Test Report Serial Number:	45461995 R2.0
Test Report Date:	February 19, 2025
Project Number:	1676

SAR Test Report - New Application

Applicant:

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

Maximum *reported* SAR			
Body (1g)	DTS	0.87	W/kg
	DSS	0.05	
	UNII	0.90	
	Simultaneous	0.95	
General Pop. Limit:		1.60	
Extremity (10g)	DTS	0.41	
	DSS	0.02	
	UNII	0.30	
	Simultaneous	0.32	
General Pop. Limit:		4.00	

FCC ID: **IPH-05008**

IC Registration Number:

Product Model Number / HVIN: **A05008**

Product Name / PMN: **A05008**

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:**	27-29 Dec 2024 20-22 Jan 2025
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	31 January 2025
1.0	Initial Release	n/a	Ben Hewson	4 February 2025
2.0	Revise SVIN	2.0	Ben Hewson	19 February 2025

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-05008**
Device Model(s) / HVIN:	A05008
Device Marketing Name / PMN:	A05008
Software Ver #/ SVIN:	4.31
Test Sample Serial No.:	OTA: 3495259659 COND: 3495259714
Device Type:	Personal Navigation Device
	Digital Transmission System (DTS)
FCC Equipment Class:	Part 15 Spread Spectrum Transmitter (DSS)
	Unlicensed National Information Infrastructure (NII)
	Short Range Devices (SRD)
Transmit Frequency Range:	BT (DTS, DSS): 2402-2480MHz
	ANT (DTS): 2402-2480MHz
	WiFi (DTS): 2412-2462MHz
	U-NII-1: 5180 - 5240, U-NII-3: 5745-5825
Manuf. Max. Rated Output Power with Tune-up Tolerance:	ANT (GFSK): 8.0dBm
	BT BR (DSS): 9.0 dBm
	BT 2EDR (DTS): 7.5 dBm
	BT 3EDR (DTS): 8 dBm
	BT LE (DTS): 7 dBm
	802.11b (DTS): 18.0 dBm
	802.11g (DTS): 17.0 dBm
	802.11n (DTS): 17.25 dBm
	U-NII-1/802.11a20: 13 dBm
	U-NII-1/802.11n20: 13 dBm
	U-NII-1/802.11n40: 13 dBm
	U-NII-1/802.11ac80: 11.5 dBm
	U-NII-3/802.11a20: 17.5 dBm
	U-NII-3/802.11n20: 17 dBm
	U-NII-3/802.11n40: 16 dBm
	U-NII-3/802.11ac80: 16 dBm
Antenna Type and Gain:	PIFA 2.4GHz: 2.4dBi, 5GHz UNII-1: 2.11dBi, UNII-3: 0dBi
Modulation:	BT BR: GFSK
	BT 2EDR: π/4-DQPSK
	Bt 3EDR: 8DPSK
	BLE: GMSK
	WiFi: CCK, DSSS, OFDM, CCK, MCS
DUT Power Source:	5V USB, Internal Li-Ion Battery
DUT Dimensions [LxWxH]	L x W x H: 214mm x 135mm x 25.3mm
Deviation(s) from standard/procedure:	None
Modification of DUT:	None

* Information on antenna gain provided by applicant.

3.0 SCOPE OF EVALUATION

This Certification Report was prepared on behalf of:

Garmin International Inc.

The A05008 FCC ID: IPH-05008, is a Low Power Digital Transmitter that offers use as a hand-held, transportation mounted or portable configuration , with a Wi-Fi transceiver that is capable of operating in the 2.4GHz WiFi, 5GHz U-NII-1 & 3 frequency bands as well as 2.4Ghz ANT/BT/BLE frequency bands. The device has two antennas covering the 2.4GHZ and a 5Ghz frequencies, and is capable of simultaneous transmission with the 2.4GHz ANT/BT and 5GHz frequencies. 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, U-NII transmitters for all required RF exposure configurations including Extremity and certain 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	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
FCC KDB	
KDB 447498 D04v01	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.	

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.	A05008	
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:**
		27-29 December 2024 20-22 January 2025

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.	 Ben Hewson Celltech Labs Inc. 31 January 2025 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 MAXIMUM OUTPUT POWER & RF CONDUCTED POWER MEASUREMENT

Table 7.1 Nominal and Maximum Output Power

Maximum Output Power					
Band	**Mode**	**Bandwidth** ***(MHz)***	**Modulation**	**Nominal Power** ***(dBm)***	**Maximum Power** ***(dBm)***
ANT	GFSK	1	GFSK	7.65	8.00
BT	BR	1	GFSK	8.94	9.00
	2EDR	1	Pi/4-DQPSK	7.20	7.50
	3EDR	1	8DPSK	7.55	8.00
	LE	1	GFSK	6.56	7.00
WLAN 2.4G	802.11b	20	DSSS	17.69	18.00
	802.11g	20	OFDM	16.74	17.00
	802.11n	20	MCS	17.03	17.25
U-NII-1	802.11a	20	OFDM	12.93	13.00
	802.11n	20	MCS	12.55	13.00
	802.11n40	40	MCS	12.45	13.00
	802.11ac80	80	MCS	11.41	11.50
U-NII-3	802.11a	20	OFDM	17.22	17.50
	802.11n	20	MCS	16.82	17.00
	802.11n40	40	MCS	15.80	16.00
	802.11ac80	80	MCS	15.55	16.00

Nominal represents Rated power assessed via conducted power evaluation by EMC lab

*Maximum allowed power includes tune-up tolerance, SAR Values were scaled to the maximum power.

Table 7.2 Conducted Power Measurements WLAN, BT, U-NII

Conducted Power Measurements												
Band	Mode	Bandwidth (MHz)	Channel	Frequency (MHz)	Modulation	Bit Rate (Mbps)	Measured Power (dBm)	Maximum Allowed Power (dBm)	Delta (dB)	Duty Cycle (%)	Crest Factor (1/DC)	SAR Test Channel (Y/-)
ANT	GFSK	1	6	2437	CCK	-	-	8.00	-	-	-	-
BT	BR	1	2	2402	GFSK	-	7.28	9.00	-1.72	77.1	1.30	-
			38	2440			8.34	9.00	-0.66	77.1	1.30	Y
			80	2480			7.49	9.00	-1.51	77.1	1.30	-
	2EDR	1	2	2402	Pi/4-DQPSK	-	5.60	7.50	-1.90	77.1	1.30	-
			38	2440			6.82	7.50	-0.68	77.1	1.30	-
			80	2480			5.55	7.50	-1.95	77.1	1.30	-
	3EDR	1	2	2402	8DPSK	-	5.79	7.75	-1.96	77.1	1.30	-
			38	2440			5.83	7.75	-1.92	77.1	1.30	-
			80	2480			5.76	7.75	-1.99	77.1	1.30	-
	LE	1	37	2402	GFSK	-	5.62	7.00	-1.38	77.1	1.30	-
			17	2440			6.61	7.00	-0.39	77.1	1.30	-
			39	2480			5.69	7.00	-1.31	77.1	1.30	-
WLAN 2.4G	802.11b	20	1	2412	DSSS	1	16.35	18.00	-1.65	99.5	1.01	-
			6	2437			16.72	18.00	-1.28	99.5	1.01	Y
			11	2462			16.66	18.00	-1.34	99.5	1.01	-
	802.11g	20	1	2412	OFDM	6	16.34	17.00	-0.66	97.3	1.03	-
			6	2437			16.64	17.00	-0.36	97.3	1.03	-
			11	2462			16.62	17.00	-0.38	97.3	1.03	-
	802.11n	20	1	2412	MCS	0	16.86	17.25	-0.39	97.1	1.03	-
			6	2437			16.94	17.25	-0.31	97.1	1.03	-
			11	2462			16.93	17.25	-0.32	97.1	1.03	-
U-NII-1	802.11a	20	36	5180	OFDM	6	11.06	13.00	-1.94	98.0	1.02	-
			40	5200			11.38	13.00	-1.62	98.0	1.02	Y
			44	5220			11.01	13.00	-1.99	98.0	1.02	-
			48	5240			11.02	13.00	-1.98	98.0	1.02	-
	802.11n	20	36	5180	MCS	0	11.07	13.00	-1.93	97.7	1.02	-
			40	5200			11.08	13.00	-1.92	97.7	1.02	-
			44	5220			11.05	13.00	-1.95	97.7	1.02	-
			48	5240			11.01	13.00	-1.99	97.7	1.02	-
	802.11n40	40	38	5190	MCS	0	11.02	13.00	-1.98	95.7	1.04	-
			46	5230			11.17	13.00	-1.83	95.7	1.04	-
	802.11ac80	80	42	5210	MCS	0	9.95	11.50	-1.55	90.7	1.10	-
U-NII-3	802.11a	20	149	5745	OFDM	6	15.52	17.50	-1.98	98.0	1.02	-
			153	5765			16.38	17.50	-1.12	98.0	1.02	-
			157	5785			17.43	17.50	-0.07	98.0	1.02	-
			161	5805			17.48	17.50	-0.02	98.0	1.02	Y
			165	5825			17.46	17.50	-0.04	98.0	1.02	-
	802.11n	20	149	5745	MCS	0	16.03	17.00	-0.97	97.7	1.02	-
			153	5765			16.19	17.00	-0.81	97.7	1.02	-
			157	5785			17.03	17.00	0.03	97.7	1.02	-
			161	5805			17.15	17.00	0.15	97.7	1.02	-
			165	5825			17.00	17.00	0.00	97.7	1.02	-
	802.11n40	40	151	5755	MCS	0	15.40	16.00	-0.60	95.7	1.04	-
			159	5795			15.97	16.00	-0.03	95.7	1.04	-
	802.11ac80	80	155	5775	MCS	0	14.76	16.00	-1.24	90.7	1.10	-

The rated power and tolerance are stated for typical transmission modes and data rates. There is no power reduction used in this device. 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 (Maximum Allowed power). 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. As the ANT transmitter occupies the same spectrum as the Bluetooth transmitter and the ANT rated power is less than the Bluetooth transmitter, the ANT transmitter was not considered for SAR evaluation.

