



RF EXPOSURE TEST REPORT

Applicant Name:
Garmin International Inc.
1200 E. 151st Street
Olathe, Kansas
USA 66062

Date of Testing:
07/20/2026 – 07/27/2026
Test Site/Location:
Element, Columbia, MD, USA

Document Serial No.:
1M2606160049-01.IPH

FCC ID: **IPH-05126**

APPLICANT: **GARMIN INTERNATIONAL INC.**

DUT Type: Portable Digital Transceiver
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model(s): A05126

Equipment Class	Band & Mode	Tx Frequency	SAR
			1g Body (W/kg)
DTS	2.4 GHz WIFI	2412 - 2462 MHz	1.14
NII	5 GHz WIFI	U-NII-1: 5180 - 5240 MHz U-NII-2A: 5260 - 5320 MHz U-NII-2C: 5500 - 5720 MHz U-NII-3: 5745 - 5825 MHz	1.16
DSS	2.4 GHz Bluetooth	2402 - 2480 MHz	0.19

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.9 of this report; for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.


RJ Ortanez
VP - Connected Technologies



The SAR Tick is an initiative of the Mobile & Wireless Forum (MWF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MWF. Further details can be obtained by emailing: sartick@mwfai.info.

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Revision	Description	Issue Date	Revised by:
-	Initial Release	07/29/2026	WKR0000005818

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1 TEST LABORATORY INFORMATION

1.1 Introduction

This test report for device subject to testing at an accredited testing laboratory has been generated by the testing laboratory that tested the device. Measurements were performed at various locations within Element Materials Technology. Detailed location and accredited information regarding the testing laboratories are provided below.

1.2 Test Laboratories Information

1.2.1 Testing Laboratory 1

Test Firm Name	ELEMENT MATERIALS TECHNOLOGY WASHINGTON DC LLC
Test Lab Location	7185 Oakland Mills Road, Columbia, MD 21046, United States Tel. +1.410.290.6652 / Fax +1.410.290.6654
Accreditation Info.	Lab Code. (ISED): 2451B
	CAB Identifier (NIST): US0110
	ISO/IEC 17025 (A2LA): CERT #2041.01
	 
Measurement system No.	L, S

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2 DEVICE UNDER TEST

2.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
2.4 GHz WIFI	Data	2412 - 2462 MHz
5 GHz WIFI	Data	U-NII-1: 5180 - 5240 MHz U-NII-2A: 5260 - 5320 MHz U-NII-2C: 5500 - 5720 MHz U-NII-3: 5745 - 5825 MHz
2.4 GHz Bluetooth	Data	2402 - 2480 MHz

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2.2 Nominal and Maximum Output Power Specifications

There is no power reduction used for any band/mode implemented in this device for SAR purposes. This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D04v01.

2.2.1 2.4 GHz WLAN Output Power

Band	IEEE 802.11 Modulated Output Power (in dBm)					
	SISO					
	A1					
	b		g		n	
Maximum / Nominal Power	Max	Nom.	Max	Nom.	Max	Nom.
2.4 GHz WLAN	18.0	16.0	18.0	16.0	18.0	16.0

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2.2.2 5 GHz WLAN Output Power

Mode	Band	IEEE 802.11 Modulated Output Power (in dBm)								
		SISO								
		A2								
		a		n		ac				
Maximum / Nominal Power		Max		Nom.	Max		Nom.	Max		Nom.
5 GHz WIFI (20MHz BW)	UNII-1	14.0		12.0	14.0		12.0	14.0		12.0
		ch. 48:	13.0	11.0						
	UNII-2A	18.0		16.0	18.0		16.0	18.0		16.0
		ch. 52:	10.0	8.0	ch. 52:	8.0	6.0	ch. 52:	8.0	6.0
		ch. 64:	15.0	13.0	ch. 64:	15.0	13.0	ch. 64:	15.0	13.0
UNII-2C	11.5		9.5	11.5		9.5	11.5		9.5	
UNII-3	17.0		15.0	17.0		15.0	17.0		15.0	
5 GHz WIFI (40MHz BW)	UNII-1				17.5		15.5	17.5		15.5
					ch. 38:	15.0	13.0	ch. 38:	15.0	13.0
	UNII-2A				18.0		16.0	18.0		16.0
					ch. 62:	14.0	12.0	ch. 62:	14.0	12.0
	UNII-2C				11.5		9.5	11.5		9.5
UNII-3	17.0		15.0	17.0		15.0				
5 GHz WIFI (80MHz BW)	UNII-1							11.0		9.0
	UNII-2A							14.0		12.0
	UNII-2C							11.5		9.5
	UNII-3							17.0		15.0

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2.2.3 2.4 GHz Maximum Bluetooth Output Power

Mode	Data Rate	Modulated Output Power (in dBm)	
		Single Antenna	
		A1	
Maximum / Nominal Power		Max	Nom.
Bluetooth	1Mbps	5.5	3.5
Bluetooth EDR	2Mbps	5.0	3.0
Bluetooth EDR	3Mbps	5.0	3.0
Bluetooth LE	1Mbps	5.5	3.5
Bluetooth LE	2Mbps	5.5	3.5

2.3 DUT Antenna Locations

The overall dimensions of this device is > 9 x 5 cm but less than < 20 cm. This device is considered a “UMPC mini-tablet”. A diagram showing the location of the device antennas can be found in the DUT Antenna Diagram and SAR Test Setup Photographs Appendix. Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC filing.

