Volume X, Y, Z	**22 mm**
Phantom	**ELI**
Fluid Depth	**100 ± 5 mm**
An Area Scan with an area extending beyond the device was used to locate the candidate maximas within 2dB of the global maxima.	
A Zoom Scan centered over the peak SAR location(s) determined by the Area Scan was used to determine the 1-gram and 10-gram peak spatial-average SAR	

14.0 SAR MEASUREMENT VARIABILITY & UNCERTAINTY

Table 14.1 Measurement Variability

Per FCC KDB Publication 865664, SAR measurement variability is not required to be assessed for each frequency band where all measured SAR values are <0.8 W/kg for 1g and < 2.0 W/kg for 10g.

Table 14.2 Measurement Uncertainty

Per FCC KDB 865664 when the highest measured SAR is <1.5 W/kg for 1 g and < 3.75 W/kg for 10g all frequency bands, the extensive SAR measurement uncertainty analysis tables described in IEEE std 1528-2013 are not required.

Table 14.3 Calculation of Degrees of Freedom

Calculation of the Degrees and Effective Degrees of Freedom	
$v_i = n - 1$	$v_{eff} = \frac{u_c^4}{\sum_{i=1}^{m} \frac{c_i^4 u_i^4}{v_i}}$

15.0 FLUID DIELECTRIC PARAMETERS

Table 15.1 Fluid Dielectric Parameters 2450MHz HEAD TSL

FLUID DIELECTRIC PARAMETERS								Fluid Sensitivity Calculation IEC/IEEE 62209-1528 7.8.2			
Date: 22-Feb-2024		Fluid Temp: 23.6		Frequency: 2450MHz		Tissue: Head		ΔSAR	ΔSAR	SAR Correction Factor (1)	
Freq (MHz)		Test ε	Test σ (S/m)	Target ε	Target σ (S/m)	Deviation Permittivity	Deviation Conductivity	1g	10g	1g	10g
2410.0000		36.0600	1.8100	39.2700	1.76	-8.17%	2.84%	0.032	0.020	1.000	1.000
2412.0000		36.0600	1.8100	39.2700	1.76	-8.17%	2.84%	0.032	0.020	1.000	1.000
2420.0000		35.7600	1.8300	39.2500	1.77	-8.89%	3.39%	0.037	0.023	1.000	1.000
2430.0000		35.7500	1.8600	39.2400	1.78	-8.89%	4.49%	0.042	0.026	1.000	1.000
2437.0000	*	35.6870	1.8670	39.2260	1.79	-9.02%	4.48%	0.042	0.026	1.000	1.000
2440.0000		35.6600	1.8700	39.2200	1.79	-9.08%	4.47%	0.042	0.026	1.000	1.000
2450.0000		35.7500	1.8900	39.2000	1.80	-8.80%	5.00%	0.044	0.027	1.000	1.000
2457.0000	*	35.7710	1.8830	39.1930	1.81	-8.73%	4.21%	0.040	0.025	1.000	1.000
2460.0000		35.7800	1.8800	39.1900	1.81	-8.70%	3.87%	0.038	0.024	1.000	1.000
2470.0000		35.5000	1.9200	39.1700	1.82	-9.37%	5.49%	0.047	0.029	1.000	1.000
2472.0000	*	35.5620	1.9160	39.1680	1.82	-9.21%	5.16%	0.045	0.028	1.000	1.000
2480.0000	*	35.8100	1.9000	39.1600	1.83	-8.55%	3.83%	0.037	0.023	1.000	1.000
2490.0000		35.5100	1.9300	39.1500	1.84	-9.30%	4.89%	0.044	0.027	1.000	1.000

*Channel Frequency Tested

16.0 SYSTEM VERIFICATION TEST RESULTS

Table 16.1 System Verification Results 2450MHz HEAD TSL

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N		S/N
22 Feb 2024		2450	D2450V2		825
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	23.6	27	24%	250	10
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
35.75	39.20	-8.80%	1.89	1.80	5.00%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
13.70	13.18	3.95%	6.17	6.01	2.75%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
54.80	52.72	3.95%	24.68	24.02	2.77%

Prior to the SAR evaluations, system checks were performed on the planar section of the phantom and a SPEAG validation dipole in accordance with the procedures described in IEC/IEEE 62209-1528 and FCC KDB 865664.

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.

The forward power was applied to the dipole and the system was verified to a tolerance of +10% from the system manufacturer's dipole calibration target SAR value.