8.0 NUMBER OF TEST CHANNELS (*Nc*)

Table 8.1 Number of Test Channels

The intended use of the device is to be mounted on a vehicle' dashboard; however, the device could transmit while held in hand or on person. As such the device was evaluated for both Body and Extremity use.

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.

As per FCC KDB 248227, the required 802.11 test channels are Ch1, Ch 6 and Ch 11; Channel 6 was the highest power channel and was selected for the 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 and 5 GHz OFDM transmission modes 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. An initial test position was established for Both UNII1 and UNII 3 bands.

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.

Simultaneous SAR - As per FCC KDB 447498D04V01 sec 3.1.8, SAR compliance for simultaneous transmission must be considered when the maximum duration of overlapping transmissions, including network hand-offs, is greater than 30 seconds. The 2.4GHz Bluetooth and 5GHz U-NII transmitters are capable of simultaneous transmission. SAR evaluations may be made to accommodate reporting of simultaneous SAR that may not otherwise be required under SAR test reduction based on Antenna distances and power levels noted in tables 8.3 & 8.4. For details of Simultaneous SAR see table 11.3.

Note:

Ant Transmitter - As the ANT transmitter occupies the same spectrum as the Bluetooth transmitter and the ANT rated power is less than the Bluetooth transmitter, the ANT transmitter was not considered for SAR evaluation.

Table 8.2 Antenna Distances

As per KDB 447498 D04V01, Appendix B, Sec B.4 SAR -based Exemption where appropriate SAR test exclusion based on antenna test separation distances may be applied.

The seperation distance is the smallest distance from any part of the antenna or radiating strucuture for all persons, during operation at the applicable ERP.
For mobile or portable devices, the seperation distance is from the outer housing of the device where it is closest to the antenna.
The SAR-based exemption formula for available time-averaged power or ERP, whichever is greater, of less than or equal to threshold P_{th} (mW) is given at 1.1307(b)3(i)(B) and is repeated as B.2 (*method is for seperation distances from 0.5 to 40 cm, and at freq from 0.3 to 6 GHz)*

$$P_{\text{th}}\,(\text{mW}) = ERP_{20\,\text{cm}}\,(\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \quad \text{(B.1)}$$

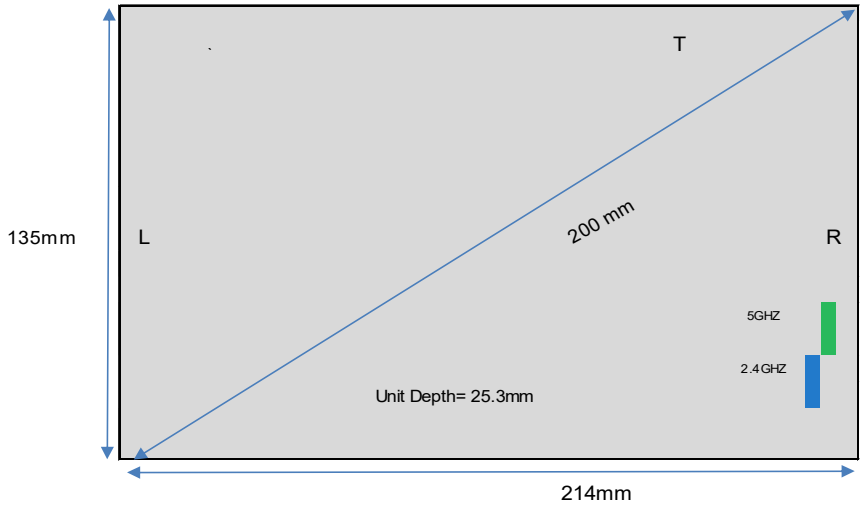
$$P_{\text{th}}\,(\text{mW}) = \begin{cases} ERP_{20\,\text{cm}}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\,\text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \quad \text{(B.2)}$$

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,\text{cm}}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1).

Topographic View
Front Facing



Antenna	Top Edge (mm)	Left Edge (mm)	Bottom Edge (mm)	Right Edge (mm)	Front Depth (mm)	Back Depth (mm)
2.4GHzWLAN/BT	121.00	167.00	14.00	47.00	13.00	12.30
5GHz/UNII-1&3	108.00	193.00	27.00	21.00	13.00	12.30

Table 8.3 Body SAR test Exclusion Workchart

X	Head, Face, Body	1g	SAR Test Exclusion Analysis					
	Extremity	10g	Antenna Separation to DUT Surfaces					
X	FCC	Band						
	ISED	2.4GHz	2.4GHz	5GHz WLAN	5GHz WLAN	Other	Other	Other
	EU	BT/ANT	WiFi	U-NII-1	U-NII-3			
DUT Power	Frequency (MHz)	2450	2462	5240	5825			
	Power (mW) OR	7.94	58.75	19.63	52.72			
	Power (dBm)	9.00	18.00	13.00	17.50			
DUT Position	Antenna Gain (dBi)	2.40	2.40	2.11	0.00			
	Total ERP (mW)	13.90	110.41	32.43	56.23			
Front Side	Separation Distance (mm)	19.00	19.00	19.00	19.00			
	Exclusion Threshold (Pth)(mW)	34.77	34.68	23.57	22.33			
	Testing Required	No	Yes	Yes	Yes			
Back Side	Separation Distance (mm)	17.30	17.30	17.30	17.30			
	Exclusion Threshold (Pth)(mW)	29.09	29.02	19.42	18.36			
	Testing Required	No	Yes	Yes	Yes			
Top Edge	Separation Distance (mm)	126.00	126.00	126.00	126.00			
	Exclusion Threshold (Pth)(mW)	1270.68	1270.06	1177.36	1164.93			
	Testing Required	No	No	No	No			
Bottom Edge	Separation Distance (mm)	19.00	19.00	32.00	32.00			
	Exclusion Threshold (Pth)(mW)	34.77	34.68	69.25	66.40			
	Testing Required	No	Yes	No	No			
Left Edge	Separation Distance (mm)	172.00	172.00	172.00	172.00			
	Exclusion Threshold (Pth)(mW)	2296.82	2296.46	2240.34	2232.59			
	Testing Required	No	No	No	No			
Right Edge	Separation Distance (mm)	52.00	52.00	52.00	52.00			
	Exclusion Threshold (Pth)(mW)	236.00	235.66	188.94	183.18			
	Testing Required	No	No	No	No			

~ Pth(mW) = ERP_{20cm}(mW) = 2040f for 0.3GHz ≤ f < 1.5GHz
~ Pth(mW) = ERP_{20cm}(mW) = 3060 for 1.5GHz ≤ f ≤ 6GHz
~ Pth(mW) = ERP_{20cm}(mW) * (d / 20cm)^{X} where x = -log10(60 / ERP_{20cm} ∨ f) for d ≤ 20cm
~ Pth(mW) = ERP_{20cm}(mW)) for 20cm < d ≤ 40cm
~ Total ERP = Power + Gain(dBd)
~ Gain(dBd) = Gain(dBi) - 2.15

Table 8.4 Extremity SAR test Exclusion Workchart

X	Head, Face, Body	1g	SAR Test Exclusion Analysis					
	Extremity	10g	Antenna Separation to DUT Surfaces					
X	FCC	Band						
	ISED	2.4GHz	2.4GHz	5GHz WLAN	5GHz WLAN	Other	Other	Other
	EU	BT/ANT	WiFi	U-NII-1	U-NII-3			
DUT Power	Frequency (MHz)	2450	2462	5240	5825			
	Power (mW) OR	7.94	58.75	19.63	52.72			
	Power (dBm)	9.00	18.00	13.00	17.50			
DUT Position	Antenna Gain (dBi)	2.40	2.40	2.11	0.00			
	Total ERP (mW)	13.90	110.41	32.43	56.23			
Front Side	Separation Distance (mm)	19.00	19.00	19.00	19.00			
	Exclusion Threshold (Pth)(mW)	34.77	34.68	23.57	22.33			
	Testing Required	No	Yes	Yes	Yes			
Back Side	Separation Distance (mm)	17.30	17.30	17.30	17.30			
	Exclusion Threshold (Pth)(mW)	29.09	29.02	19.42	18.36			
	Testing Required	No	Yes	Yes	Yes			
Top Edge	Separation Distance (mm)	126.00	126.00	126.00	126.00			
	Exclusion Threshold (Pth)(mW)	1270.68	1270.06	1177.36	1164.93			
	Testing Required	No	No	No	No			
Bottom Edge	Separation Distance (mm)	19.00	19.00	32.00	32.00			
	Exclusion Threshold (Pth)(mW)	34.77	34.68	69.25	66.40			
	Testing Required	No	Yes	No	No			
Left Edge	Separation Distance (mm)	172.00	172.00	172.00	172.00			
	Exclusion Threshold (Pth)(mW)	2296.82	2296.46	2240.34	2232.59			
	Testing Required	No	No	No	No			
Right Edge	Separation Distance (mm)	52.00	52.00	52.00	52.00			
	Exclusion Threshold (Pth)(mW)	236.00	235.66	188.94	183.18			
	Testing Required	No	No	No	No			

~ Pth(mW) = ERP_{20cm}(mW) = 2040f for 0.3GHz ≤ f < 1.5GHz
~ Pth(mW) = ERP_{20cm}(mW) = 3060 for 1.5GHz ≤ f ≤ 6GHz
~ Pth(mW) = ERP_{20cm}(mW) * (d / 20cm)^{X} where x = -log10(60 / ERP_{20cm} ∨ f) for d ≤ 20cm
~ Pth(mW) = ERP_{20cm}(mW)) for 20cm < d ≤ 40cm
~ Total ERP = Power + Gain(dBd)
~ Gain(dBd) = Gain(dBi) - 2.15