Table 2-1
Device Edges/Sides for SAR Testing

Antenna	Back	Front	Top	Bottom	Right	Left
A1	Yes	Yes	No	Yes	No	Yes
A2	Yes	Yes	No	Yes	No	Yes

Note: Particular DUT edges were not required to be evaluated for UMPC mini-tablet SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D07v01r02. The distances between the transmit antennas and the edges of the device are included in the filing.

2.4 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D04v01, transmitters are considered to be operating simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.

This device does not contain multiple transmitters that operate simultaneously; therefore, no simultaneous transmission analysis is required according to FCC KDB Publication 447498 D04v01 4.3.2 procedures.

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2.5 Miscellaneous SAR Test Considerations

(A) WIFI/BT

Since U-NII-1 has a lower maximum output than U-NII-2A and the highest reported SAR for U-NII-2A is less than 1.2 W/kg, SAR is not required for U-NII-1 band according to FCC KDB Publication 248227 D01v02r02.

This device supports IEEE 802.11ac with the following features:

- a) Up to 80 MHz Bandwidth only
- b) No aggregate channel configurations
- c) 1 Tx antenna output
- d) 256 QAM is supported
- e) TDWR supported
- f) TDWR band gap channels 138, 142, and 144 are not supported

2.6 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D04v01 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 941225 D07v01r02 (UMPC Mini-Tablet Devices)
- IEC 62479:2010
- SPEAG DASY6 System Handbook
- IEC/IEEE 63195-1:2022

2.7 Device Serial Numbers

Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units. The serial numbers used for each test are indicated alongside the results in Section 10.

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3 INTRODUCTION

The FCC and Innovation, Science, and Economic Development Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [3] and Health Canada RF Exposure Guidelines Safety Code 6 [22]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [4] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields,” Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

3.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 3-1).

Equation 3-1
SAR Mathematical Equation

$$SAR = \frac{d}{dt} \left(\frac{dU}{dm} \right) = \frac{d}{dt} \left(\frac{dU}{\rho dv} \right)$$

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \frac{\sigma \cdot E^2}{\rho}$$

where:

- σ = conductivity of the tissue-simulating material (S/m)
- ρ = mass density of the tissue-simulating material (kg/m³)
- E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

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4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013:

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):
 - a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
 - b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

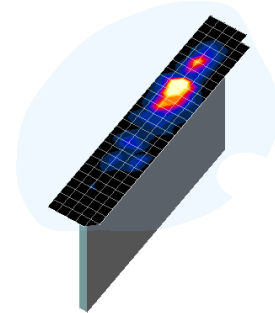


Figure 4-1
Sample SAR Area Scan

Table 4-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

Frequency	Maximum Area Scan Resolution (mm) ($\Delta x_{3\text{area}}, \Delta y_{3\text{area}}$)	Maximum Zoom Scan Resolution (mm) ($\Delta x_{\text{zoomTV}}, \Delta y_{\text{zoom}}$)	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
				$\Delta z_{\text{zoom}}(n)$	$\Delta z_{\text{zoom}}(1)^*$	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 22

*Also compliant to IEEE 1528-2013 Table 6

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5 TEST CONFIGURATION POSITIONS

5.1 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon = 3$ and loss tangent $\delta = 0.02$.

5.2 SAR Testing for UMPC Mini-Tablet per KDB 941225 D07v01r02

Small hand-held tablets (and devices of similar form factors that are designed primarily for interactive hand-held use next to or near the body of users) require body SAR and extremity SAR evaluation. These types of minitables are normally optimized for mobile web access and multimedia use. UMPC test procedures are applicable for devices with displays and overall diagonal dimension ≤ 20 cm. Devices are to be set up according to KDB publication 941225 D07v01r02 requirements and are configured with maximum output power during SAR assessment for a worst case SAR evaluation.

Per KDB Publication 941225 D07v01r02, UMPC mini-tablet devices must be tested for all surfaces and edges ≤ 25 mm from a transmitting antenna. A test separation distance of 5 mm may be considered for 1g SAR and may exclude 10g SAR at 0 mm.

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6 RF EXPOSURE LIMITS

6.1 Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

6.2 Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 6-1
SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT <i>General Population</i> (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT <i>Occupational</i> (W/kg) or (mW/g)
Peak Spatial Average SAR Head	1.6	8.0
Whole Body SAR	0.08	0.4
Peak Spatial Average SAR Hands, Feet, Ankle, Wrists, etc.	4.0	20

1. 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.
2. The Spatial Average value of the SAR averaged over the whole body.
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.

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7 FCC MEASUREMENT PROCEDURES

7.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D04v01, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as *reported* SAR. The highest *reported* SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

7.2 SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

7.2.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

7.2.2 U-NII-1 and U-NII-2A

For devices that operate in both U-NII-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, SAR measurement using OFDM SAR test procedures is not required for U-NII-1 unless the highest reported SAR for U-NII-2A is > 1.2 W/kg. When different maximum output powers are specified for the bands, SAR measurement for the U-NII band with the lower maximum output power is not required unless the highest reported SAR for the U-NII band with the higher maximum output power, adjusted by the ratio of lower to higher specified maximum output power for the two bands, is > 1.2 W/kg. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

7.2.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 – 5.65 GHz in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification. Unless band gap channels are permanently disabled, SAR must be considered for these channels. Each band is tested independently according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

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7.2.4 Initial Test Position Procedure

For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all positions in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

7.2.5 2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

- 1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
- 2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

7.2.6 OFDM Transmission Mode and SAR Test Channel Selection

When the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11ac or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n and 802.11ac or 802.11g then 802.11n, is used for SAR measurement. Per April 2019 TCB Workshop guidance, 802.11ax was considered the highest order 802.11 mode. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

7.2.7 Initial Test Configuration Procedure

For OFDM, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order IEEE 802.11 mode. The channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required.

Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR

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result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements (See Section 7.2.6). When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

7.2.8 Subsequent Test Configuration Procedures

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure. When the highest reported SAR (for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg, no additional SAR tests for the subsequent test configurations are required. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

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8 RF CONDUCTED POWERS

8.1 WLAN Conducted Powers

Table 8-1
2.4 GHz WLAN Maximum Average RF Power – Ant A1

2.4GHz WIFI (20MHz 802.11g SISO A1)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	17.36
2437	6		17.25
2462	11		17.79

2.4GHz WIFI (20MHz 802.11g SISO A1)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	17.29
2437	6		17.00
2462	11		17.52

2.4GHz WIFI (20MHz 802.11n SISO A1)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	17.77
2437	6		17.70
2462	11		18.00

Table 8-2
5 GHz WLAN Maximum Average RF Power – Ant A2

5GHz WIFI (40MHz 802.11n SISO A2)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	14.54
	5230	46	17.47
UNII-2A	5270	54	17.34
	5310	62	13.33

5GHz WIFI (40MHz 802.11ac SISO A2)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	14.36
	5230	46	17.50
UNII-2A	5270	54	17.27
	5310	62	13.52

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5GHz WIFI (80MHz 802.11ac SISO A2)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-2C	5530	106	11.25
	5610	122	11.24
UNII-3	5775	155	16.12

Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.

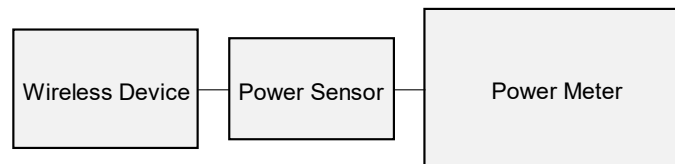


Figure 10-1
Power Measurement Setup

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8.2 Bluetooth Conducted Powers

Table 8-3
Bluetooth Maximum Average RF Power– A1

Frequency [MHz]	Data Rate [Mbps]	Mod.	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	1 Mbps	GFSK	0	4.07	2.554
2441	1 Mbps	GFSK	39	5.04	3.192
2480	1 Mbps	GFSK	78	4.20	2.629
2402	2 Mbps	$\pi/4$ -DQPSK	0	4.41	2.761
2441	2 Mbps	$\pi/4$ -DQPSK	39	4.36	2.729
2480	2 Mbps	$\pi/4$ -DQPSK	78	3.42	2.198
2402	3 Mbps	8DPSK	0	4.45	2.786
2441	3 Mbps	8DPSK	39	4.41	2.761
2480	3 Mbps	8DPSK	78	3.51	2.244

Table 8-4
Bluetooth LE Maximum Average RF Power– A1

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Bluetooth Mode	Average Conducted Power	
				[dBm]	[mW]
2402	1 Mbps	37	LE	4.69	2.944
2440	1 Mbps	17	LE	4.87	3.069
2480	1 Mbps	39	LE	4.08	2.559
2402	2 Mbps	37	LE	4.66	2.924
2440	2 Mbps	17	LE	4.84	3.048
2480	2 Mbps	39	LE	4.05	2.541

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Figure 8-2
Bluetooth Antenna A1 Transmission Plot

Equation 8-1

Bluetooth Antenna A1 Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.900ms}{3.752ms} * 100\% = 77.29\%$$

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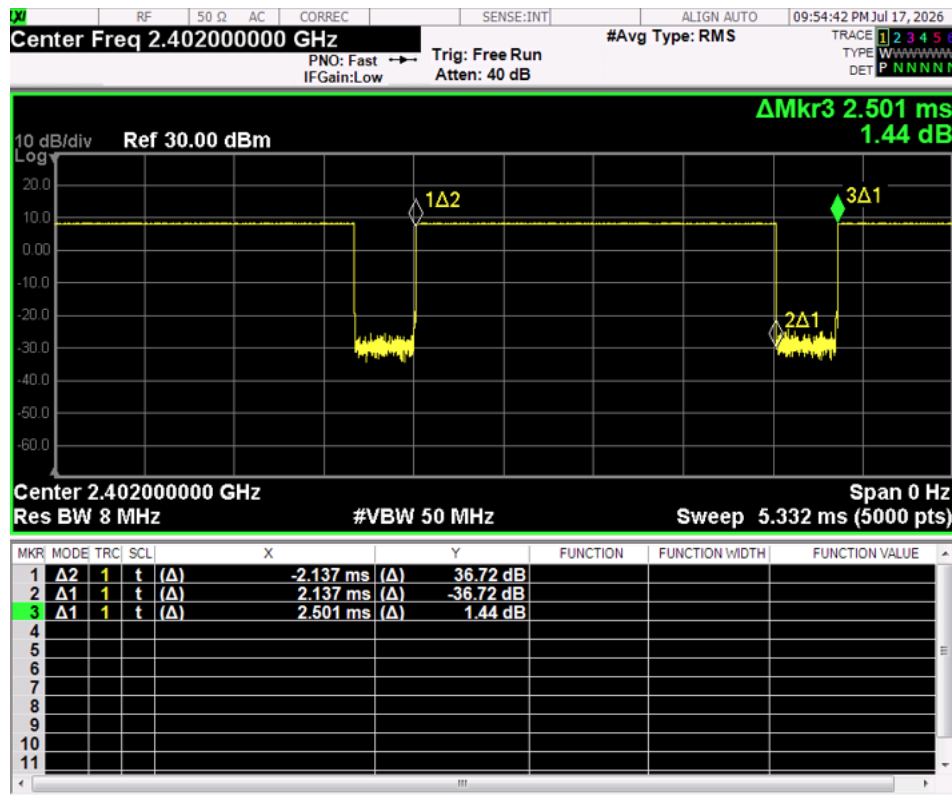