The forward power applied was same forward power applied by the calibration lab during the calibration of this validation source.

17.0 SYSTEM VALIDATION SUMMARY

Table 17.1 System Validation Summary

SAR Validation Summary Chart							
Validation Date	Probe Model	Probe S/N	Validation Source	Frequency (MHz)	Validation Results		
					Linearity	Isotropy	Extrapolation
21-Jun-23	EX3DV4	7826	D2450V2	2450	Pass	Pass	Pass

18.0 MEASUREMENT SYSTEM SPECIFICATIONS

Table 18.1 Measurement System Specifications

Measurement System Specification	
Specifications	
Positioner	Stäubli Unimation Corp. Robot Model: TX90XL
Repeatability	+/- 0.035 mm
No. of axis	6.0
Data Acquisition Electronic (DAE) System	
Cell Controller	
Processor	Intel(R) Core(TM) i7-7700
Clock Speed	3.60 GHz
Operating System	Windows 10 Professional
Data Converter	
Features	Signal Amplifier, multiplexer, A/D converter, and control logic
Software	Measurement Software: DASY6, V 6.4.0.12171 / DASY52 V10.2(1504)
	Postprocessing Software: SEMCAD X, V14.6.12(7470)
Connecting Lines	Optical downlink for data and status info., Optical uplink for commands and clock
DASY Measurement Server	
Function	Real-time data evaluation for field measurements and surface detection
Hardware	Intel ULV Celeron CPU 400 MHz; 128 MB chip disk; 128 MB RAM
Connections	COM1, COM2, DAE, Robot, Ethernet, Service Interface
E-Field Probe	
Model	EX3DV4
Serial No.	3600
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 GHz)
Phantom	
Type	ELI Elliptical Planar Phantom
Shell Material	Fiberglass
Thickness	2mm +/- .2mm
Volume	> 30 Liter
Phantom	
Type	Twin SAM Phantom
Shell Material	Fiberglass
Thickness	2mm +/- .2mm
Volume	< 25 Liter
Phantom	
Type	Modular Flat Phantom
Shell Material	Fiberglass
Thickness	2mm +/- .2mm
Volume	< 9 Liter

Table 18.1

Measurement System Specification (Continued)

Probe Specification

Construction:	Symmetrical design with triangular core; Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents (e.g. DGBE)
Calibration:	ISO/IEC 17025
Frequency:	4 MHz - 10 GHz; Linearity: ± 0.2 dB (30 MHz - 10 GHz)
Directivity:	± 0.1 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)
Dynamic Range:	10 μW/g to > 100 mW/g; Linearity: ± 0.2 dB (noise: typically <1 mW/g)
Dimensions:	Overall length: 337 mm; (tip: 20 mm) Tip diameter: 2.5 mm; Tip (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application:	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better than 30%

EX3DV4 E-Field Probe

Phantom Specification

The ELI V5.0 phantom is an elliptical planar fiberglass shell phantom with a shell thickness of 2.0mm +/- .2mm at the planar area. This phantom conforms to OET Bulletin 65, Supplement C, IEC\IEEE 62209-1528.

ELI Phantom

Phantom Specification

The SAM V4.0 phantom is a flat planar fiberglass shell phantom with a shell thickness of 2.0mm +/- .2mm at the planar area. This phantom conforms to OET Bulletin 65, Supplement C, IEC\IEEE 62209-1528.

SAM Phantom

Phantom Specification

The MFP V5.1C phantom is a flat planar fiberglass shell phantom with a shell thickness of 2.0mm +/- .2mm at the planar area. This phantom conforms to OET Bulletin 65, Supplement C, IEC\IEEE 62209-1528.

MFP Phantom

Device Positioner Specification

The DASY device positioner 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^{O}. 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.