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 1g - 2.4GHz WiFi, BT and UNII

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																	
12/29/2024	B50	2437	Bottom Edge	802.11b-NA_	20	DSSS	1	----	5	19	0.556	0.020	-1.620	1.005	1.000	100.000	0.811
12/29/2024	B51	2437	Back	802.11b-NA_	20	DSSS	1	----	5	17.3	0.611	-0.070	-1.620	1.005	1.000	100.000	0.906
12/29/2024	B52	2437	Front	802.11b-NA_	20	DSSS	1	----	5	19	0.225	-0.080	-1.620	1.005	1.000	100.000	0.334
12/28/2024	B7	2440	Bottom Edge	BT BR	20	GFSK	1	----	0	14	0.041	0.720	-0.660	1.297	1.000	100.000	0.062
1/20/2025	B60	5805	Front	802.11a -NA	20	OFDM	6	----	5	19	0.187	2.030	-0.020	1.020	1.000	100.000	0.192
1/21/2025	B61	5805	Back	802.11a -NA	20	OFDM	6	----	5	17.3	0.651	0.270	-0.020	1.020	1.000	100.000	0.667
1/21/2025	B63	5745	Back	802.11a -NA	20	OFDM	6	----	5	17.3	0.671	1.400	-1.980	1.020	1.000	100.000	1.080
1/21/2025	B64	5765	Back	802.11a -NA	20	OFDM	6	----	5	17.3	0.697	1.000	-1.120	1.020	1.000	100.000	0.920
1/22/2025	B70	5200	Front	802.11a -NA	20	OFDM	6	----	5	19	0.052	2.530	-1.620	1.020	1.000	100.000	0.077
1/22/2025	B71	5200	Back	802.11a -NA	20	OFDM	6	----	5	17.3	0.192	9.390	-1.620	1.020	1.000	100.000	0.284
Zoom Scan																	
12/29/2024	B50Z	2437	Bottom Edge	802.11b-NA_	20	DSSS	1	----	5	19	0.545	0.040	-1.620	1.005	1.000	100.000	0.795
12/29/2024	B51Z	2437	Back	802.11b-NA_	20	DSSS	1	----	5	17.3	0.595	0.010	-1.620	1.005	1.000	100.000	0.868
12/29/2024	B52Z	2437	Front	802.11b-NA_	20	DSSS	1	----	5	19	0.222	0.140	-1.620	1.005	1.000	100.000	0.324
12/28/2024	B7Z	2440	Bottom Edge	BT BR	20	GFSK	1	----	0	14	0.034	1.000	-0.660	1.297	1.000	100.000	0.051
1/21/2025	B61Z	5805	Back	802.11a -NA	20	OFDM	6	----	5	17.3	0.564	1.330	-0.020	1.020	1.000	100.000	0.578
1/21/2025	B63Z	5745	Back	802.11a -NA	20	OFDM	6	----	5	17.3	0.561	1.700	-1.980	1.020	1.000	100.000	0.903
1/21/2025	B64Z	5765	Back	802.11a -NA	20	OFDM	6	----	5	17.3	0.573	0.590	-1.120	1.020	1.000	100.000	0.757
1/22/2025	B71Z	5200	Back	802.11a -NA	20	OFDM	6	----	5	17.3	0.197	2.120	-1.620	1.020	1.000	100.000	0.292
Applicable SAR Limit								Use Group					Limit				
FCC CFR 2.1093			Health Canada Safety Code 6					General Population/User Unaware					1.6 W/kg				

Table 10.2: Measured Results – Extremity 10g - 2.4GHz WiFi, BT and UNII

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																	
12/29/2024	E50	2437	Bottom Edge	802.11b-NA_	20	DSSS	1	- - - -	0	14	0.273	0.020	-1.620	1.005	1.000	100.000	0.398
12/29/2024	E51	2437	Back	802.11b-NA_	20	DSSS	1	- - - -	0	12.3	0.304	-0.070	-1.620	1.005	1.000	100.000	0.451
12/29/2024	E52	2437	Front	802.11b-NA_	20	DSSS	1	- - - -	0	14	0.122	-0.080	-1.620	1.005	1.000	100.000	0.181
12/28/2024	E7	2440	Bottom Edge	BT BR	20	GFSK	1	- - - -	0	14	0.020	0.720	-0.660	1.297	1.000	100.000	0.031
1/20/2025	E60	5805	Front	802.11a -NA	20	OFDM	6	- - - -	0	14	0.075	2.030	-0.020	1.020	1.000	100.000	0.077
1/20/2025	E61	5805	Back	802.11a -NA	20	OFDM	6	- - - -	0	12.3	0.350	0.400	-0.020	1.020	1.000	100.000	0.359
Zoom Scan																	
12/29/2024	E50Z	2437	Bottom Edge	802.11b-NA_	20	DSSS	1	- - - -	0	14	0.264	0.040	-1.620	1.005	1.000	100.000	0.385
12/29/2024	E51Z	2437	Back	802.11b-NA_	20	DSSS	1	- - - -	0	12.3	0.280	0.010	-1.620	1.005	1.000	100.000	0.409
12/29/2024	E52Z	2437	Front	802.11b-NA_	20	DSSS	1	- - - -	0	14	0.115	0.140	-1.620	1.005	1.000	100.000	0.168
12/28/2024	E7Z	2440	Bottom Edge	BT BR	20	GFSK	1	- - - -	0	14	0.015	1.000	-0.660	1.297	1.000	100.000	0.023
1/20/2025	E61Z	5805	Back	802.11a -NA	20	OFDM	6	- - - -	0	12.3	0.289	0.400	-0.020	1.020	1.000	100.000	0.296
Applicable SAR Limit								Use Group					Limit				
FCC CFR 2.1093			Health Canada Safety Code 6					General Population/User Unaware					4 W/kg				

11.0 SCALING OF MAXIMUM MEASURE SAR

Table 11.1 SAR Scaling 1g – Body 2.4GHz WiFi, BT and UNII

Scaling of Maximum Measured SAR (1g)					
Measured Parameters		Configuration			
		Body	Body	Body	
Plot ID		B51Z	B7Z	B63Z	
Maximum Measured SAR_M		0.595	0.034	0.561	(W/kg)
Frequency		2437	2440	5745	(MHz)
Drift	Power Drift	0.010 (8)	1.000 (11)	1.700 (17)	(dB)
Conducted Power		16.380	8.340	15.520	(dBm)
DC	Transmiter Duty Cycle				(%)
DF	Use Duty Factor	100.0 (9)	100.0 (12)	100.0 (18)	(%)
Fluid Deviation from Target					
Δe	Permitivity	-8.63%	-8.57%	-6.21%	
Δσ	Conductivity	3.13%	2.79%	4.99%	

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)	2.437	2.44	5.745	
Ce		-0.225	-0.225	-0.199	
Cσ		0.483	0.482	-0.045	
Ce * Δe		0.019	0.019	0.012	
Cσ * Δσ		0.015	0.013	-0.002	
ΔSAR		0.035 (7)	0.033 (10)	0.010 (16)	(%)

Manufacturer's Tuneup Tolerance				
Measured Conducted Power	16.380	8.340	15.520	(dBm)
Rated Conducted Power	18.000	9.000	17.500	(dBm)
ΔP	-1.620	-0.660	-1.980	(dB)

Transmitter Duty Cycle [Crest Factor]				
Transmiter Duty Cycle (DC)	99.5	77.1	98.0	(%)
CF (1/DC)	1.01	1.30	1.02	

SAR Adjustment for Fluid Sensitivity				
$SAR_1 = SAR_M$ X [ΔSAR]	0.595 (7)	0.034 (10)	0.561 (16)	(W/kg)

SAR Adjustment for Tuneup Tolerance				
$SAR_2 = SAR_1$ + [ΔP]	**0.864**	**0.040**	**0.885**	(W/kg)

SAR Adjustment for Drift				
$SAR_3 = SAR_2$ + [Drift]	0.864 (8)	0.040 (11)	0.885 (17)	(W/kg)

SAR Adjustment for Transmitter Duty Cycle [Crest Factor]				
$SAR_4 = SAR_3$ x [CF]	**0.868**	**0.051**	**0.903**	(W/kg)

SAR Adjustment for Use Duty Factor				
$SAR_5 = SAR_4$ x [DF]	0.868 (9)	0.051 (12)	0.903 (18)	(W/kg)

reported 1g SAR				
reported SAR	**0.87**	**0.05**	**0.90**	(W/kg)

Table 11.2 SAR Scaling 10g – Extremity 2.4GHz WiFi, BT and UNII

Scaling of Maximum Measured SAR (10g)					
Measured Parameters		Configuration			
		Extremity	Extremity	Extremity	
Plot ID		E51Z	E7Z	E61Z	
Maximum Measured SAR_M		0.280	0.015	0.289	(W/kg)
Frequency		2437	2440	5805	(MHz)
Drift	Power Drift	0.010 (2)	1.000 (5)	0.400 (14)	(dB)
Conducted Power		16.380	8.340	17.480	(dBm)
DC	Transmiter Duty Cycle				(%)
DF	Use Duty Factor	100.0 (3)	100.0 (6)	100.0 (15)	(%)
Fluid Deviation from Target					
Δe	Permitivity	-8.63%	-8.57%	-5.40%	
Δσ	Conductivity	3.13%	2.79%	5.40%	