Figure 8-3
Bluetooth LE Antenna A1 Transmission Plot

Equation 8-2
Bluetooth LE Antenna A1 Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.137ms}{2.501ms} * 100\% = 85.44\%$$

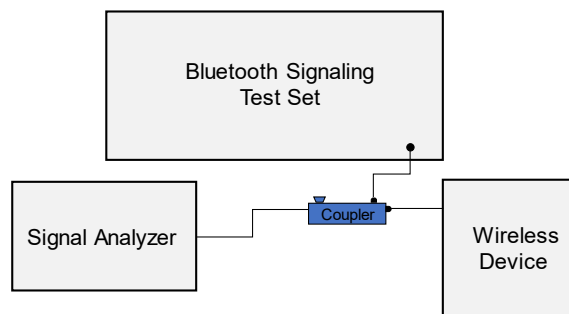


Figure 8-3
Power Measurement Setup

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9 SYSTEM VERIFICATION

9.1 Tissue Verification

Table 9-1
Measured Head Tissue Properties

Calibrated for Tests Performed etc.	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
07/23/2026	2450 Head	19.6	2300	1.636	38.220	1.670	39.500	-1.86%	-3.24%
			2310	1.640	38.209	1.679	39.460	-1.97%	-3.22%
			2320	1.654	38.197	1.687	39.460	-1.96%	-3.20%
			2400	1.712	38.074	1.756	39.289	-2.51%	-3.09%
			2450	1.748	37.989	1.800	39.200	-3.00%	-3.09%
			2480	1.769	37.949	1.833	39.162	-3.49%	-3.10%
			2500	1.783	37.918	1.855	39.136	-3.88%	-3.11%
			2510	1.790	37.900	1.866	39.123	-4.07%	-3.13%
			2535	1.810	37.852	1.893	39.092	-4.38%	-3.17%
			2550	1.823	37.829	1.909	39.073	-4.50%	-3.18%
			2560	1.832	37.816	1.920	39.060	-4.58%	-3.18%
			2300	1.679	39.210	1.670	39.500	0.52%	-0.74%
07/27/2026	2450 Head	20.1	2310	1.686	39.195	1.679	39.460	0.41%	-0.72%
			2320	1.693	39.182	1.687	39.460	0.38%	-0.70%
			2400	1.750	39.053	1.756	39.289	-0.32%	-0.60%
			2450	1.788	38.984	1.800	39.200	-0.64%	-0.58%
			2480	1.811	38.929	1.833	39.162	-1.20%	-0.59%
			2500	1.826	38.893	1.855	39.136	-1.57%	-0.62%
			2510	1.834	38.874	1.866	39.123	-1.74%	-0.64%
			2535	1.853	38.826	1.893	39.092	-2.11%	-0.67%
			2550	1.865	38.805	1.909	39.073	-2.28%	-0.68%
			2560	1.874	38.788	1.920	39.060	-2.42%	-0.70%
			2600	1.904	38.730	1.964	39.009	-3.05%	-0.72%
			2650	1.942	38.613	2.018	38.945	-3.75%	-0.85%
07/29/2026	5200-5800 Head	21.2	2680	1.968	38.569	2.051	38.907	-4.03%	-0.87%
			5150	4.525	35.580	4.608	36.050	-1.80%	-1.30%
			5160	4.540	35.552	4.618	36.040	-1.69%	-1.38%
			5170	4.548	35.529	4.629	36.030	-1.75%	-1.39%
			5180	4.553	35.509	4.635	36.009	-1.77%	-1.39%
			5190	4.559	35.492	4.645	35.998	-1.85%	-1.41%
			5200	4.571	35.474	4.655	35.986	-1.80%	-1.42%
			5210	4.585	35.439	4.666	35.975	-1.74%	-1.49%
			5220	4.597	35.417	4.676	35.963	-1.69%	-1.52%
			5240	4.622	35.377	4.696	35.940	-1.58%	-1.57%
			5250	4.636	35.363	4.706	35.929	-1.49%	-1.58%
			5260	4.646	35.349	4.717	35.917	-1.51%	-1.58%
			5270	4.653	35.342	4.727	35.906	-1.57%	-1.57%
			5280	4.659	35.325	4.737	35.894	-1.60%	-1.59%
			5290	4.669	35.302	4.748	35.883	-1.68%	-1.62%
			5300	4.684	35.278	4.758	35.871	-1.58%	-1.65%
			5310	4.696	35.259	4.768	35.860	-1.51%	-1.68%
			5320	4.704	35.237	4.778	35.849	-1.55%	-1.71%
			5500	4.905	34.922	4.963	35.643	-1.17%	-2.02%
			5510	4.914	34.908	4.973	35.632	-1.19%	-2.03%
			5520	4.928	34.882	4.983	35.620	-1.10%	-2.07%
			5530	4.937	34.847	4.994	35.609	-1.14%	-2.14%
			5540	4.947	34.822	5.004	35.597	-1.14%	-2.18%
			5550	4.959	34.800	5.014	35.586	-1.12%	-2.21%
			5560	4.968	34.781	5.024	35.574	-1.11%	-2.23%
			5580	4.995	34.745	5.045	35.551	-0.99%	-2.27%
			5600	5.018	34.699	5.065	35.529	-0.90%	-2.34%
			5610	5.028	34.668	5.076	35.518	-0.95%	-2.39%
			5620	5.042	34.658	5.086	35.506	-0.87%	-2.39%
			5640	5.065	34.657	5.106	35.483	-0.80%	-2.33%
			5660	5.084	34.604	5.127	35.460	-0.84%	-2.41%
			5670	5.094	34.584	5.137	35.449	-0.84%	-2.44%
			5680	5.105	34.578	5.147	35.437	-0.80%	-2.42%
			5690	5.119	34.568	5.158	35.426	-0.76%	-2.42%
			5700	5.133	34.550	5.168	35.414	-0.68%	-2.44%
			5710	5.147	34.543	5.178	35.403	-0.60%	-2.43%
			5720	5.159	34.533	5.188	35.391	-0.58%	-2.42%
			5745	5.161	34.491	5.214	35.363	-0.63%	-2.47%
			5750	5.167	34.477	5.219	35.357	-0.61%	-2.49%
			5755	5.194	34.469	5.224	35.351	-0.57%	-2.49%
			5765	5.208	34.453	5.234	35.340	-0.50%	-2.51%
			5775	5.220	34.441	5.245	35.329	-0.48%	-2.51%
			5785	5.229	34.432	5.255	35.317	-0.49%	-2.51%
			5795	5.239	34.413	5.265	35.305	-0.51%	-2.53%
			5800	5.244	34.402	5.270	35.300	-0.49%	-2.54%
			5800	5.244	34.402	5.270	35.300	-0.49%	-2.54%
			5805	5.249	34.380	5.275	35.294	-0.49%	-2.59%
			5825	5.280	34.339	5.296	35.271	-0.30%	-2.64%
			5835	5.289	34.319	5.305	35.250	-0.30%	-2.59%
			5845	5.295	34.303	5.315	35.210	-0.38%	-2.58%
			5850	5.298	34.293	5.320	35.200	-0.41%	-2.58%
			5855	5.303	34.274	5.325	35.197	-0.41%	-2.62%
			5865	5.313	34.256	5.336	35.190	-0.43%	-2.65%
			5865	5.313	34.256	5.336	35.190	-0.43%	-2.65%
			5865	5.313	34.256	5.336	35.190	-0.43%	-2.65%
			5875	5.329	34.233	5.347	35.183	-0.34%	-2.70%
			5885	5.338	34.206	5.357	35.177	-0.38%	-2.78%
			5905	5.360	34.199	5.379	35.163	-0.38%	-2.74%

