



FCC SAR TEST REPORT

Applicant	:	SELVAS Healthcare, Inc.
Address of Applicant	:	155, Sinseong-ro, Yuseong-gu, Daejeon, Republic of Korea
Manufacturer	:	SELVAS Healthcare, Inc.
Address of Manufacturer	:	155, Sinseong-ro, Yuseong-gu, Daejeon, Republic of Korea
Equipment under Test	:	BrailleSense 7-32
Model No.	:	H732B, H720B
FCC ID	:	2AL4D-H732B
Test Standard(s)	:	Test Standard Used: IEEE Std. 1528-2013 FCC Rules and Regulations: 47 CFR § 2.1093 Test Procedure Used: KDB447498 D04 v01, KDB 865664 D01 v01r04, KDB 865664 D02 v01r02, KDB 248227 D01 v02r02
Report No.	:	DDT-RE26040120-1E13
Issue Date	:	2026/08/27
Issue By	:	Guangdong Dongdian Testing Service Co., Ltd.
Address of Laboratory	:	Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

REPORT

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Test Report Declare

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IEEE Std. 1528-2013, FCC Rules and Regulations: 47 CFR § 2.1093

Test Procedure Used:

KDB447498 D04 v01, KDB 865664 D01 v01r04, KDB 865664 D02 v01r02, KDB 248227 D01 v02r02

We Declare:

The equipment described above is tested by Guangdong Dongdian Testing Service Co., Ltd and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangdong Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above standards.

Report No.:	DDT-RE26040120-1E13		
Date of Receipt:	2026/06/04	Date of Test:	2026/06/04 - 2026/08/22

Created: Johnson Huang	Reviewed: Tiger Mo	Approved: Ella Gong
		
2026/08/26	2026/08/27	2026/08/27

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Guangdong Dongdian Testing Service Co., Ltd.

Revision History

Version	Revision Content	Issue Date	Approved
V0	Initial issue	2026/08/27	Ella Gong

1. General test information

1.1. Description of EUT

EUT Name	: BrailleSense 7-32
Model Number	: H732B, H720B
Difference of model number	Above models are identical in schematic, structure, only the Model Number, keyboard is different for all the models, therefore the whole test performed on the model H732B.
EUT Function Description	: Please reference user manual of this device
Power Supply	: Powered by DC 5V external adapter or built-in battery.
Radio Specification	Bluetooth BR/EDR/LE, : 2.4G WiFi: IEEE 802.11b/g/n, 5G WiFi: IEEE 802.11a/n/ac
Operation Frequency	Bluetooth BR/EDR/LE: 2402 MHz to 2480 MHz 2.4G WiFi: IEEE 802.11b: 2412MHz to 2462MHz IEEE 802.11g: 2412MHz to 2462MHz IEEE 802.11n HT20: 2412MHz to 2462MHz : IEEE 802.11n HT40: 2422MHz to 2452MHz 5G WiFi: U-NII-1: 5180 MHz to 5240 MHz U-NII-2A: 5260 MHz to 5320 MHz U-NII-2C: 5500 MHz to 5720 MHz U-NII-3: 5745 MHz to 5825 MHz
Modulation	Bluetooth BR/EDR: GFSK, $\pi/4$ -DQPSK, 8DPSK Bluetooth LE: GFSK 2.4G WiFi: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) 5G WiFi: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Type	: FPC
Max Antenna Gain(dBi)	Bluetooth BR/EDR/LE:1.6dbi : 2.4G WiFi: Ant1: 1.6dBi, Ant2:0.39dBi 5 WiFi: Ant1:3.79dBi, Ant2:2.01dBi

Note : EUT is the abbreviation of equipment under test.

1.2. Accessories of EUT

Accessories	Manufacturer	Model number	Description
/	/	/	/

1.3. Assistant equipment used for test

Accessories	Manufacturer	Model number	Description
N/A	N/A	N/A	N/A

1.4. Block diagram of EUT configuration for test



EUT

A block diagram showing a single rectangular box labeled 'EUT' (Equipment Under Test) centered on a light gray background.

1.5. Decision of final test mode

Test software: EngineerMode.exe

The test software was used to control EUT work in Continuous Tx mode, and select test channel, wireless mode as below table.

Bluetooth BR/EDR:

Tested mode, Tx Power Setting, Channel, and Frequency

Tested mode	Tx Power Setting	Channel	Frequency (MHz)
GFSK hopping on Tx mode	7	CH0 to CH78	2402 to 2480
$\pi/4$ -DQPSK hopping on Tx mode	7	CH0 to CH78	2402 to 2480
GFSK hopping off Tx mode	7	CH0	2402
	7	CH39	2441
	7	CH78	2480
$\pi/4$ -DQPSK hopping off Tx mode	7	CH0	2402
	7	CH39	2441
	7	CH78	2480

Note: According exploratory test, EUT will have maximum output power in those data rate, worst-case data rates were: GFSK mode: DH5, $\pi/4$ -DQPSK mode: 2DH5

Bluetooth LE:

Tested mode, Tx Power Setting, Channel, and Frequency

Mode	Setting Tx Power	Channel	Frequency (MHz)
GFSK 1M	7	CH0	2402
	7	CH19	2440
	7	CH39	2480
GFSK 2M	7	CH1	2404
	7	CH19	2440
	7	CH38	2478