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)
$C\sigma = (0.004479*f^3) - (0.01586*f^2) - (0.1972*f) + 0.7717$				(12)
f	Frequency (GHz)	2.437	2.44	5.805	
Ce		-0.159	-0.159	-0.254	
Cσ		0.262	0.261	-0.031	
Ce * Δe		0.014	0.014	0.014	
Cσ * Δσ		0.008	0.007	-0.002	
ΔSAR		0.022 (1)	0.021 (4)	0.012 (13)	(%)

Manufacturer's Tuneup Tolerance				
Measured Conducted Power	16.380	8.340	17.480	(dBm)
Rated Conducted Power	18.000	9.000	17.500	(dBm)
ΔP	-1.620	-0.660	-0.020	(dB)

Transmitter Duty Cycle [Crest Factor]				
Transmiter Duty Cycle (DC)	99.5	77.1	98.0	(%)
CF (1/DC)	1.01	1.30	1.02	

SAR Adjustment for Fluid Sensitivity				
$SAR_1 = SAR_M$ X [ΔSAR]	0.280 (1)	0.015 (4)	0.289 (13)	(W/kg)

SAR Adjustment for Tuneup Tolerance				
$SAR_2 = SAR_1$ + [ΔP]	**0.407**	**0.018**	**0.290**	(W/kg)

SAR Adjustment for Drift				
$SAR_3 = SAR_2$ + [Drift]	0.407 (2)	0.018 (5)	0.290 (14)	(W/kg)

SAR Adjustment for Transmitter Duty Cycle [Crest Factor]				
$SAR_4 = SAR_3$ x [CF]	**0.409**	**0.023**	**0.296**	(W/kg)

SAR Adjustment for Use Duty Factor				
$SAR_5 = SAR_4$ x [DF]	0.409 (3)	0.023 (6)	0.296 (15)	(W/kg)

reported 1g SAR				
reported SAR	**0.41**	**0.02**	**0.30**	(W/kg)

NOTES to Table
Scaling of the Maximum Measured SAR is based on the highest Face, Body, Extremity and/or Head SAR measured of ALL test channels, configurations and accessories used during THIS evaluation. The Measured Fluid Deviation parameters, Drift, Conducted Power, Duty Cycle [Crest] and Use Duty Factor apply only to those test frequencies and configurations producing the highest SAR. The *reported* SAR is the accumulation of all SAR Adjustments from the applicable steps above. The Plot ID is for identification of the SAR Measurement Plot(s) in the Annexes of this report. NOTE: The above adjustments have been applied to ALL Measured SAR values. In some cases, the highest Measure SAR may not have produced the highest *reported* SAR after all adjustments have been made. NOTE: Some of the above adjustments may not be applicable to each configuration. They are identified by grayed fields.
SAR_1
Per IEC/IEEE 62209-1528, FCC KDB 865664, ISED RSS-102 and ISED Notice 2012-DRS0529, SAR adjustment is applied when the calculated ΔSAR, resulting from the equations indicated, is negative (-). ΔSAR is given as a percentage (%). The SAR is MULTIPLIED by this scaling factor only when the scaling factor is negative (-).
SAR_2
Per IEC/IEEE 62209-1528, FCC KDB 865664 and ISED RSS-102, adjustment is required only when the difference (ΔP) between the Measured Conducted Power and the Manufacturer's Rated Conducted Power is (-) Negative. ΔP is given in dB. The absolute value of ΔP is ADDED (logarithmically) to the SAR when ΔP is negative (-).
SAR_3
Per IEC/IEEE 62209-1528, FCC KDB 865664 and ISED RSS-102, adjustment is required only when Measured Drift is negative (-). The absolute value of Measured Drift is ADDED (logarithmically) to the SAR. Drift is given in dB. The absolute value of Drift is ADDED (logarithmically) to the SAR when Drift is negative (-).
SAR_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. CF is given as a decimal. The SAR is MULTIPLIED by this scaling factor only when the scaling factor is greater than 1.
SAR_5
Use Duty Factor applies to Push-To-Talk (PTT) transceivers or other devices whereby the user has some control of the transmitter on-off period. Per IEC/IEEE 62209-1528, FCC KDB 447498, FCC KDB 643646 and ISED RSS-102, a Duty Factor (DF) of 50% may be applied. In cases where Voice Activated transmit is employed, a DF of 75% may be applied. DF is given as a percentage (5). The SAR is MULTIPLIED by this scaling factor only when the scaling factor is less than 100%.
***reported* SAR**
The *reported* SAR is the Maximum SAR after all applicable adjustments have been made and is indicated on the cover page of this report.

Note (1): Delta SAR is Positive, SAR Adjustment for Fluid Sensitivity is not Required, in accordance with ISED Notice 2012-DRS0529
Note (2): Power Drift is Positive, Drift Adjustment not Required.
Note (3): Use Duty Factor is 100%. No Duty Factor Correction applied.
Note (4): Delta SAR is Positive, SAR Adjustment for Fluid Sensitivity is not Required, in accordance with ISED Notice 2012-DRS0529
Note (5): Power Drift is Positive, Drift Adjustment not Required.
Note (6): Crest Factor = 1 (100% Duty Cycle), Crest Factor Adjustment not Required.
Note (7): Use Duty Factor is 100%. No Duty Factor Correction applied.
Note (8): Delta SAR is Positive, SAR Adjustment for Fluid Sensitivity is not Required, in accordance with ISED Notice 2012-DRS0529
Note (9): Power Drift is Positive, Drift Adjustment not Required.
Note (10): Use Duty Factor is 100%. No Duty Factor Correction applied.
Note (11): Delta SAR is Positive, SAR Adjustment for Fluid Sensitivity is not Required, in accordance with ISED Notice 2012-DRS0529
Note (12): Power Drift is Positive, Drift Adjustment not Required.
Note (13): Crest Factor = 1 (100% Duty Cycle), Crest Factor Adjustment not Required.
Note (14): Use Duty Factor is 100%. No Duty Factor Correction applied.
Note (15): Power Drift is Positive, Drift Adjustment not Required.
Note (16): Use Duty Factor is 100%. No Duty Factor Correction applied.
Note (17): Delta SAR is Positive, SAR Adjustment for Fluid Sensitivity is not Required, in accordance with ISED Notice 2012-DRS0529
Note (18): Power Drift is Positive, Drift Adjustment not Required.
Note (19): Use Duty Factor is 100%. No Duty Factor Correction applied.
Note (20): Delta SAR is Positive, SAR Adjustment for Fluid Sensitivity is not Required, in accordance with ISED Notice 2012-DRS0529
Note (21): Power Drift is Positive, Drift Adjustment not Required.
Note (22): Use Duty Factor is 100%. No Duty Factor Correction applied.
Note (23): Delta SAR is Positive, SAR Adjustment for Fluid Sensitivity is not Required, in accordance with ISED Notice 2012-DRS0529
Note (24): Power Drift is Positive, Drift Adjustment not Required.
Note (25): Use Duty Factor is 100%. No Duty Factor Correction applied.

Table 11.3 Simultaneous Transmission SAR Analysis

The 2.4GHz Bluetooth and 5GHz U-NII transmitters are capable of simultaneous transmission, and the following is the analysis of the simultaneous transmission configurations.

From Table 11.1 and 11.2 above, the *reported* Standalone SAR are as follows:

BODY SAR (1g)

Bluetooth (SAR_{BT}): 0.05W/kg
WiFi (SAR_{WiFii}): 0.90/kg (U-NII)

Simultaneous SAR (SAR_{TOT}) = SAR_{BT} + SAR_{WiFi} = 0.05 + 0.90 =**0.95 W/kg**

EXTREMITY SAR (10g)

Bluetooth (SAR_{BT}): 0.02W/kg
WiFi (SAR_{WiFii}): 0.30 (U-NII)

Simultaneous SAR (SAR_{TOT}) = SAR_{BT} + SAR_{WiFi} = 0.02 + 0.30 =**0.32 W/kg**

The BT SAR measurements were not required as per antenna distances and power levels and noted in tables 8.3 and 8.4.
A SAR measurement was undertaken to facilitate a simultaneous SAR value for reporting purposes. BT SAR was very low and the bottom edge touch position was used, to provide a measurable and conservative SAR value for simultaneous SAR analysis of both Body and Extremity.

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								
Date	Ambient Temp (°C)	Fluid Temp (°C)	Relative Humidity (%)	Barometric Pressure (kPa)	Fluid Dielectric	SPC	Test	Task
27 Dec 2024	24.0	23.8	29%	100.7	X	X	X	2450H Fluids, SPC, SAR Testing
28 Dec 2024	23.4	22.4	30%	100.5			X	2450H SAR Testing
29 Dec 2024	25.5	22.6	26%	100.8			X	2450H SAR Testing
20 Jan 2025	23.2	23.0	21%	103.5	X	X	X	5750H Fluids, SPC, SAR Testing
21 Jan 2025	23.7	22.4	22%	103.1			X	5750H SAR Testing
22 Jan 2025	23.9	23.0	23%	102.5	X	X	X	5250H Fluids, SPC, SAR Testing