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB Publication 865664 D01v01r04 and IEEE 1528-2013 6.6.1.2. The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

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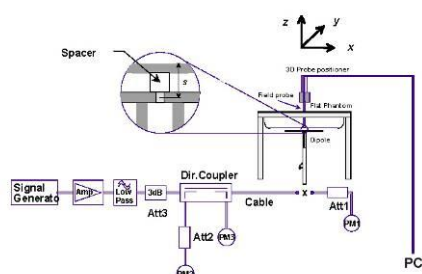
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9.2 Test System Verification

Prior to SAR assessment, the system is verified using the procedures and dipole sources as defined by IEEE 1528-2013. The system is verified to $\pm 10\%$ of the SAR measurement on the reference dipole at the time of calibration by the calibration facility. Full system validation status and result summary can be found in the SAR System Validation Appendix.

**Table 9-2
System Verification Results**

SAR System	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp. (C)	Liquid Temp. (C)	Input Power (W)	Source SN	Probe SN	DAE	Measured SAR 1g (W/kg)	1W Target SAR 1g (W/kg)	1W Normalized SAR 1g (W/kg)	Deviation 1g (%)	Measured SAR 10g (W/kg)	1W Target SAR 10g (W/kg)	1W Normalized SAR 10g (W/kg)	Deviation 10g (%)
L	2450	Head	07/23/2026	22.2	20.4	0.10	797	7539	1450	5.64	52.60	56.40	7.22%	2.66	24.80	26.60	7.26%
L	2450	Head	07/27/2026	21.2	20.1	0.10	797	7539	1450	5.67	52.60	56.70	7.79%	2.68	24.80	26.80	8.06%
S	5250	Head	07/20/2026	21.7	21.0	0.05	1191	3914	728	3.99	78.40	79.80	1.79%	1.14	22.50	22.80	1.33%
S	5600	Head	07/20/2026	21.7	21.0	0.05	1191	3914	728	4.23	77.50	84.60	9.16%	1.20	22.30	24.00	7.62%
S	5750	Head	07/20/2026	21.7	21.0	0.05	1191	3914	728	3.97	75.40	79.40	5.31%	1.13	21.50	22.60	5.12%
S	5850	Head	07/20/2026	21.7	21.0	0.05	1191	3914	728	4.15	76.80	83.00	8.07%	1.17	21.90	23.40	6.85%