2.4G WiFi:

Tested mode, Tx Power Setting, Data rate, Channel, and Frequency

Tested mode	Tx Power Setting		Data rate (Mbps) (see Note)	Test Channel	Frequency (MHz)
	ANT1	ANT2			
IEEE 802.11b	14	14	1	LCH: CH1	2412
	14	14	1	MCH: CH6	2437
	14	14	1	HCH: CH11	2462
IEEE 802.11g	14	14	6	LCH: CH1	2412
	14	14	6	MCH: CH6	2437
	14	14	6	HCH: CH11	2462
IEEE 802.11n HT20	14	14	MCS 8	LCH: CH1	2412
	14	14	MCS 8	MCH: CH6	2437
	14	14	MCS 8	HCH: CH11	2462
IEEE 802.11n	14	14	MCS 8	LCH: CH3	2422

HT40	14	14	MCS 8	MCH: CH6	2437
	14	14	MCS 8	HCH: CH9	2452
Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.					

5G WiFi:

Tested mode, Tx Power Setting, Data rate, Channel, and Frequency					
Tested mode	Tx Power Setting		Data rate (Mbps) (see Note)	Test Channel	Frequency (MHz)
	ANT1	ANT2			
IEEE 802.11a	15	15	6	LCH: CH36	5180
	15	15	6	MCH: CH40	5200
	15	15	6	HCH: CH48	5240
	15	15	6	LCH: CH52	5260
	15	15	6	MCH: CH56	5280
	15	15	6	HCH: CH64	5320
	13	13	6	LCH: CH100	5500
	13	13	6	MCH: CH116	5580
	13	13	6	HCH: CH140	5700
	13	13	6	Straddle: CH144	5720
	13	13	6	LCH: CH149	5745
	13	13	6	MCH: CH157	5785
	13	13	6	HCH: CH165	5825
	15	15	MCS 8	LCH: CH36	5180
IEEE 802.11n HT20	15	15	MCS 8	MCH: CH40	5200
	15	15	MCS 8	HCH: CH48	5240
	15	15	MCS 8	LCH: CH52	5260
	15	15	MCS 8	MCH: CH56	5280
	15	15	MCS 8	HCH: CH64	5320
	13	13	MCS 8	LCH: CH100	5500
	13	13	MCS 8	MCH: CH116	5580
	13	13	MCS 8	HCH: CH140	5700
	13	13	MCS 8	Straddle: CH144	5720
	13	13	MCS 8	LCH: CH149	5745
	13	13	MCS 8	MCH: CH157	5785
	13	13	MCS 8	HCH: CH165	5825
IEEE 802.11n HT40	15	15	MCS 8	LCH: CH38	5190
	15	15	MCS 8	HCH: CH46	5230
	15	15	MCS 8	LCH: CH54	5270

	15	15	MCS 8	HCH: CH62	5310
	13	13	MCS 8	LCH: CH102	5510
	13	13	MCS 8	MCH: CH110	5550
	13	13	MCS 8	HCH: CH134	5670
	13	13	MCS 8	Straddle: CH142	5710
	13	13	MCS 8	LCH: CH151	5755
	13	13	MCS 8	HCH: CH159	5795
IEEE 802.11ac VHT20	15	15	MCS 8	LCH: CH36	5180
	15	15	MCS 8	MCH: CH40	5200
	15	15	MCS 8	HCH: CH48	5240
	15	15	MCS 8	LCH: CH52	5260
	15	15	MCS 8	MCH: CH56	5280
	15	15	MCS 8	HCH: CH64	5320
	13	13	MCS 8	LCH: CH100	5500
	13	13	MCS 8	MCH: CH116	5580
	13	13	MCS 8	HCH: CH140	5700
	13	13	MCS 8	Straddle: CH144	5720
	13	13	MCS 8	LCH: CH149	5745
	13	13	MCS 8	MCH: CH157	5785
	13	13	MCS 8	HCH: CH165	5825
IEEE 802.11 ac VHT40	15	15	MCS 8	LCH: CH38	5190
	15	15	MCS 8	HCH: CH46	5230
	15	15	MCS 8	LCH: CH54	5270
	15	15	MCS 8	HCH: CH62	5310
	13	13	MCS 8	LCH: CH102	5510
	13	13	MCS 8	MCH: CH110	5550
	13	13	MCS 8	HCH: CH134	5670
	13	13	MCS 8	Straddle: CH142	5710
	13	13	MCS 8	LCH: CH159	5755
	13	13	MCS 8	HCH: CH36	5795
IEEE 802.11ac VHT80	15	15	MCS 0	CH42	5210
	15	15	MCS 0	CH58	5290
	13	13	MCS 0	LCH: CH106	5530
	13	13	MCS 0	HCH: CH122	5610
	13	13	MCS 0	Straddle: CH138	5690
	13	13	MCS 0	CH155	5775

Note: According exploratory test, EUT will have maximum output power in those data rate, so

those data rate were used for all test.

1.6. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Condition	Normal Condition	Extreme Condition
Relative Humidity	20-75%	N/A
Temperature(°C)	18°C-25°C	N/A
Voltage(V)	3.8V	N/A

1.7. Test laboratory

Guangdong Dongdian Testing Service Co., Ltd.