Device Positioner

19.0 TEST EQUIPMENT LIST

Table 19.1 Equipment List and Calibration

Test Equipment List				
DESCRIPTION	**ASSET NO.**	**SERIAL NO.**	**DATE CALIBRATED**	**CALIBRATION DUE**
Schmid & Partner DASY 6 System	-	-	-	-
-DASY Measurement Server	00158	1078	CNR	CNR
-Robot	00046	599396-01	CNR	CNR
-DAE4	00019	353	16-Apr-23	16-Apr-24
-EX3DV4 E-Field Probe	00357	7826	16-May-23	16-May-24
-D2450V2 Validation Dipole	00219	825	24-Apr-21	24-Apr-24
ELI Phantom	00247	1234	CNR	CNR
SAM Phantom	00154	1033	CNR	CNR
MFP Phantom	00355	1177/2	CNR	CNR
HP 85070C Dielectric Probe Kit	00033	none	CNR	CNR
Gigatronics 8652A Power Meter	00007	1835801	10-May-22	10-May-25
Gigatronics 80701A Power Sensor	00186	1837002	COU	COU
Gigatronics 80334A Power Sensor	00237	1837001	10-May-22	10-May-25
HP 8753ET Network Analyzer	00134	US39170292	06-Jan-24	06-Jan-27
Rohde & Schwarz SMR20 Signal Generator	00006	100104	COU	COU
Amplifier Research 10W1000C Power Amplifier	00041	27887	CNR	CNR
Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR
Narda Directional Coupler 3020A	00064	-	CNR	CNR
Digital Multi Meter DMR-1800	00250	TE182	23-Jun-20	23-Jun-23
Bipolar Power Supply 6299A	00086	1144A02155	CNR	CNR
DC-18G 10W 30db Attenuator	00102	-	COU	COU
R&S FSP40 Spectrum Analyzer	00241	100500	09-Aug-21	09-Aug-24
HP 8566B Spectrum Analyzer	00051	2747A055100	29-Jun-20	29-Jun-23
RF Cable-SMA	00311	-	CNR	CNR
HP Calibration Kit	00145	-	CNR	CNR

CNR = Calibration Not Required

SB=Stand By

COU = Calibrate on Use

*Verifed and Extended

* *Per KDB 865664 3.2.2; Supporting documentation is included in the report for validation dipoles exceeding the recommended anual calibration cycle.

20.0 FLUID COMPOSITION

Table 20.1 Fluid Composition 2450MHz HEAD TSL

Tissue Simulating Liquid (TSL) Composition				2450MHz Body
Component by Percent Weight				
Water	Glycol	Salt(1)	HEC(2)	Bacteriacide(3)
69.98	30.0	0.02	0.0	0.0

(1) Non-Iodinized
(2) **H**ydroxy**E**thyl-**C**ellulose: Sigma-Aldrich P/N 54290-500g
(3) Dow Chemical Dowicil 75 Antimicrobial Perservative

END OF REPORT

APPENDIX A – SYSTEM VERIFICATION PLOTS

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:825
Procedure Name: SPC 2450H_Input=250mw, Target=[11.86]13.18][14.50]W/kg 3

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.89 S/m; ε_r = 35.75; ρ = 1000 kg/m^3
Phantom section: Flat Section