**Figure 9-1
System Verification Setup Diagram**



**Figure 9-2
System Verification Setup Photo**

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10 SAR DATA SUMMARY

10.1 2.4 GHz WLAN Standalone SAR Data

Table 10-1| Plot A1

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	DUT Version	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Plot #
Body	2.4 GHz WiFi / IEEE 802.11b	22	DSSS	A1	V2	925000340	99.73	0.00	2412.00	1	1.0	18.0	17.36	Back	5	0.845	1.159	1.003	0.982	
Body	2.4 GHz WiFi / IEEE 802.11b	22	DSSS	A1	V1	925000145	99.73	0.01	2412.00	1	1.0	18.0	17.36	Back	5	0.976	1.159	1.003	1.135	Plot
Body	2.4 GHz WiFi / IEEE 802.11b	22	DSSS	A1	V1	925000145	99.73	0.09	2412.00	1	1.0	18.0	17.36	Back	5	0.966	1.159	1.003	1.123	
Body	2.4 GHz WiFi / IEEE 802.11b	22	DSSS	A1	V1	925000145	99.73	0.01	2437.00	6	1.0	18.0	17.25	Back	5	0.942	1.189	1.003	1.123	
Body	2.4 GHz WiFi / IEEE 802.11b	22	DSSS	A1	V1	925000145	99.73	-0.02	2462.00	11	1.0	18.0	17.79	Back	5	0.871	1.050	1.003	0.917	
Body	2.4 GHz WiFi / IEEE 802.11b	22	DSSS	A1	V1	925000145	99.73	0.02	2462.00	11	1.0	18.0	17.79	Front	5	0.174	1.050	1.003	0.183	
Body	2.4 GHz WiFi / IEEE 802.11b	22	DSSS	A1	V1	925000145	99.73	0.02	2462.00	11	1.0	18.0	17.79	Bottom	5	0.132	1.050	1.003	0.139	
Body	2.4 GHz WiFi / IEEE 802.11b	22	DSSS	A1	V1	925000145	99.73	0.03	2412.00	1	1.0	18.0	17.36	Left	5	0.566	1.159	1.003	0.658	
Body	2.4 GHz WiFi / IEEE 802.11b	22	DSSS	A1	V1	925000145	99.73	0.01	2437.00	6	1.0	18.0	17.25	Left	5	0.518	1.189	1.003	0.618	
Body	2.4 GHz WiFi / IEEE 802.11b	22	DSSS	A1	V1	925000145	99.73	-0.02	2462.00	11	1.0	18.0	17.79	Left	5	0.712	1.050	1.003	0.750	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT																Body				
Spatial Peak																1.6 W/kg (mW/g)				
Uncontrolled Exposure/General Population																averaged over 1 gram				

Note: Blue entry represents variability measurement

10.2 5 GHz WLAN Standalone SAR Data

Table 10-2| Plot A2

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	DUT Version	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	U-NII band	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Plot #
Body	5 GHz WiFi / IEEE 802.11n	40	OFDM	A2	V1	927000056	95.27	0.13	5190.00	38	U-NII-1	13.5	15.0	14.54	Back	5	0.220	1.112	1.050	0.257	
Body	5 GHz WiFi / IEEE 802.11n	40	OFDM	A2	V2	927000323	95.27	0.03	5230.00	46	U-NII-1	13.5	17.5	17.47	Back	5	1.060	1.007	1.050	1.121	
Body	5 GHz WiFi / IEEE 802.11n	40	OFDM	A2	V1	927000056	95.27	-0.02	5230.00	46	U-NII-1	13.5	17.5	17.47	Back	5	1.100	1.007	1.050	1.163	Plot
Body	5 GHz WiFi / IEEE 802.11n	40	OFDM	A2	V1	927000056	95.27	-0.06	5230.00	46	U-NII-1	13.5	17.5	17.47	Back	5	0.766	1.060	1.050	0.806	
Body	5 GHz WiFi / IEEE 802.11n	40	OFDM	A2	V1	925000145	95.27	-0.02	5270.00	54	U-NII-2A	13.5	18.0	17.34	Back	5	0.545	1.164	1.050	0.586	
Body	5 GHz WiFi / IEEE 802.11n	40	OFDM	A2	V1	925000145	95.27	-0.07	5310.00	62	U-NII-2A	13.5	14.0	13.33	Back	5	0.545	1.167	1.050	0.668	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	927000056	90.33	0.04	5530.00	106	U-NII-2C	29.3	11.5	11.25	Back	5	0.978	1.059	1.107	1.147	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	927000056	90.33	-0.06	5530.00	106	U-NII-2C	29.3	11.5	11.25	Back	5	0.936	1.059	1.107	1.086	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	927000056	90.33	0.10	5610.00	122	U-NII-2C	29.3	11.5	11.24	Back	5	0.849	1.062	1.107	0.998	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	925000145	90.33	0.05	5775.00	155	U-NII-3	29.3	17.0	16.12	Back	5	0.811	1.225	1.107	1.100	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	925000145	90.33	-0.08	5775.00	155	U-NII-3	29.3	17.0	16.12	Back	5	0.811	1.225	1.107	1.100	
Body	5 GHz WiFi / IEEE 802.11n	40	OFDM	A2	V1	927000056	95.27	0.08	5230.00	46	U-NII-1	13.5	17.5	17.47	Front	5	0.028	1.007	1.050	0.030	
Body	5 GHz WiFi / IEEE 802.11n	40	OFDM	A2	V1	925000145	95.27	0.01	5270.00	54	U-NII-2A	13.5	18.0	17.34	Front	5	0.035	1.164	1.050	0.043	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	927000056	90.33	0.01	5530.00	106	U-NII-2C	29.3	11.5	11.25	Front	5	0.016	1.059	1.107	0.019	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	925000145	90.33	0.08	5775.00	155	U-NII-3	29.3	17.0	16.12	Front	5	0.028	1.225	1.107	0.038	
Body	5 GHz WiFi / IEEE 802.11n	40	OFDM	A2	V1	927000056	95.27	-0.14	5230.00	46	U-NII-1	13.5	17.5	17.47	Bottom	5	0.162	1.007	1.050	0.171	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	925000145	95.27	0.00	5270.00	54	U-NII-2A	13.5	18.0	17.34	Bottom	5	0.403	1.164	1.050	0.493	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	927000056	90.33	-0.21	5530.00	106	U-NII-2C	29.3	11.5	11.25	Bottom	5	0.296	1.059	1.107	0.347	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	925000145	90.33	0.01	5775.00	155	U-NII-3	29.3	17.0	16.12	Bottom	5	0.360	1.225	1.107	0.353	
Body	5 GHz WiFi / IEEE 802.11n	40	OFDM	A2	V1	927000056	95.27	-0.06	5230.00	46	U-NII-1	13.5	17.5	17.47	Left	5	0.236	1.007	1.050	0.250	
Body	5 GHz WiFi / IEEE 802.11n	40	OFDM	A2	V1	925000145	95.27	-0.08	5270.00	54	U-NII-2A	13.5	18.0	17.34	Left	5	0.321	1.164	1.050	0.392	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	927000056	90.33	-0.12	5530.00	106	U-NII-2C	29.3	11.5	11.25	Left	5	0.270	1.059	1.107	0.317	
Body	5 GHz WiFi / IEEE 802.11ac	80	OFDM	A2	V1	925000145	90.33	0.02	5775.00	155	U-NII-3	29.3	17.0	16.12	Left	5	0.505	1.225	1.107	0.685	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT																Body					
Spatial Peak																1.6 W/kg (mW/g)					
Uncontrolled Exposure/General Population																averaged over 1 gram					