Add: Unit 2, Building 1, No.17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20155, G-20118

2. Summary of test results

2.1. Report SAR results

Band	Test Position	Max. Reported SAR (W/kg)	SAR limit (W/kg)	Verdict
Bluetooth	Body (1-g) 0mm	0.338	1.6	Pass
2.4G WIFI	Body (1-g) 0mm	0.789	1.6	Pass
5G WIFI	Body (1-g) 0mm	0.992	1.6	Pass
Simultaneous Transmission	Body(1-g) 0mm	1.231	1.6	Pass

EUT is compliant with Uncontrolled Environment General Population.

EUT have the same physical, mechanical, and thermal characteristics and operational tolerances expected for production units

2.2. RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Average SAR** (Whole Body)	0.08 W/kg	0.40 W/kg
Spatial Peak SAR* (Brain*Trunk)	1.60 W/kg	8.00 W/kg
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	4.00 W/kg	20.00 W/kg

Notes:

- 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.
- 4) Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.
- 5) 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.)

3.1. The SAR measurement system

- A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software. An arm extension for accommodation the data acquisition electronics (DAE).
- An isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY52 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning

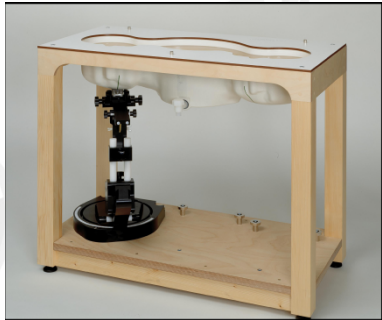
lamps, etc.

- The SAM twin phantom enabling testing left-hand, right-hand and Body Worn usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validating the proper functioning of the system.

3.2. Isotropic E-field probe EX3DV4

	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 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 Db (30 MHz to 6 GHz)
Directivity	± 0.3 Db in TSL (rotation around probe axis) ± 0.5 Db in TSL (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 Mw/g Linearity: ± 0.2 Db (noise: typically < 1 μ W/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (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 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

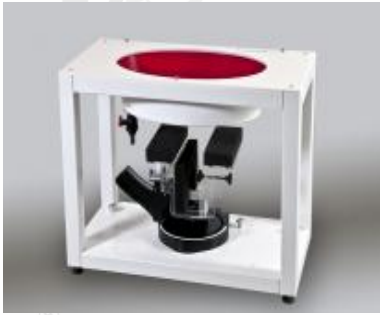
3.3. SAM twin phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)	
Dimensions (incl. Wooden Support)	Length: 1000 mm Width: 500 mm Height: adjustable feet	
Filling Volume	14esolut. 25 liters	
Wooden Support	SPEAG standard phantom table	
The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the		

phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.

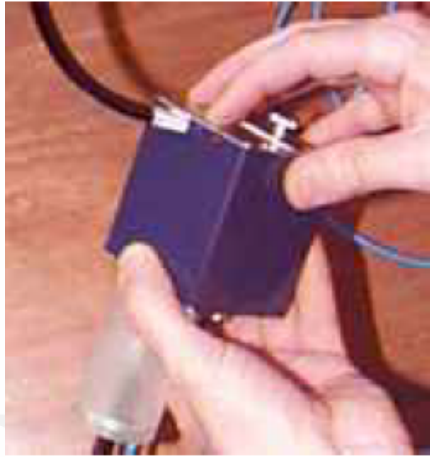
3.4. ELI phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	15esolut. 30 liters	
Wooden Support	SPEAG standard phantom table	

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure.

3.5. Data acquisition electronics (DAE)

Model	DAE4	
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY4/5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.	
Measurement Range	-100 to +300 mv (16 bit resolution and two range settings: mV, 400 mV)	
Input Offset Voltage	< 5mv (with auto zero)	
Input Bias Current	< 50 fA	
Dimensions	60 x 60 x 68 mm	

3.6. Device holder for transmitters



The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centres for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon=3$ and loss tangent $\delta=0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

4. Measurement procedure

4.1. Scanning procedure

Step 1: Power reference measurement

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure.

Step 2: Area scan

The SAR distribution at the exposed side of the head was measured at a distance of 4mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm*15mm or 12mm*12mm or 10mm*10mm. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Zoom scan

Around this point, a volume of 30mm*30mm*30mm (fine resolution volume scan, zoom scan) was assessed by measuring 5x5x7 points ($\leq 2\text{GHz}$) and 7x7x7 points ($\geq 2\text{GHz}$). On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the centre of the dipoles is 2.0mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. Refer to the probe specification). The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points were interpolated to calculate the average. All neighbouring volumes were evaluated until no neighboring volume with a higher average value was found.

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE 1528-2013.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm $\pm$ 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2)$ mm $\pm$ 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			$30^{\circ} \pm 1^{\circ}$	$20^{\circ} \pm 1^{\circ}$
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.				
* When zoom scan is required and the <u>reported</u> SAR from the <u>area scan based 1-g SAR estimation</u> procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

Step 4: Power reference measurement (drift)

The Power Drift Measurement job measures the field at the same location as the most recent power reference measurement job within the same procedure, and with the same settings. The indicated drift is mainly the variation of the DUT's output power and should vary max. $\pm 5\%$

Step 5: Z-Scan (FCC only)

The Z scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation, the extrapolated distance should not be greater than the step size in Z-direction.