Date/Time: 2/22/2024 6:18:54 PM

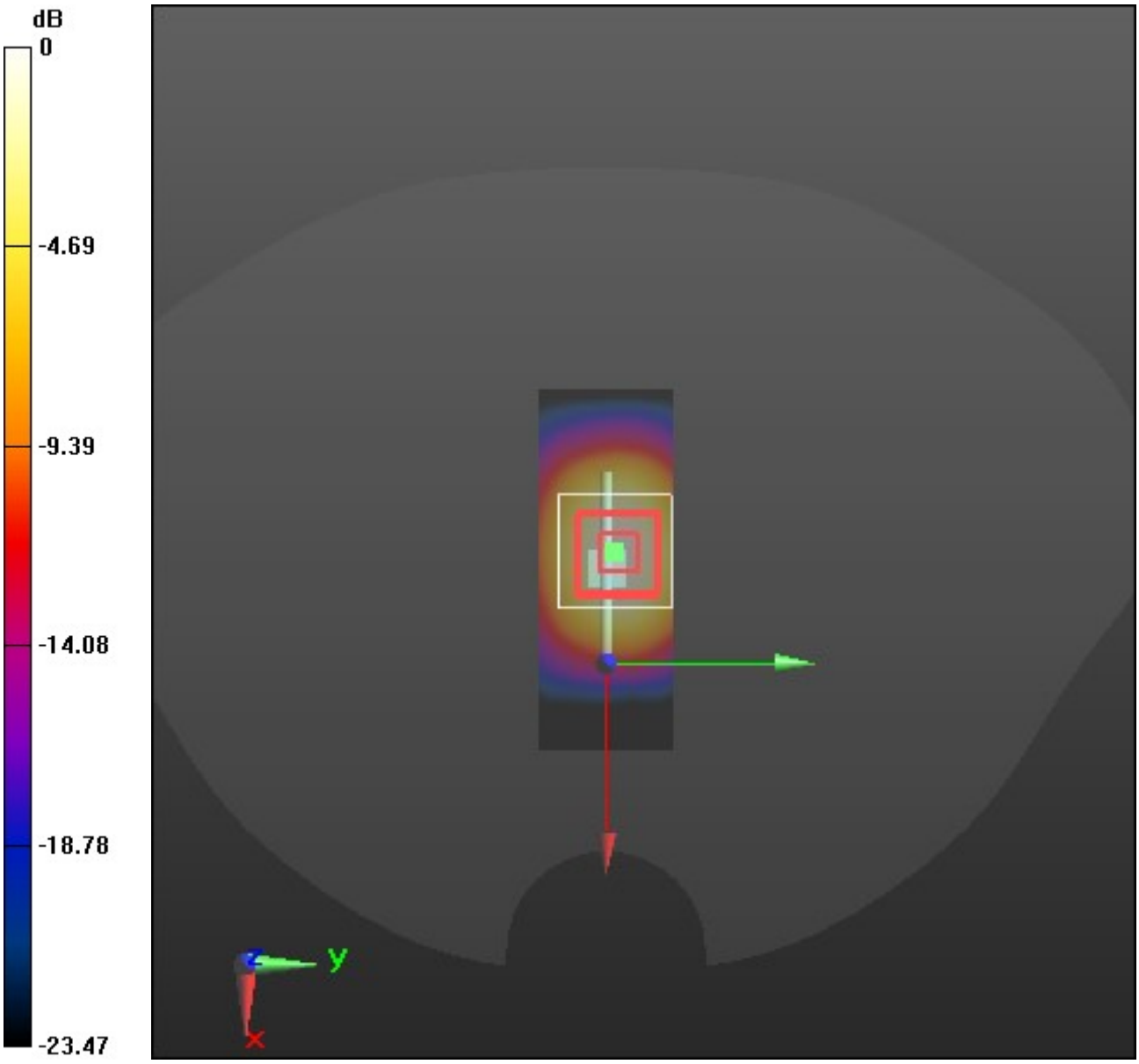
DASY5 Configuration:

- Probe: EX3DV4 - SN7826; ConvF(7.91, 7.42, 7.62) @ 2450 MHz; Calibrated: 5/16/2023
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 4/18/2023
- Phantom: Twin-SAM V4.0 (30deg probe tilt); Type: QD 000 P40 CC; Serial: xxxx
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

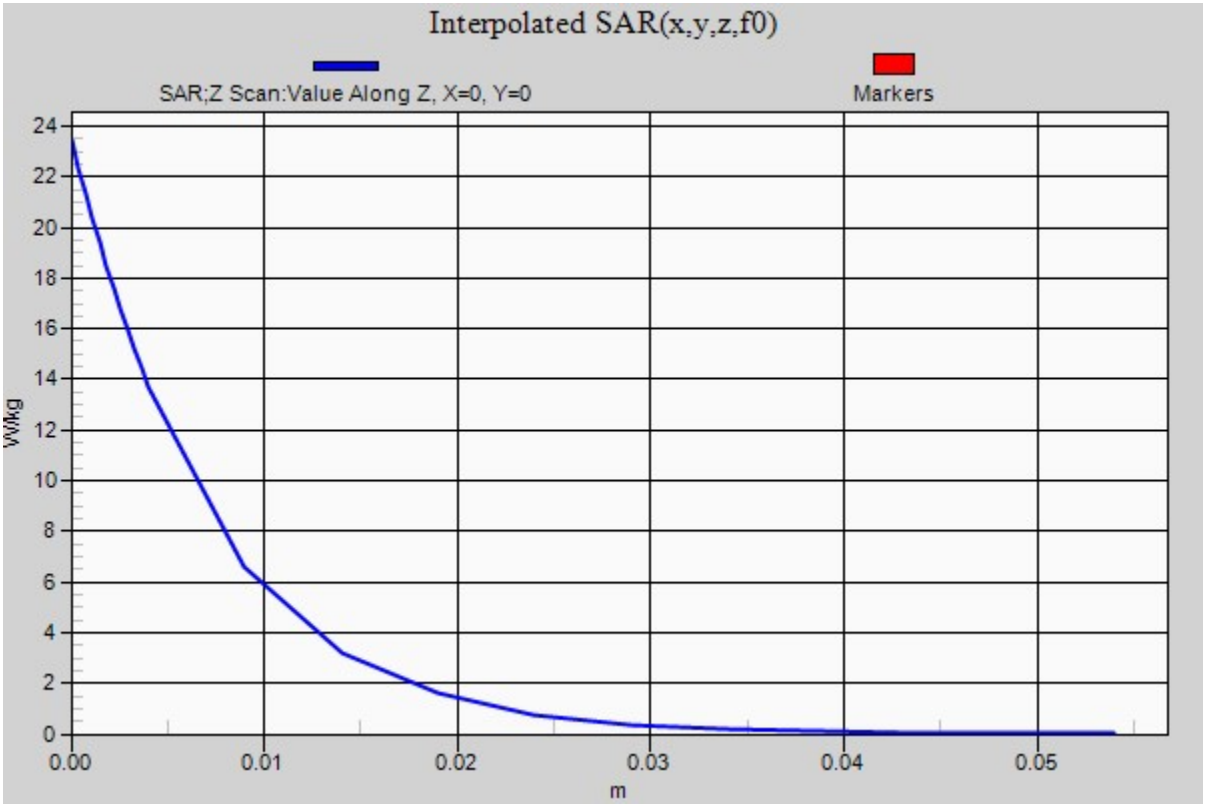
SPC/SPC 2450H_Input=250mw, Target=[11.86]13.18][14.50]W/kg 3/Area Scan (81x31x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Reference Value = 85.39 V/m; Power Drift = 0.10 dB
Fast SAR: SAR(1 g) = 13.8 W/kg; SAR(10 g) = 6.49 W/kg
Maximum value of SAR (interpolated) = 16.4 W/kg