Note: Blue entry represents variability measurement

10.3 Bluetooth Standalone SAR Data

Table 10-3

Exposure	Band / Mode	Service / Modulation	Ant.	DUT Version	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Plot #
Body	2.4 GHz Bluetooth	FHSS	A1	V1	925000145	77.29	-0.01	2441.00	39	1	5.5	5.04	Back	0	0.110	1.112	1.294	0.158	
Body	2.4 GHz Bluetooth	FHSS	A1	V1	925000145	77.29	0.08	2441.00	39	1	5.5	5.04	Front	0	0.014	1.112	1.294	0.020	
Body	2.4 GHz Bluetooth	FHSS	A1	V1	925000145	77.29	0.01	2441.00	39	1	5.5	5.04	Bottom	0	0.002	1.112	1.294	0.003	
Body	2.4 GHz Bluetooth	FHSS	A1	V1	925000145	77.29	-0.04	2441.00	39	1	5.5	5.04	Left	0	0.133	1.112	1.294	0.191	Plot
Body	2.4 GHz Bluetooth	FHSS	A1	V2	925000340	77.29	0.09	2441.00	39	1	5.5	5.04	Left	0	0.132	1.112	1.294	0.190	
Body	2.4 GHz Bluetooth LE	DSSS	A1	V1	925000145	85.44	0.02	2440.00	17	1	5.5	4.87	Left	0	0.077	1.156	1.170	0.104	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT													Body						
Spatial Peak													1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population													averaged over 1 gram						

Note: BT was evaluated at the more conservative test distance of 0mm.

10.4 SAR Test Notes

General Notes:

- The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528:2020, and FCC KDB Publication 447498 D04v01.
- Batteries are fully charged at the beginning of the SAR measurements.
- Liquid tissue depth was at least 15.0 cm for all frequencies.
- The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.

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5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D04v01.
6. Per FCC KDB Publication 865664 D01v01r04, variability SAR tests were not required since measured SAR results for all frequency bands were less than 0.8 W/kg.

WLAN Notes:

1. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 7.2.5 for more information.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg for 1g evaluations. See Section 7.2.6 for more information.
3. When the maximum reported 1g averaged SAR is ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.
4. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.

Bluetooth Notes

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests test mode type. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100% transmission duty factor for Bluetooth and 100% transmission duty factor for Bluetooth LE to determine compliance. See RF Conducted Power Section for the time domain plot and calculation for the duty factor of the device.
2. When the BT LE frame average target is equal to the BT BDR frame average target, a spotcheck for BT LE is run on the worst case position from BT BDR testing to ensure compliance of both modes

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11 SAR MEASUREMENT VARIABILITY

11.1 SAR Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

- 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
- 2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~10% from the 1g SAR limit).
- 3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
- 4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg
- 5) When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

Table 11-1

BODY VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	Side	Test Position	Antenna Config	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)
2450	2412.00	1	2.4 GHz WIFI/IEEE 802.11b	DSSS	Back	5	A1	0.976	0.966	1.01	N/A	N/A	N/A
5250	5230.00	46	5 GHz WIFI/IEEE 802.11n	OFDM	Back	5	A2	1.100	1.020	1.08	N/A	N/A	N/A
5600	5530.00	106	5 GHz WIFI/IEEE 802.11ac	OFDM	Back	5	A2	0.978	0.926	1.06	N/A	N/A	N/A
5750	5775.00	155	5 GHz WIFI/IEEE 802.11ac	OFDM	Back	5	A2	0.811	0.811	1.00	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					Body 1.6 W/kg (mW/g) averaged over 1 gram								

11.2 SAR Measurement Uncertainty

The measured SAR was < 1.5 W/kg for 1g and < 3.75 W/kg for 10g for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