According to RSS-102.SAR.MEAS, SAR evaluations in the range of 4 MHz to 6 GHz shall be made in accordance with the latest version of IEC/IEEE 62209-1528 with the deviations outlined below:

- 1) Clause 7.6 of IEC/IEEE 62209-1528 is not applicable for device certification. Instead the provisions of this RSS shall be followed.
- 2) The SAR assessment procedures for Long-Term Evolution (LTE) devices provided in Federal Communications Commission (FCC) knowledge database (KDB) 941225 D05 take precedence over clause 7.9.3.6 of IEC/IEEE 62209-1528. ISSED accepts the fast SAR testing procedures set forth in clause 7.9.2 of IEC/IEEE 62209-1528

According to the reference distribution functions specified in IEC/IEEE 62209-1528:2020 :

Parameter	DUT transmit frequency being tested	
	$f \leq 3 \text{ GHz}$	$3 \text{ GHz} < f \leq 10 \text{ GHz}$
Maximum distance between the measured points (geometric centre of the sensors) and the inner phantom surface (z_{M1} in Figure 20 in mm)	5 ± 1	$\delta \ln(2)/2 \pm 0,5^a$
Maximum spacing between adjacent measured points in mm (see O.8.3.1) ^b	20, or half of the corresponding zoom scan length, whichever is smaller	$60/f$, or half of the corresponding zoom scan length, whichever is smaller
Maximum angle between the probe axis and the phantom surface normal (α in Figure 20) ^c	5° (flat phantom only) 30° (other phantoms)	5° (flat phantom only) 20° (other phantoms)
Tolerance in the probe angle	1°	1°
^a δ is the penetration depth for a plane-wave incident normally on a planar half-space. ^b See Clause O.8 on how Δx and Δy may be selected for individual area scan requirements. ^c The probe angle relative to the phantom surface normal is restricted due to the degradation in the measurement accuracy in fields with steep spatial gradients. The measurement accuracy decreases with increasing probe angle and increasing frequency. This is the reason for the tighter probe angle restriction at frequencies above 3 GHz.		

Parameter	DUT transmit frequency being tested	
	$f \leq 3 \text{ GHz}$	$3 \text{ GHz} < f \leq 10 \text{ GHz}$
Maximum distance between the closest measured points and the phantom surface (z_{M1} in Figure 20 and Table 3, in mm)	5	$\delta \ln(2)/2^a$
Maximum angle between the probe axis and the phantom surface normal (α in Figure 20)	5° (flat phantom only) 30° (other phantoms)	5° (flat phantom only) 20° (other phantoms)
Maximum spacing between measured points in the x - and y -directions (Δx and Δy , in mm)	8	$24/f^b$
For uniform grids: Maximum spacing between measured points in the direction normal to the phantom shell (Δz_1 in Figure 20, in mm)	5	$10/(f - 1)$
For graded grids: Maximum spacing between the two closest measured points in the direction normal to the phantom shell (Δz_1 in Figure 20, in mm)	4	$12/f$
For graded grids: Maximum incremental increase in the spacing between measured points in the direction normal to the phantom shell ($R_z = \Delta z_2/\Delta z_1$ in Figure 20)	1,5	1,5
Minimum edge length of the zoom scan volume in the x - and y -directions (L_z in O.8.3.2, in mm)	30	22
Minimum edge length of the zoom scan volume in the direction normal to the phantom shell (L_h in O.8.3.2 in mm)	30	22
Tolerance in the probe angle	1°	1°
^a δ is the penetration depth for a plane-wave incident normally on a planar half-space.		
^b This is the maximum spacing allowed, which might not work for all circumstances.		

5. Description of test position

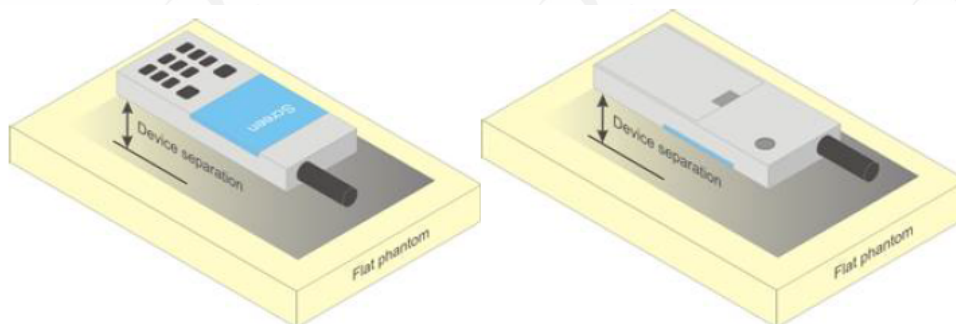
5.1. Body-worn accessory configurations

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations.

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D04 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is $> 1.2 \text{ W/kg}$, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e., the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.



5.2. Extremity exposure configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions: i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1-g body and 10-g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D04v01 should be applied to determine SAR test requirements.