SPC/SPC 2450H_Input=250mw, Target=[11.86]13.18][14.50]W/kg 3/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.39 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 29.9 W/kg
SAR(1 g) = 13.7 W/kg; SAR(10 g) = 6.17 W/kg
Smallest distance from peaks to all points 3 dB below = 10 mm
Ratio of SAR at M2 to SAR at M1 = 46.8%
Maximum value of SAR (measured) = 15.5 W/kg

SPC/SPC 2450H_Input=250mw, Target=[11.86]13.18][14.50]W/kg 3/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Penetration depth = 7.003 (6.795, 7.012) [mm]
Maximum value of SAR (interpolated) = 23.4 W/kg



0 dB = 15.5 W/kg = 11.90 dBW/kg


Interpolated SAR(x,y,z,f0)
SAR;Z Scan:Value Along Z, X=0, Y=0
Markers
W/kg
24
22
20
18
16
14
12
10
8
6
4
2
0
0.00
0.01
0.02
0.03
0.04
0.05
m

APPENDIX B – MEASUREMENT PLOTS OF MAXIMUM MEASURED SAR

Plot B1Z

DUT: A04741; Type: Transmitter; Serial: 3390944989
Procedure Name: B1-A04741, Body- Front Side, 2457MHz, 5.5 bits WIFI

Communication System: UID 0, CW (0); Frequency: 2457 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2457 MHz; σ = 1.883 S/m; ε_r = 35.771; ρ = 1000 kg/m^3
Phantom section: Flat Section

Date/Time: 2/22/2024 7:37:34 PM

DASY5 Configuration:

- Probe: EX3DV4 - SN7826; ConvF(7.91, 7.42, 7.62) @ 2457 MHz; Calibrated: 5/16/2023
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 4/18/2023
- Phantom: Twin-SAM V4.0 (30deg probe tilt); Type: QD 000 P40 CC; Serial: xxxx
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

2450H/B1-A04741, Body- Front Side, 2457MHz, 5.5 bits WIFI/Area Scan (8x13x1): Measurement grid: dx=12mm, dy=12mm