13.2 DUT Setup and Configuration

DUT Setup and Configuration	
1	The DUT was evaluated for Extremity at a 0mm distance, for Body at a 5mm distance, from a flat phantom filled with head tissue-equivalent medium. The DUT was evaluated for SAR in accordance with the procedures as described in FCC KDB 447498, 248227, 865664 and 62209-1528 IEC/IEEE. Initial testing was undertaken in the highest power band for extremity and body configuration on sides as indicated in the tables in sec 8, antenna seperation distances.
2	2.4GHz 802.11g/n OFDM SAR Test Exclusion As Per KDB 248227 D01v02r02 - 5.2.2, 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 ≤ 1.2W/kg When applying this formula to 10-g, the threshold should be multiplied by 2.5, i.e. when 10-g extremity SAR s considered the threshold adjusted SAR is ≤ 3.0W/kg Maximum 802.11g/n OFDM specified power(POFDM) 802.11g = 17.0dBm (50.1mW) and 802.11n = 17.25dBm (53.09mW) Maximum 802.11b DSSS specified power (PDSSS)= 18 dBm (63.1mW) Ratio OFDM/DSSS power 802.11g =79.4% and 802.11n=**84.1%** Highest reported SAR $(SARMAX)_{EXTREMITY}$=0.41W/kg and Highest reported SAR $(SARMAX)_{BODY}$=0.87W/kg POFDM/PDSSS X $SARMAX_{EXTREMITY}$ = 0.35 W/kg ≤ 3.0 W/kg (Extremity) SAR test exclusion applies. POFDM/PDSSS X $SARMAX_{BODY}$ = 0.73 W/kg ≤ 1.5 W/kg (Body) SAR test exclusion applies. UNII rated power is the same or lower in higher order modulations as a result the UNII 802.11A OFDM SAR value would not be higher, in higher order modulations and further testing is not required in UNII.
3	The Device was capable of transmitting at various modulations, data rates and duty cycles. The Conducted Power was measured at the lowest modulation and largest bandwidth and with the Duty cycle noted. The DUT was evaluated for SAR at the maximum conducted output power level, preset by the manufacturer, and adjusted crest factor for 100% duty cycle.
4	Bluetooth was evaluated for SAR in BT BR (GFSK) mode with a transmit duty cycle of noted and with a crest factor adjustment to 100% duty cycle if required, in the worst-case configuration from the WiFi test evaluation.The Duty cycle could not be altered in test mode or by the user. The DUT was evaluated for SAR at the maximum conducted output power level, preset by the manufacturer.
5	Each SAR evaluation was performed with the device battery fully charged.

13.3 DUT Positioning

DUT Positioning
Positioning
The DUT Positioner was securely fastened to the Phantom Platform. Registration marks were placed on the DUT and the Positioner to ensure consistent positioning of the DUT for each test evaluation.
FACE Configuration
Head SAR - (held- to-face). Devices that are designed to be near extremity and may operate with in a mode for voice communication, with the device positioned next to the mouth. When next-to-mouth SAR evaluation is required, the device is positioned at 10mm from a flat phantom filled with head tissue-equivalent medium.
BODY Configuration
Devices that are designed to be worn on the Body or on person are positioned on the device holder with a body worn accessory in place against the surface of the phantom, or with-out an accessory at 5mm from the bottom of the phantom in the Body configuration.
HEAD Configuration
This device is not intended to be held to the ear and was not tested in the HEAD configuration.
Extremity Configuration
Devices that are designed to be near extremity, or hand-held are positioned with the back side directly against the phantom surface.

13.4 General Procedures and Report

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 ±2.0°C throughout the test series. The liquid parameters shall be measured within 24 hours before the start of a test series and if it takes longer than 48 hours, the liquid parameters shall also be measured at the end of the test series. 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.
Reporting
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 SAR column are the SAR values reported by the SAR Measurement Server with the DUT operating at maximum transmit duty cycle. These tables also include other information such as transmit channel and frequency, modulation, accessories tested and DUT-phantom separation distance. In the Scaling of Maximum Measured SAR Section of this report, the highest measured SAR in the BODY configuration, 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 FCC KDB 865664 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 62201-1 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 IEEE 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 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**
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 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**
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 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**
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 MEASUREMENT VAIABILITY & 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.

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: 27-Dec-2024		Fluid Temp: 23.8		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		36.1000	1.8000	39.2700	1.76	-8.07%	2.27%	0.029	0.019	1.000	1.000
2412.0000	*	36.0580	1.8060	39.2660	1.76	-8.17%	2.50%	0.031	0.020	1.000	1.000
2420.0000		35.8900	1.8300	39.2500	1.77	-8.56%	3.39%	0.036	0.023	1.000	1.000
2430.0000		35.7900	1.8500	39.2400	1.78	-8.79%	3.93%	0.039	0.024	1.000	1.000
2437.0000	*	35.8390	1.8430	39.2260	1.79	-8.63%	3.13%	0.035	0.022	1.000	1.000
2440.0000	*	35.8600	1.8400	39.2200	1.79	-8.57%	2.79%	0.033	0.021	1.000	1.000
2450.0000		35.8300	1.8400	39.2000	1.80	-8.60%	2.22%	0.030	0.019	1.000	1.000
2460.0000		35.8100	1.8900	39.1900	1.81	-8.62%	4.42%	0.041	0.025	1.000	1.000
2462.0000	*	35.7740	1.8900	39.1860	1.81	-8.71%	4.30%	0.040	0.025	1.000	1.000
2470.0000		35.6300	1.8900	39.1700	1.82	-9.04%	3.85%	0.039	0.024	1.000	1.000
2472.0000	*	35.6980	1.8860	39.1680	1.82	-8.86%	3.51%	0.037	0.023	1.000	1.000
2480.0000		35.9700	1.8700	39.1600	1.83	-8.15%	2.19%	0.029	0.019	1.000	1.000

*Channel Frequency Tested

Table 15.2 Fluid Dielectric Parameters 5750MHz HEAD TSL

FLUID DIELECTRIC PARAMETERS								Fluid Sensitivity Calculation IEC/IEEE 62209-1528 7.8.2			
Date: 20-Jan-2025		Fluid Temp: 23		Frequency: 5750MHz		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
5740.0000		33.3700	5.4600	35.3700	5.21	-5.65%	4.80%	0.009	0.013	1.000	1.000
5745.0000	*	33.1700	5.4750	35.3650	5.22	-6.21%	4.99%	0.010	0.014	1.000	1.000
5750.0000		32.9700	5.4900	35.3600	5.22	-6.76%	5.17%	0.011	0.015	1.000	1.000
5760.0000		33.2100	5.5600	35.3500	5.23	-6.05%	6.31%	0.009	0.013	1.000	1.000
5765.0000	*	33.2800	5.5750	35.3400	5.24	-5.83%	6.49%	0.009	0.013	1.000	1.000
5770.0000		33.3500	5.5900	35.3300	5.24	-5.60%	6.68%	0.008	0.012	1.000	1.000
5800.0000		33.3700	5.5500	35.3000	5.27	-5.47%	5.31%	0.008	0.012	1.000	1.000
5805.0000	*	33.3900	5.5600	35.2950	5.28	-5.40%	5.40%	0.008	0.012	1.000	1.000
5810.0000		33.4100	5.5700	35.2900	5.28	-5.33%	5.49%	0.008	0.012	1.000	1.000

*Channel Frequency Tested

Table 15.3 Fluid Dielectric Parameters 5250MHz HEAD TSL

FLUID DIELECTRIC PARAMETERS								Fluid Sensitivity Calculation IEC/IEEE 62209-1528 7.8.2			
Date: 22-Jan-2025		Fluid Temp: 23		Frequency: 5250MHz		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
5170.0000		33.6700	4.6900	36.0200	4.62	-6.52%	1.52%	0.013	0.016	1.000	1.000
5180.0000	*	33.6700	4.6700	36.0100	4.63	-6.50%	0.86%	0.013	0.016	1.000	1.000
5190.0000		33.6900	4.7500	36.0000	4.64	-6.42%	2.37%	0.012	0.015	1.000	1.000
5200.0000	*	33.6200	4.8100	35.9900	4.65	-6.59%	3.44%	0.012	0.015	1.000	1.000
5210.0000		33.4700	4.7800	35.9700	4.67	-6.95%	2.36%	0.013	0.017	1.000	1.000
5230.0000		33.0200	4.7800	35.9500	4.69	-8.15%	1.92%	0.016	0.020	1.000	1.000
5240.0000	*	33.2200	4.8300	35.9400	4.70	-7.57%	2.77%	0.014	0.018	1.000	1.000
5250.0000		33.4900	4.7700	35.9300	4.71	-6.79%	1.27%	0.013	0.017	1.000	1.000

*Channel Frequency Tested

16.0 SYSTEM VERIFICATION TEST RESULTS

Table 16.1 - 2450MHz

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N		S/N
27 Dec 2024		2450	D2450V2		825
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	23.0	23.8	29%	250	10
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
35.83	39.20	-8.60%	1.84	1.80	2.22%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
13.40	13.13	2.10%	6.11	6.23	-1.85%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
53.60	52.50	2.10%	24.44	24.90	-1.85%

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.

Table 16.2 - 5750MHz

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N		S/N
20 Jan 2025		5750	D5GHzV2		1031
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	22.2	23	21%	50	10
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
32.97	35.36	-6.76%	5.49	5.22	5.17%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
4.26	3.93	8.40%	1.20	1.12	7.14%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
85.20	78.60	8.40%	24.00	22.40	7.14%

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.