For smart phones with a display diagonal dimension >15.0 cm or an overall diagonal dimension >16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D04 v01r03 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna ≤ 25 mm from that surface or edge, in direct contact with the phantom, for 10-g SAR. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g SAR is required only for the surfaces and edges with hotspot to the maximum output power (including tolerance) is 1-g SAR > 1.2 W/kg.

5.3. Head exposure configurations

Devices that are designed to transmit next to the ear and operate according to the handset procedures in IEEE Std 1528-2013, or conditions described in the published RF exposure KDB procedures, must be tested using the SAM phantom defined in IEEE Std 1528-2013. When antennas are near the bottom of a handset and the peak SAR location is located in regions of the SAM phantom where SAR probe access can be limited, the procedures in KDB Publication 648474 D04 must be applied. Other head exposure conditions, for example, in-front-of the face, should be tested using a flat phantom according to the required published RF exposure KDB procedures.

6. RF exposure conditions

6.1. EUT Test sides

SAR test sides						
Band	Body					
	Front	Back	Top	Bottom	Left	Right
Bluetooth	√	√	√	√	√	√
2.4G WiFi	√	√	√	√	√	√
5G WiFi	√	√	√	√	√	√

6.2. Standalone SAR test exclusion considerations

According to the KDB447498, the SAR test exclusion threshold:

Frequency (MHz)	Distance(mm)										
	\	5	10	15	20	25	30	35	40	45	50
300		39	65	88	110	129	148	166	184	201	217
450		22	44	67	89	112	135	158	180	203	226
835		9	25	44	66	90	116	145	175	207	240
1900		3	12	26	44	66	92	122	157	195	236
2450		3	10	22	38	59	83	111	143	179	219
3600		2	8	18	32	49	71	96	125	158	195
5800		1	6	14	25	40	58	80	106	136	169

7. SAR system verification procedure

7.1. Tissue simulate liquid

7.1.1. Target dielectric properties of head tissue-equivalent material

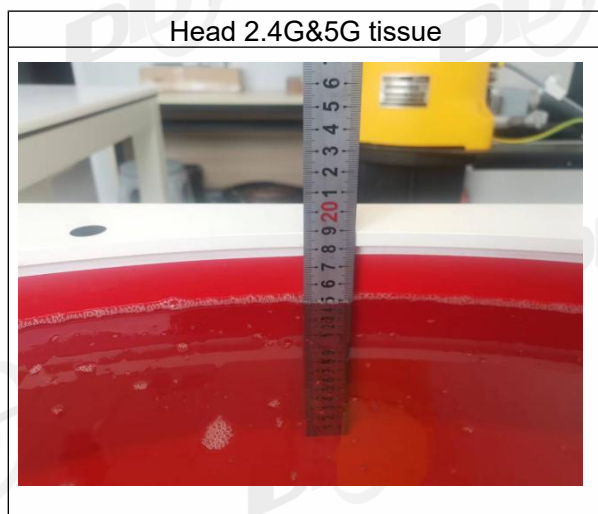
Frequency (MHz)	Relative permittivity (ϵ_r)	Conductivity (σ) (S/m)
300	45.3	0.87
450	43.5	0.87
750	41.9	0.89
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1500	40.4	1.23
1640	40.2	1.31
1750	40.1	1.37
1800	40.0	1.40
1900	40.0	1.40
2000	40.0	1.40
2100	39.8	1.49
2300	39.5	1.67
2450	39.2	1.80
2600	39.0	1.96
3000	38.5	2.40
3500	37.9	2.91
4000	37.4	3.43
4500	36.8	3.94
5000	36.2	4.45
5200	36.0	4.66
5400	35.8	4.86
5600	35.5	5.07
5800	35.3	5.27
6000	35.1	5.48

NOTE—For convenience, permittivity and conductivity values at some frequencies that are not part of the original data from Drossos et al. [B60] or the extension to 5800 MHz are provided (i.e., the values shown in italics). These values were linearly interpolated between the values in this table that are immediately above and below these values, except the values at 6000 MHz that were linearly extrapolated from the values at 3000 MHz and 5800 MHz.