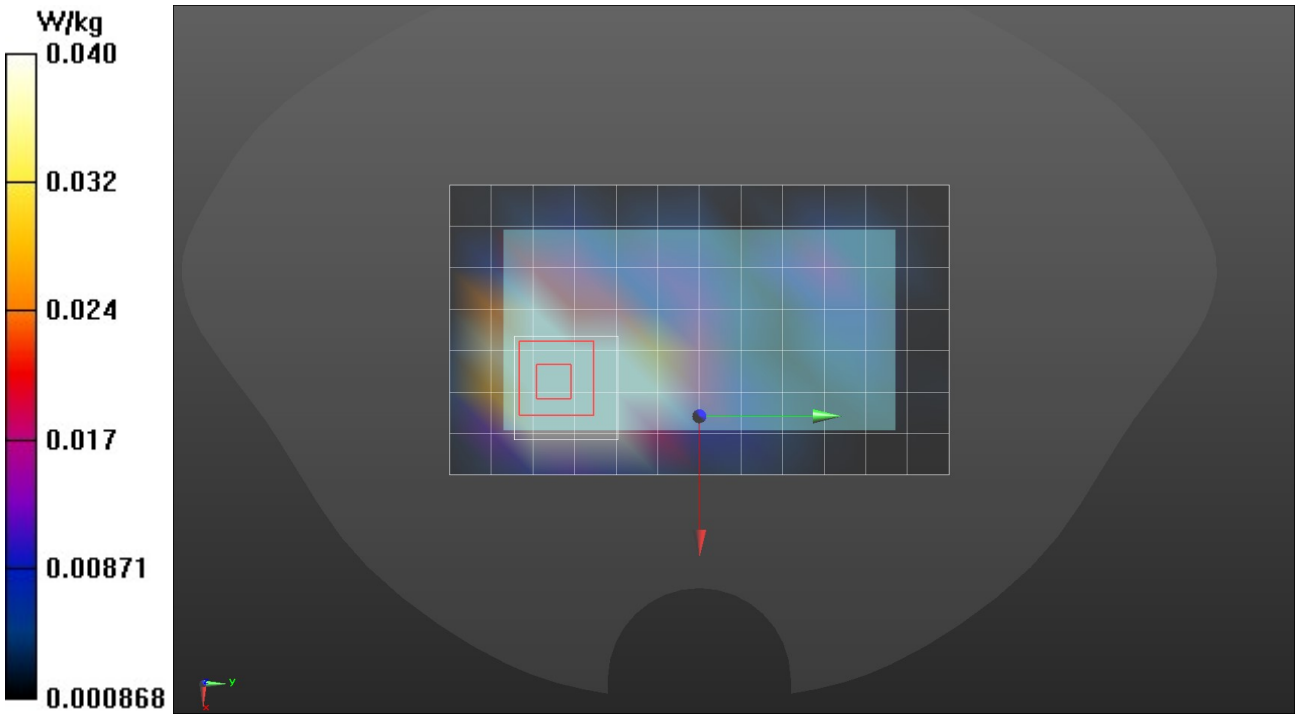
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.193 W/kg

2450H/B1-A04741, Body- Front Side, 2457MHz, 5.5 bits WIFI/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.993 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.473 W/kg
SAR(1 g) = 0.184 W/kg; SAR(10 g) = 0.074 W/kg
Smallest distance from peaks to all points 3 dB below = 8 mm
Ratio of SAR at M2 to SAR at M1 = 40.1%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.211 W/kg

2450H/B1-A04741, Body- Front Side, 2457MHz, 5.5 bits WIFI/Z Scan probably DNU this Z scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Info: Interpolated medium parameters used for SAR evaluation.
Penetration depth = 9.342 (8.468, 11.39) [mm]
Maximum value of SAR (interpolated) = 0.0401 W/kg


W/kg
0.040
0.032
0.024
0.017
0.00871
0.000868

Plot B10Z

DUT: A04741; Type: Transmitter; Serial: 3390944989
Procedure Name: B10-A04741, Body- Front Side, 2480MHz, BT EDR2

Communication System: UID 0, CW (0); Frequency: 2480 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2480 MHz; σ = 1.9 S/m; ε_r = 35.81; ρ = 1000 kg/m^3
Phantom section: Flat Section

Date/Time: 2/23/2024 1:02:42 PM

DASY5 Configuration:

- Probe: EX3DV4 - SN7826; ConvF(7.91, 7.42, 7.62) @ 2480 MHz; Calibrated: 5/16/2023
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 4/18/2023
- Phantom: Twin-SAM V4.0 (30deg probe tilt); Type: QD 000 P40 CC; Serial: xxxx
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

2450H/B10-A04741, Body- Front Side, 2480MHz, BT EDR2/Area Scan (8x13x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.0625 W/kg

2450H/B10-A04741, Body- Front Side, 2480MHz, BT EDR2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.292 V/m; Drift = 1.25 dB
Peak SAR (extrapolated) = 0.194 W/kg
SAR(1 g) = 0.074 W/kg; SAR(10 g) = 0.030 W/kg
Ratio of SAR at M2 to SAR at M1 = 40.3%
Maximum value of SAR (measured) = 0.0852 W/kg

2450H/B10-A04741, Body- Front Side, 2480MHz, BT EDR2/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Penetration depth = 11.78 (14.19, 62.63) [mm]
Maximum value of SAR (interpolated) = 0.00530 W/kg