Table 16.3 - 5250MHz

System Verification Test Results					
Date		Frequency (MHz)	Validation Source		
			P/N		S/N
22 Jan 2025		5250	D5GHzV2		1031
Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power (mW)	Source Spacing (mm)
Head	23.0	24	23%	50	10
Fluid Parameters					
Permittivity			Conductivity		
Measured	Target	Deviation	Measured	Target	Deviation
33.49	35.93	-6.79%	4.77	4.71	1.27%
Measured SAR					
1 gram			10 gram		
Measured	Target	Deviation	Measured	Target	Deviation
3.91	4.03	-2.86%	1.11	1.15	-3.48%
Measured SAR Normalized to 1.0W					
1 gram			10 gram		
Normalized	Target	Deviation	Normalized	Target	Deviation
78.20	80.50	-2.86%	22.20	23.00	-3.48%

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
	✓ = Complete				✓ = Not Required		
30-May-24	EX3DV4	7826	D2450V2	2450	Pass	Pass	Pass
23-Jul-24	EX3DV4	7826	D5GHzV2	5250	Pass	Pass	Pass
25-Jul-24	EX3DV4	7826	D5GHzV2	5750	Pass	Pass	Pass

18.0 MEASUREMENT SYSTEM SPECIFICATIONS

Table 18.0 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.	7826
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	13-May-24	13-May-25
-EX3DV4 E-Field Probe	00357	7826	15-May-24	15-May-25
-D2450V2 Validation Dipole	00219	825	15-May-24	15-May-27
-D5GHzV2 Validation Dipole	00126	1031	16-May-24	16-May-27
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	6-Jan-24	6-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
Bipolar Power Supply 6299A	00086	1144A02155	CNR	CNR
DC-18G 10W 30db Attenuator	00102	-	COU	COU
R&S FSP40 Spectrum Analyzer	00241	100500	10-Sep-24	10-Sep-27
HP 8566B Spectrum Analyzer	00051	2747A055100	6-Jul-24	6-Jul-27
RF Cable-SMA	00311	-	CNR	CNR
HP Calibration Kit	00145	-	CNR	CNR

CNR = Calibration Not Required
SB=Stand By
COU = Calibrate on Use

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

Table 20.2 Fluid Composition 5250, 5750MHz HEAD TSL
The 5GHz Head TSL is a SPEAG proprietary broad band fluid:

Type: **HBBL3500-5500V2**
Batch number: **131210-2**
P/N: **SL AAH 502 AC**

END OF REPORT

APPENDIX A – SYSTEM VERIFICATION PLOTS

DUT: D2450V2 - SN825; Type: D2450V2; Serial: SN825
Procedure Name: SPC 2450H_Input=250mw, 1gTarget=[12.15]13.5][14.85]W/kg 10g Target=[5.68][6.32][6.95]

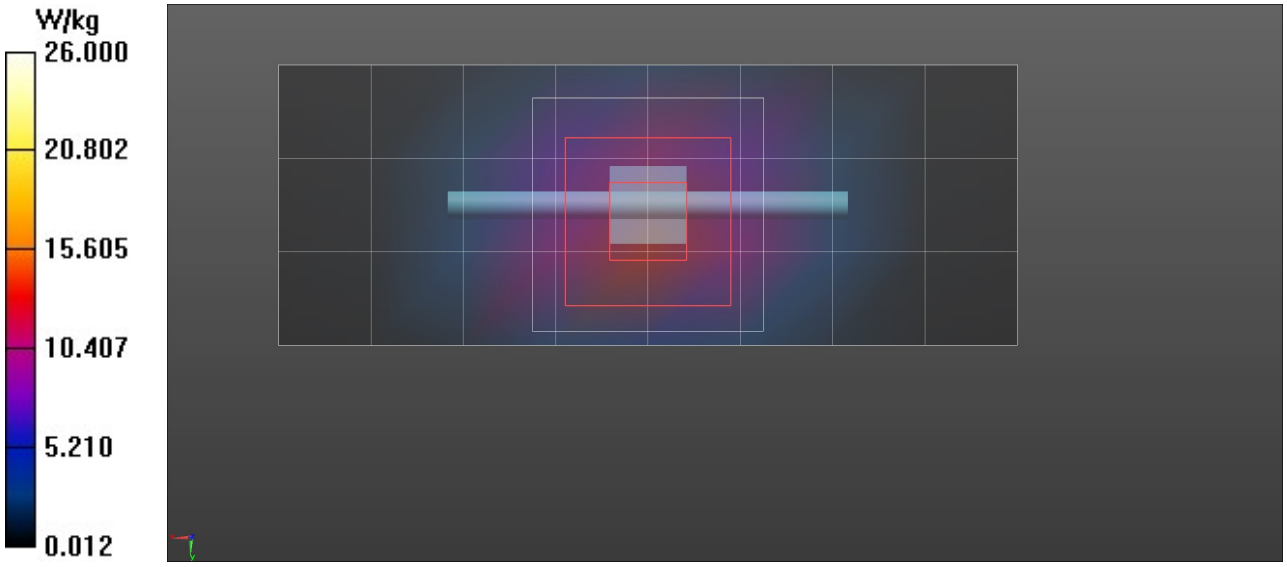
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.84 S/m; ε_r = 35.83; ρ = 1000 kg/m^3
Phantom section: Left Section
Date/Time: 12/27/2024 11:42:04 AM
DASY5 Configuration:

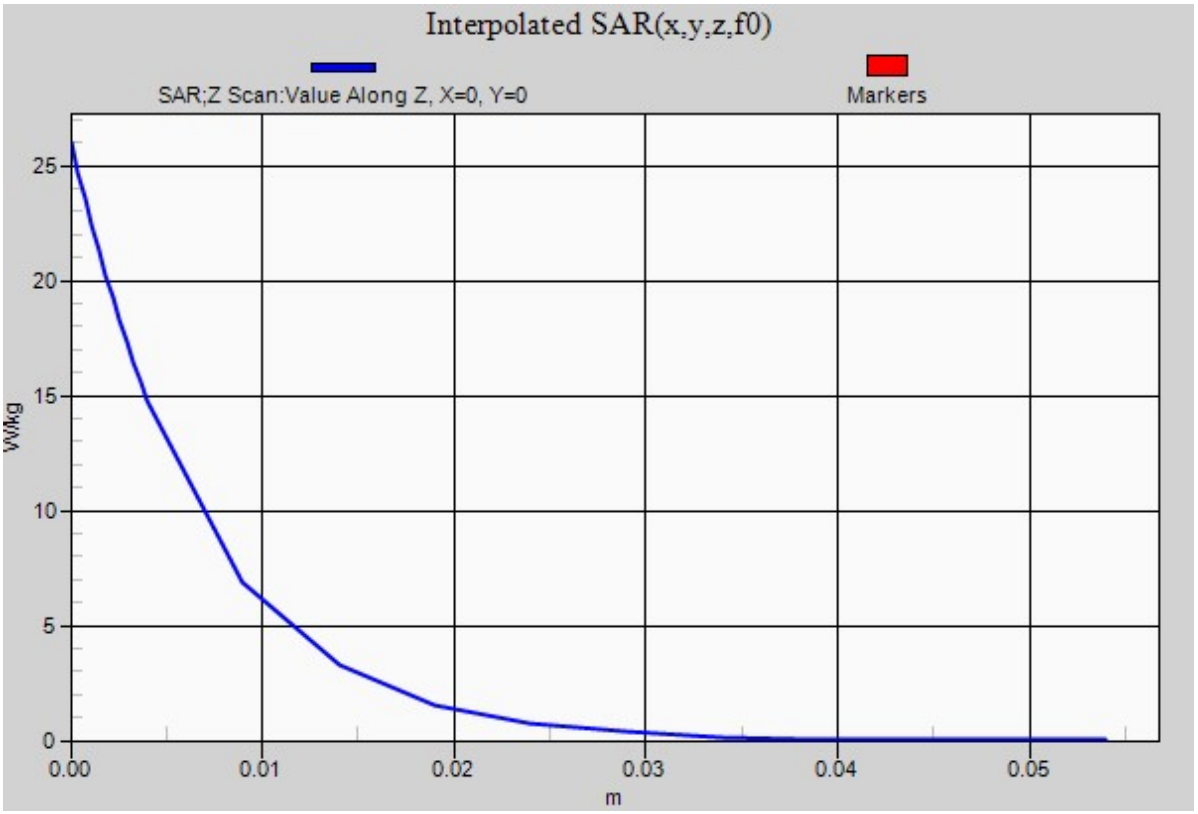
- Probe: EX3DV4 - SN7826; ConvF(7.5, 7.2, 7.38) @ 2450 MHz; Calibrated: 5/15/2024
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 5/13/2024
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1177/2
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

SPC/SPC 2450H_Input=250mw, 1gTarget=[12.15][13.5][14.85]W/kg 10g Target=[5.68][6.32][6.95]/Area Scan (9x4x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 13.5 W/kg

SPC/SPC 2450H_Input=250mw, 1gTarget=[12.15][13.5][14.85]W/kg 10g Target=[5.68][6.32][6.95]/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.29 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 29.1 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.11 W/kg
Smallest distance from peaks to all points 3 dB below = 11 mm
Ratio of SAR at M2 to SAR at M1 = 46.2%
Maximum value of SAR (measured) = 15.1 W/kg

SPC/SPC 2450H_Input=250mw, 1gTarget=[12.15][13.5][14.85]W/kg 10g Target=[5.68][6.32][6.95]/Z Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Penetration depth = 6.664 (6.527, 6.715) [mm]
Maximum value of SAR (interpolated) = 26.0 W/kg


W/kg
26.000
20.802
15.605
10.407
5.210
0.012


Interpolated SAR(x,y,z,f0)
SAR;Z Scan:Value Along Z, X=0, Y=0
Markers
W/kg
25
20
15
10
5
0
0.00
0.01
0.02
0.03
0.04
0.05
m

Procedure Name: SPC 5750H Input=50mw, Target=[3.53][3.92][4.31], Target=78.6W/kg@1000 mw 2