7.1.2. Measurement for tissue simulate liquid

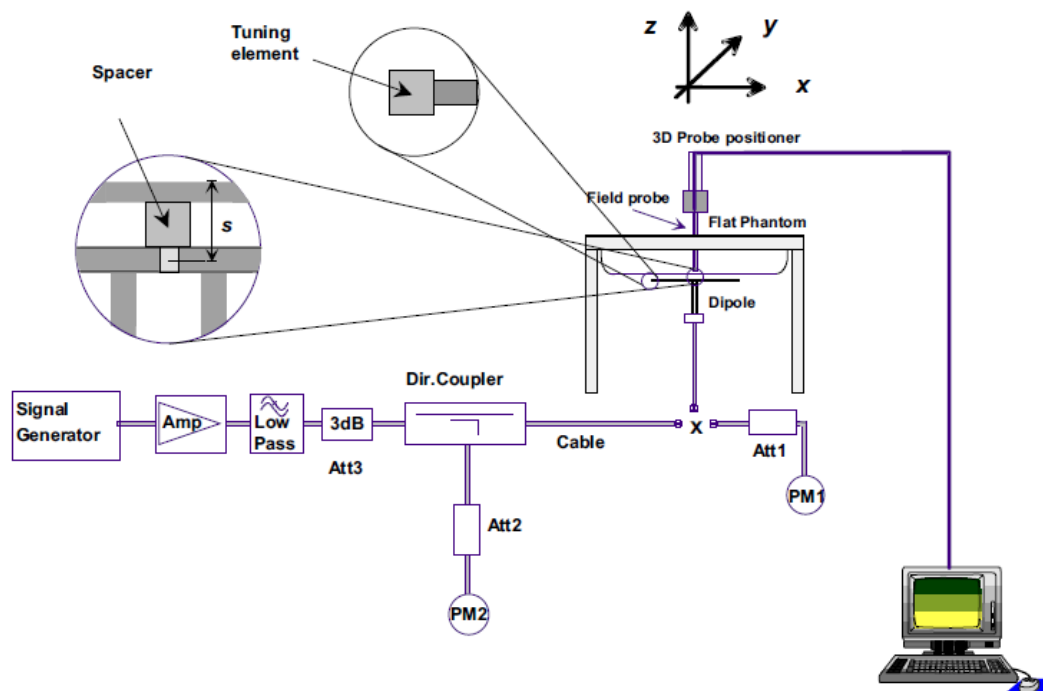
The dielectric properties for this Tissue Simulate Liquids were measured by using the Agilent Model 85070E Dielectric Probe in conjunction with Agilent E5071C Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in table. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was $\pm 2^\circ\text{C}$.

	Freq. (MHz)	Target Tissue ($\pm 5\%$)		Measured Tissue		Liquid Temp. ($^{\circ}\text{C}$)	Measured Date
		ϵ_r	$\sigma(\text{S/m})$	ϵ_r	$\sigma(\text{S/m})$		
Tissue Type	2402	39.3 (37.33~41.27)	1.76 (1.672~1.848)	38.73	1.718	20.7	2026/07/23
	2412	39.3 (37.30~41.23)	1.76 (1.67~1.85)	37.74	1.726	20.7	2026/07/23
	2437	39.22 (37.25~41.18)	1.79 (1.7005~1.879)	38.49	1.734	20.7	2026/07/23
	2440	39.22 (37.25~41.18)	1.79 (1.7005~1.879)	38.43	1.735	20.7	2026/07/23
	2450	39.20 (37.240~41.160)	1.80 (1.710~1.890)	38.43	1.746	20.7	2026/07/23
	2462	39.18 (37.22~41.14)	1.81 (1.72~1.90)	38.45	1.755	20.7	2026/07/23
	2480	39.16 (37.20~41.12)	1.83 (1.75~1.92)	38.44	1.766	20.7	2026/07/23
	5180	36.0 (34.238~37.842)	4.66 (4.43~4.89)	36.90	4.439	21.4	2026/07/27
	5200	36 (34.2~37.8)	4.66 (4.427~4.893)	36.83	4.461	21.4	2026/07/27
	5260	35.9 (34.11~37.70)	4.76 (4.522~4.998)	36.64	4.552	21.4	2026/07/27
	5300	35.9 (34.105~37.695)	4.76 (4.522~4.998)	36.56	4.602	21.4	2026/07/27
	5500	35.6 (33.82~37.38)	4.96 (4.712~5.208)	35.82	4.795	21.4	2026/07/27
	5550	35.6 (33.82~37.38)	4.96 (4.712~5.208)	35.76	4.845	21.4	2026/07/27
	5600	35.5 (33.725~37.275)	5.07 (4.816~5.323)	35.61	4.892	21.4	2026/07/27
	5745	35.3 (33.5~37.1)	5.22 (4.96~5.48)	35.19	5.040	21.4	2026/07/27
	5785	35.3 (33.5~37.1)	5.26 (5.00~5.52)	35.12	5.080	21.4	2026/07/27
	5800	35.3 (33.535~37.065)	5.27 (5.006~5.534)	35.18	5.092	21.4	2026/07/27



7.2. SAR system validation

The microwave circuit arrangement for system verification is sketched in bellow figure. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within $\pm 10\%$ from the target SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the table 5 (A power level of 250mw was input to the dipole antenna). During the tests, The laboratory temperature range shall not exceed 2°C , the relative humidity was in the range 75% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.



7.2.1. Justification for extended SAR dipole calibrations

1) Referring to KDB865664 D01 requirements for dipole calibration, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C and Appendix E.