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12 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E4404B	Spectrum Analyzer	N/A	N/A	N/A	MY45113242
Agilent	E4438C	ESG Vector Signal Generator	11/2/2025	Annual	11/2/2026	MY45093852
Agilent	E4438C	ESG Vector Signal Generator	3/23/2026	Annual	3/23/2027	MY45092078
Agilent	N5182A	MXG Vector Signal Generator	4/13/2026	Annual	4/13/2027	MY48180366
Agilent	8753ES	S-Parameter Vector Network Analyzer	10/28/2025	Annual	10/28/2026	MY40003841
Agilent	8753ES	S-Parameter Vector Network Analyzer	10/27/2025	Annual	10/27/2026	US39170118
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433973
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433974
Anritsu	MN8110B	I/O Adaptor	CBT	N/A	CBT	6261747881
Insize	1108-150	Insizer - Digital Caliper	1/7/2026	Annual	1/7/2027	1410255640
Anritsu	MA24106A	USB Power Sensor	2/20/2026	Annual	2/20/2027	1520501
Anritsu	MA24106A	USB Power Sensor	12/12/2025	Annual	12/12/2026	1344554
Control Company	4352	Long Stem Thermometer	12/22/2025	Biennial	12/22/2027	250770121
Control Company	4352	Long Stem Thermometer	12/22/2025	Biennial	12/22/2027	250770096
Control Company	4040	Therm./ Clock/ Humidity Monitor	12/29/2025	Biennial	12/29/2027	250778120
Control Company	4040	Therm./ Clock/ Humidity Monitor	10/24/2025	Biennial	10/24/2027	250652331
Control Company	4040	Therm./ Clock/ Humidity Monitor	10/15/2024	Biennial	10/15/2026	240763503
Keysight Technologies	N9020A	MXA Signal Analyzer	6/5/2026	Annual	6/5/2027	MY54500644
Agilent	N9020A	MXA Signal Analyzer	7/7/2025	Biennial	7/7/2027	MY56470202
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Mini-Circuits	VLF-6000+	Low Pass Filter DC to 6000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	ZUDC10-83-S+	Directional Coupler	CBT	N/A	CBT	2050
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	NC-100	Torque Wrench	5/29/2025	Biennial	5/29/2027	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	11/10/2025	Annual	11/10/2026	1277
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/5/2025	Annual	8/5/2026	1041
SPEAG	MAIA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1237
SPEAG	MAIA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1331
SPEAG	MAIA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1390
SPEAG	D2450V2	2450 MHz SAR Dipole	10/7/2025	Annual	10/7/2026	797
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/16/2026	Annual	1/16/2027	1191
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/7/2026	Annual	5/7/2027	728
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/10/2026	Annual	3/10/2027	1450
SPEAG	EX3DV4	SAR Probe	5/8/2026	Annual	5/8/2027	3914
SPEAG	EX3DV4	SAR Probe	3/11/2026	Annual	3/11/2027	7539

Note: 1) All equipment was used solely within its respective calibration period. 2) CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

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13 MEASUREMENT UNCERTAINTIES

Applicable for SAR measurements < 6GHz on a flat phantom:

SAR Uncertainty Budget based on IEEE 1528-2013 and SPEAG (0.3 GHz to 6 GHz)

a	b	c	d	e f(d,k)	f	g	h cxf/e	i exg/e	k
Uncertainty component	Reference	Tol. (± %)	Prob. dist.	Dvi.	ci (1g)	ci (10g)	1g ui (± %)	10g ui (± %)	vi
Measurement system									
Probe calibration	E.2.1	6.55	N	1	1	1	6.55	6.55	∞
Axial isotropy	E.2.2	0.25	N	1	0.707	0.707	0.18	0.18	∞
Hemispherical isotropy	E.2.2	1.30	N	1	0.707	0.707	0.92	0.92	∞
Boundary effect	E.2.3	2.00	R	1.73	1	1	1.15	1.15	∞
Linearity	E.2.4	0.30	R	1.73	1	1	0.17	0.17	∞
System detection limits	E.2.4	0.25	R	1.73	1	1	0.14	0.14	∞
Modulation response	E.2.5	4.80	R	1.73	1	1	2.77	2.77	∞
Readout electronics	E.2.6	0.30	N	1	1	1	0.30	0.30	∞
Response time	E.2.7	1.01	R	1.73	1	1	0.58	0.58	∞
Integration time	E.2.8	2.60	R	1.73	1	1	1.50	1.50	∞
RF ambient conditions - noise	E.6.1	3.00	R	1.73	1	1	1.73	1.73	∞
RF ambient conditions - reflections	E.6.1	3.00	R	1.73	1	1	1.73	1.73	∞
Probe positioner mechanical tolerance	E.6.2	0.04	R	1.73	1	1	0.02	0.02	∞
Probe positioning with respect to phantom shell	E.6.3	0.80	R	1.73	1	1	0.46	0.46	∞
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	E.5	4.00	R	1.73	1	1	2.31	2.31	∞
Test sample related									
Test sample positioning	E.4.2	3.12	N	1	1	1	3.12	3.12	35
Device holder uncertainty	E.4.1	1.67	N	1	1	1	1.67	1.67	5
Output power variation - SAR drift	E.2.9	5.00	R	1.73	1	1	2.89	2.89	∞
SAR scaling	E.6.5	0.00	R	1.73	1	1	0.00	0.00	∞
Phantom and tissue parameters									
Phantom shell uncertainty - shape, thickness and permittivity	E.3.1	7.60	R	1.73	1	1	4.39	4.39	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	0.00	N	1	1	1	0.00	0.00	∞
Liquid conductivity measurement	E.3.3	2.50	N	1	0.78	0.71	1.95	1.78	∞
Liquid permittivity measurement	E.3.3	2.50	N	1	0.23	0.26	0.58	0.65	∞
Liquid conductivity - temperature uncertainty	E.3.4	3.36	R	1.73	0.78	0.71	1.51	1.38	∞
Liquid permittivity - temperature uncertainty	E.3.4	0.77	R	1.73	0.23	0.26	0.10	0.12	∞
Liquid Conductivity - deviation from target values	E.3.2	5.00	R	1.73	0.64	0.43	1.85	1.24	∞
Liquid Permittivity - deviation from target values	E.3.2	5.00	R	1.73	0.60	0.49	1.73	1.41	∞
Combined standard uncertainty							11.0	10.8	40
Expanded uncertainty (95% confidence interval)							21.9	21.6	

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14 CONCLUSION

14.1 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Innovation, Science, and Economic Development Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

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