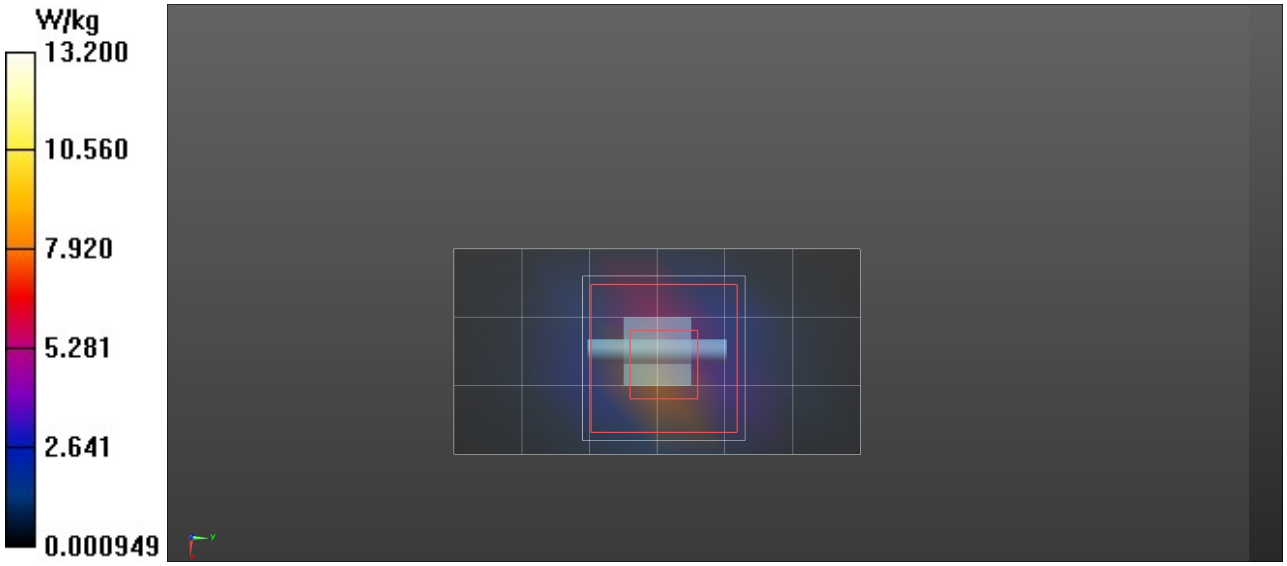
Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5750 MHz; σ = 5.49 S/m; ε_r = 32.97; ρ = 1000 kg/m^3
Phantom section: Left Section
Date/Time: 1/20/2025 10:12:03 AM
DASY5 Configuration:

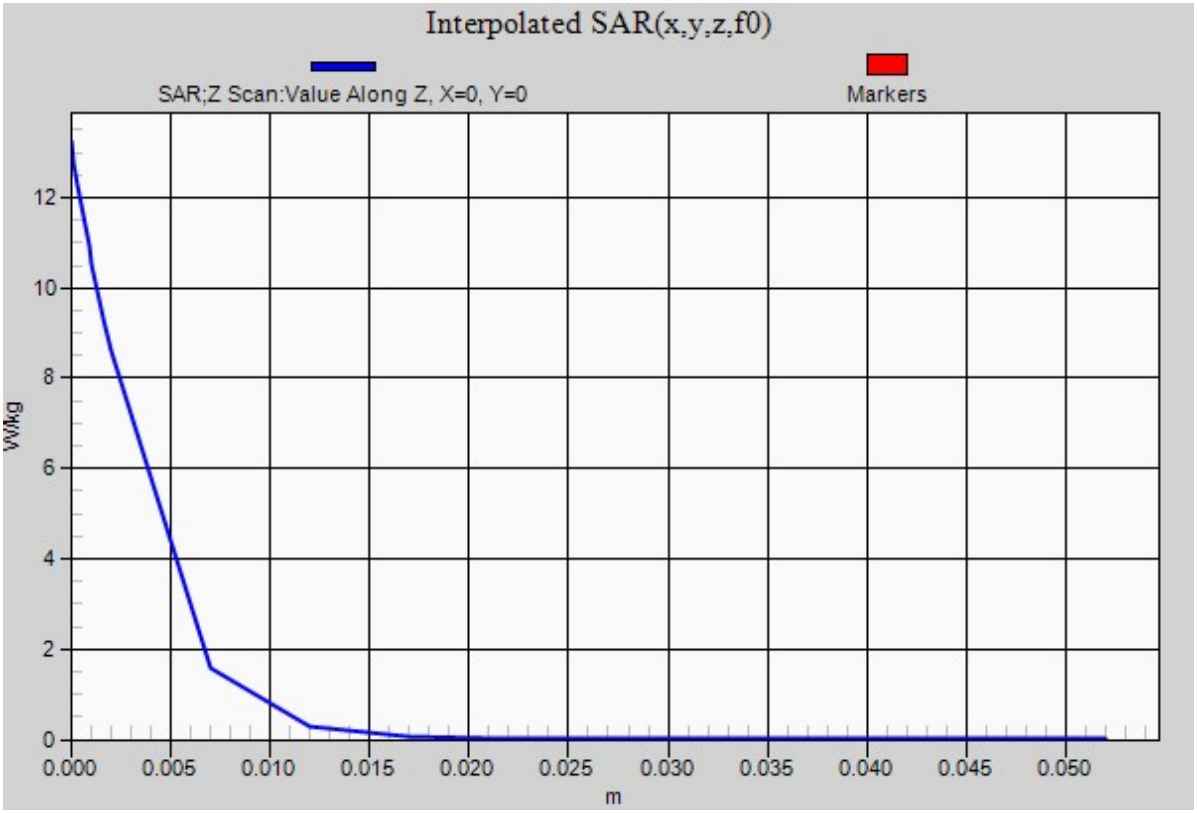
- Probe: EX3DV4 - SN7826; ConvF(4.91, 4.76, 4.89) @ 5750 MHz; Calibrated: 5/15/2024
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 5/13/2024
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1177/2
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

SPC/SPC 5750H Input=50mw, Target=[3.53][3.92][4.31], 10g Target=[1.01][1.12][1.23]/Area Scan (4x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 7.78 W/kg

SPC/SPC 5750H Input=50mw, Target=[3.53][3.92][4.31], 10g Target=[1.01][1.12][1.23]/Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 29.20 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 19.1 W/kg
SAR(1 g) = 4.26 W/kg; SAR(10 g) = 1.2 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 51.1%
Maximum value of SAR (measured) = 9.10 W/kg

SPC/SPC 5750H Input=50mw, Target=[3.53][3.92][4.31]/Scan (1x1x22): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Penetration depth = 2.811 (2.978, 2.832) [mm]
Maximum value of SAR (interpolated) = 13.2 W/kg


W/kg
13.200
10.560
7.920
5.281
2.641
0.000949


Interpolated SAR(x,y,z,f0)
SAR;Z Scan:Value Along Z, X=0, Y=0
Markers
W/kg
12
10
8
6
4
2
0
0.000
0.005
0.010
0.015
0.020
0.025
0.030
0.035
0.040
0.045
0.050
m

DUT: D5GHzV2 - SN1031; Type: D5GHzV2; Serial: SN1031
Procedure Name: SPC 5250H Input=50 mw, Target= [3.71[4.12][4.53] Target=82.4W/kg@1000mw_

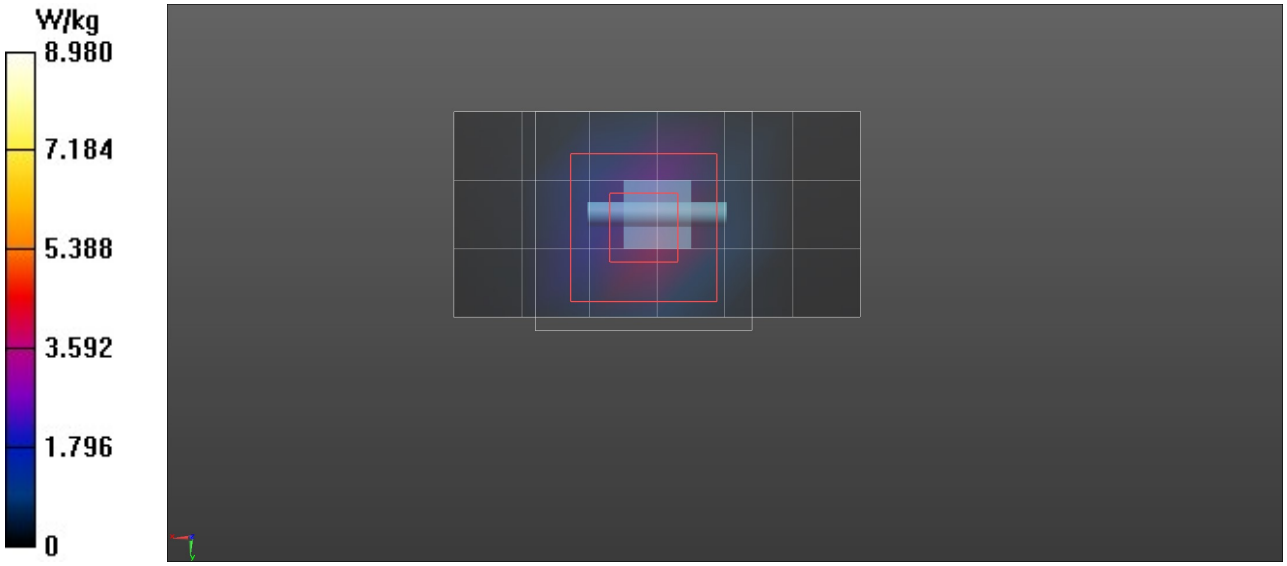
Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5250 MHz; σ = 4.77 S/m; ε_r = 33.49; ρ = 1000 kg/m^3
Phantom section: Left Section
Date/Time: 1/22/2025 1:43:54 PM
DASY5 Configuration:

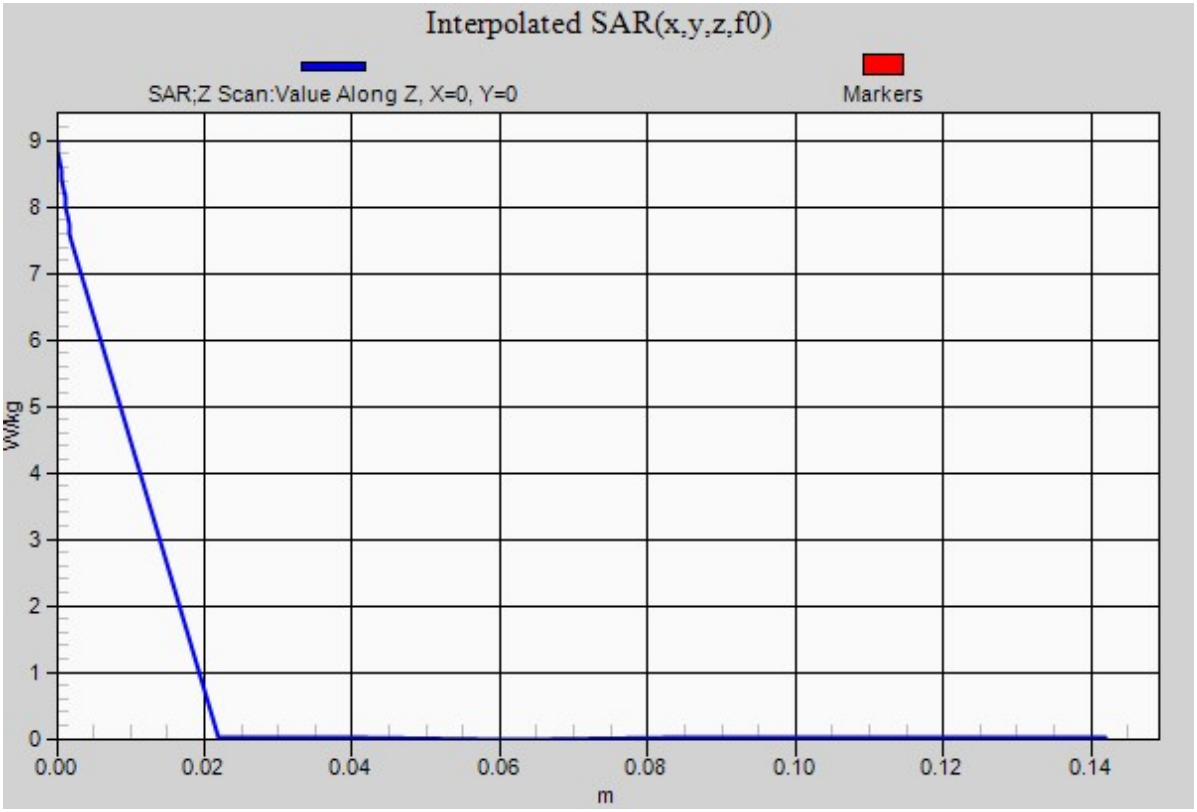
- Probe: EX3DV4 - SN7826; ConvF(5.53, 5.11, 5.33) @ 5250 MHz; Calibrated: 5/15/2024
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 5/13/2024
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1177/2
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

SPC/SPC 5250H Input=50 mw, Target= [3.61][4.01][4.41] 10g Target=[1.035][1.15][1.27]/Area Scan (7x4x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 3.76 W/kg

SPC/SPC 5250H Input=50 mw, Target= [3.61][4.01][4.41] 10g Target=[1.035][1.15][1.27]/Zoom Scan (9x9x6)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 30.11 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 16.0 W/kg
SAR(1 g) = 3.91 W/kg; SAR(10 g) = 1.11 W/kg
Smallest distance from peaks to all points 3 dB below = 7.4 mm
Ratio of SAR at M2 to SAR at M1 = 54.1%
Maximum value of SAR (measured) = 8.20 W/kg

SPC/SPC 5250H Input=50 mw, Target= [3.71[4.12][4.53]/Z Scan (1x1x19): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Penetration depth = n/a (n/a, 2.904) [mm]
Maximum value of SAR (interpolated) = 8.98 W/kg


W/kg
8.980
7.184
5.388
3.592
1.796
0


Interpolated SAR(x,y,z,f0)
SAR;Z Scan:Value Along Z, X=0, Y=0
Markers
W/kg
9
8
7
6
5
4
3
2
1
0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
m

APPENDIX B – MEASUREMENT PLOTS OF MAXIMUM MEASURED SAR

E61/E61Z

DUT: A05008; Type: Transmitter; Serial: 3495259659
Procedure Name: E61-A05008 NA, Back Side, 5805MHz 6mb OFDM

Communication System: UID 0, CW (0); Frequency: 5805 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5805 MHz; σ = 5.56 S/m; ε_r = 33.39; ρ = 1000 kg/m^3
Phantom section: Left Section
Date/Time: 1/20/2025 2:59:04 PM
DASY5 Configuration:

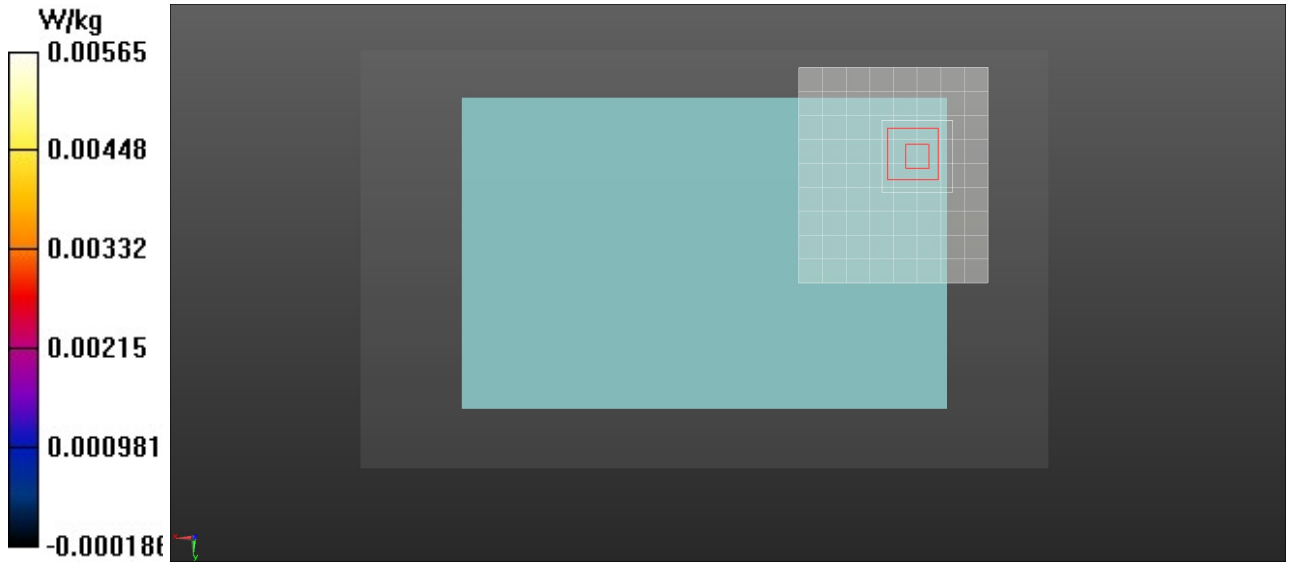
- Probe: EX3DV4 - SN7826; ConvF(4.91, 4.76, 4.89) @ 5805 MHz; Calibrated: 5/15/2024
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 5/13/2024
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1177/2
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

5750H/E61-A05008 NA, Back Side, 5805MHz 6mb OFDM/Area Scan (9x10x1): Measurement grid: dx=10mm, dy=10mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.912 W/kg

5750H/E61-A05008 NA, Back Side, 5805MHz 6mb OFDM/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.180 V/m; Power Drift = 0.40 dB
Peak SAR (extrapolated) = 2.68 W/kg
SAR(1 g) = 0.845 W/kg; SAR(10 g) = 0.289 W/kg
Smallest distance from peaks to all points 3 dB below = 9.2 mm
Ratio of SAR at M2 to SAR at M1 = 15.8%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 2.10 W/kg

5750H/E61-A05008 NA, Back Side, 5805MHz 6mb OFDM/Z Scan (1x1x19): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Info: Interpolated medium parameters used for SAR evaluation.
Penetration depth = n/a (n/a, 0) [mm]
Maximum value of SAR (interpolated) = 0.00565 W/kg



B63/B63Z

DUT: A05008; Type: Transmitter; Serial: 3495259659
Procedure Name: B63-A05008 NA, Back Side, 5745MHz 6mb OFDM 5 mm

Communication System: UID 0, CW (0); Frequency: 5805 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5805 MHz; σ = 5.56 S/m; ε_r = 33.39; ρ = 1000 kg/m^3
Phantom section: Left Section
Date/Time: 1/21/2025 4:09:41 PM
DASY5 Configuration:

- Probe: EX3DV4 - SN7826; ConvF(4.91, 4.76, 4.89) @ 5805 MHz; Calibrated: 5/15/2024
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 1.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 5/13/2024
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1177/2
- Measurement SW: DASY52, Version 52.10 (3); SEMCAD X Version 14.6.13 (7474)

5750H/B63-A05008 NA, Back Side, 5745MHz 6mb OFDM 5 mm/Area Scan (9x10x1): Measurement grid: dx=10mm, dy=10mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.589 W/kg

5750H/B63-A05008 NA, Back Side, 5745MHz 6mb OFDM 5 mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.395 V/m; Power Drift = 1.70 dB
Peak SAR (extrapolated) = 1.95 W/kg
SAR(1 g) = 0.561 W/kg; SAR(10 g) = 0.218 W/kg
Smallest distance from peaks to all points 3 dB below = 11.4 mm
Ratio of SAR at M2 to SAR at M1 = 18.9%

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.31 W/kg

5750H/B63-A05008 NA, Back Side, 5745MHz 6mb OFDM 5 mm/Z Scan (1x1x19): Measurement grid: dx=20mm, dy=20mm, dz=20mm
Info: Interpolated medium parameters used for SAR evaluation.
Penetration depth = n/a (n/a, 0) [mm]
Maximum value of SAR (interpolated) = 0.00239 W/kg