- a) There is no physical damage on the dipole;
- b) System check with specific dipole is within 10% of calibrated value;
- c) Return-loss is within 10% of calibrated measurement;
- d) Impedance is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

7.2.2. Validation test setup photograph



7.2.3. Summary system validation results

Validation Kit		Measured SAR 100mW (W/kg)	Measured SAR normalized to 1w (W/kg)	Target SAR normalized to 1w ($\pm 10\%$) (W/kg)	Liquid Temp. (°C)	Measured Date
D2450V2 @2450MHz	1-g	5.21	52.1	52.8 (47.52~58.08)	20.7	2026/07/23
	10-g	2.53	25.3	24.6 (22.14~27.06)	20.7	2026/07/23
D5GHzV2 @5200MHz	1-g	7.85	78.5	75.6 (68.04~83.16)	21.4	2026/07/27
	10-g	2.33	23.3	21.2 (19.08~23.32)	21.4	2026/07/27
D5GHzV2 @5300MHz	1-g	7.73	77.3	78.4 (70.56~86.24)	21.4	2026/07/27
	10-g	2.28	22.8	22.1 (19.89~24.31)	21.4	2026/07/27
D5GHzV2 @5500MHz	1-g	7.80	78	83.2 (74.88~91.52)	21.4	2026/07/27
	10-g	2.28	22.8	23.3 (20.97~25.63)	21.4	2026/07/27
D5GHzV2 @5600MHz	1-g	7.93	79.3	80.8 (72.72~88.88)	21.4	2026/07/27
	10-g	2.32	23.2	22.6 (20.34~24.86)	21.4	2026/07/27
D5GHzV2 @5800MHz	1-g	7.26	72.6	76.9 (69.21~84.59)	21.4	2026/07/27
	10-g	2.12	21.2	21.3 (19.17~23.43)	21.4	2026/07/27

7.2.4. Detailed system validation results

See the Appendix A.

8. Equipment list

Test Platform	SPEAG DASY5 Professional				
Location	SAR room				
Description	SAR Test System (Frequency range 300MHz-6GHz)				
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
Robot	Staubli	TX90 XL	F12/5N3XC/A/01	NCR	NCR
ELI Phantom	SPEAG	QDOVA002 AA	1752	NCR	NCR
Data Acquisition Electronics	SPEAG	DAE4	1366	2026-06-22	2027-06-21
SAR test Probe	SPEAG	EX3DV4	3906	2026-06-22	2027-06-21
Validation Kits	SPEAG	D2450V2	904	2025-02-18	2028-02-17
Agilent Network Analyzer	Agilent	E5071C	MY46316792	2026-03-28	2027-03-27
Dielectric Probe Kit	Agilent	85070E	85070-20037	2026-03-28	2027-03-27
0.1G-2Ghz DUAL DIRECTIONAL COUPLER	Agilent	778D	MY52180233	NCR	NCR
2G-18Ghz DUAL DIRECTIONAL COUPLER	Agilent	772D	MY52180116	NCR	NCR
Signal Generator	Agilent	N5182A	MY19060405	2026-03-28	2027-03-27
Preamplifier	Mini-Circuits	ZHL-42W	QA1240001	NCR	NCR
Preamplifier	Mini-Circuits	ZVE-8G+	926701231	NCR	NCR
EPM Series Power Meter	Agilent	E4417A	MY50000999	2026-03-28	2027-03-27
Power Sensor	Agilent	E9327A	MY44420458	2026-03-28	2027-03-27
Power Sensor	Agilent	E9327A	MY44420760	2026-03-28	2027-03-27
Attenuator	Agilent	8491A 3dB	MY52460179	NCR	NCR
Attenuator	Agilent	8491A 10dB	MY52460275	NCR	NCR
Humidity and Temperature Indicator	Euchamp Electronics	YSWS53020 B	20210916	2026-07-14	2027-07-13
Test software	Speag	DASY5	V52.10.4.1535	N/A	N/A

Note:

- 1) NCR is short for "No Calibration Requirement".
- 2) The probe shall be calibrated in a tissue-equivalent medium required for the calibration frequency and temperature range, according to the methodology specified in Annex E of IEC/IEEE 62209-1528:2020. Calibration of the probe separately from the measurement system is allowed, provided that the same electrical interface characteristics specified for the probe and readout electronics are used during measurements.

The probe(s) shall be calibrated together with an identical amplifier, measurement device, and data acquisition system.

- a) There is no physical damage on the dipole.
 - b) System check with specific dipole is within 10% of calibrated value.
 - c) The most recent return-loss result, measured at least annually, deviates by no more than 20% from the previous measurement.
 - d) The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.
- 3) Dielectric assessment kit is calibrated against air, distilled water and a shorting block performed before measuring liquid parameters.

9. Measurement uncertainty

Symbol	Input quantity X_i (source of uncertainty)	Unc. ($\pm$)	Prob. Dist. PDF _i	Unc. $a(x_i)$	c_i (1g)	c_i (10g)	U_i (1g) (%)	U_i (10g) (%)
Measurement system errors								
CF	Probe calibration	17.8	N ($k = 2$)	2	1	1	8.9	8.9
CF _{drift}	Probe calibration drift	1.8	R	$\sqrt{3}$	1	1	1.0	1.0
LIN	Probe linearity and detection limit	0.6	R	$\sqrt{3}$	1	1	0.3	0.3
BBS	Broadband signal	0.5	R	$\sqrt{3}$	1	1	0.3	0.3
ISO	Probe isotropy	0.5	R	$\sqrt{3}$	1	1	0.3	0.3
DAE	Other probe and data acquisition errors	2.4	N	1	1	1	2.4	2.4
AMB	RF ambient and noise	3.0	R	$\sqrt{3}$	1	1	1.7	1.7
Δ_{xyz}	Probe positioning errors	0.5	N	1	0.33	0.33	0.2	0.2
DAT	Data processing errors	4.0	R	$\sqrt{3}$	1	1	2.3	2.3
Phantom and device (DUT or validation antenna) errors								
LIQ(σ)	Measurement of phantom conductivity(σ)	2.5	N	1	0.78	0.71	2.0	1.8
LIQ(T_c)	Temperature effects (medium)	2.7	R	$\sqrt{3}$	0.78	0.71	1.2	1.1
EPS	Shell permittivity	14.0	R	$\sqrt{3}$	0.5	0.5	4.0	4.0
DIS	Distance between the radiating element of the DUT and the phantom medium	2.0	N	1	2	2	4.0	4.0
D_{xyz}	Repeatability of positioning the DUT or source against the phantom	2.9	N	1	1	1	2.9	2.9
H	Device holder effects	3.6	N	1	1	1	3.6	3.6
MOD	Effect of operating mode on probe sensitivity	2.4	R	$\sqrt{3}$	1	1	1.4	1.4
TAS	Time-average SAR	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
RF _{drift}	Variation in SAR due to drift in output of DUT	2.5	N	1	1	1	2.5	2.5
VAL	Validation antenna uncertainty (validation measurement only)	0.0	N	1	1	1	0.0	0.0
P_{in}	Uncertainty in accepted power (validation measurement only)	0.0	N	1	1	1	0.0	0.0
Corrections to the SAR result (if applied)								
$C(\epsilon', \sigma)$	Phantom deviation from target (ϵ', σ)	1.9	N	1	1	0.84	1.9	1.6
C(R)	SAR scaling	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
$u(\Delta SAR)$	Combined uncertainty	\					12.85	12.77
U	Expanded uncertainty and effective degrees of freedom ($k = 2$)	\					25.70	25.54

10. Measurement of SAR data

10.1. RF conducted power

See the Appendix F

Note:

- 1) The output power of the device was set to transmit at maximum power for all test.
- 2) According to KDB447498, BT Conforms to SAR test reduction procedures does not require testing. The Bluetooth maximum output power mode is BLE.
- 3) For 2.4G band the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and 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, SAR is not required for the 2.4 GHz OFDM conditions.
- 4) For ANT1 5G WIFI U-NII-2A maximum output power mode is 802.11a, The adjusted SAR is ≤ 1.2 W/kg ,SAR is not required for that 802.11 mode configuration and exposure condition U-NII-1. For ANT2 5G WIFI U-NII-1 maximum output power mode is 802.11a, The adjusted SAR is ≤ 1.2 W/kg ,SAR is not required for that 802.11 mode configuration and exposure condition U-NII-2A.
- 5) U-NII-2C maximum output power mode is 802.11n40, U-NII-3 maximum output power mode is 802.11ac20 , The highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR test for the other 802.11 modes are not required.

10.2. Measurement of SAR data

ANT1 Bluetooth Body 0mm SAR 1-g											
Test position	Test mode	Test Freq (MHz)	Duty Cycle	SAR 1-g (W/kg)	Power drift (dB)	E.I.R.P Power (dBm)	Max. Tune-up E.I.R.P Power (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp. (°C)	SAR limit 1-g (W/kg)
Top	DH5	2480	0.7666	0.0446	0.13	7.42	7.6	1.360	0.061	20.7	1.6
Bottom	DH5	2480	0.7666	0.0631	0.09	7.42	7.6	1.360	0.086	20.7	1.6
Front	DH5	2480	0.7666	0.145	-0.13	7.42	7.6	1.360	0.197	20.7	1.6
Back	DH5	2480	0.7666	0.0446	0.18	7.42	7.6	1.360	0.061	20.7	1.6
Left	DH5	2480	0.7666	0.0056	0.04	7.42	7.6	1.360	0.008	20.7	1.6
Right	DH5	2480	0.7666	0.0017	0.11	7.42	7.6	1.360	0.002	20.7	1.6
Front	DH5	2402	0.7686	0.175	-0.08	6.47	6.6	1.341	0.235	20.7	1.6
Front	DH5	2441	0.7686	0.245	-0.17	7.35	7.6	1.378	0.338	20.7	1.6

ANT1 2.4G WiFi Body 0mm SAR 1-g											
Test position	Test mode	Test Freq (MHz)	Duty Cycle	SAR 1-g (W/kg)	Power drift (dB)	E.I.R.P Power (dBm)	Max. Tune-up E.I.R.P Power (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp. (°C)	SAR limit 1-g (W/kg)
Top	11B	2462	0.9952	0.174	0.13	10.69	11.6	1.239	0.216	20.7	1.6
Bottom	11B	2462	0.9952	0.177	0.11	10.69	11.6	1.239	0.219	20.7	1.6
Front	11B	2462	0.9952	0.599	0.14	10.69	11.6	1.239	0.742	20.7	1.6
Back	11B	2462	0.9952	0.0083	-0.03	10.69	11.6	1.239	0.010	20.7	1.6
Left	11B	2462	0.9952	0.0085	-0.06	10.69	11.6	1.239	0.011	20.7	1.6
Right	11B	2462	0.9952	0.0012	0.18	10.69	11.6	1.239	0.001	20.7	1.6
Front	11B	2412	0.9964	0.517	-0.09	10.44	11.6	1.311	0.678	20.7	1.6
Front	11B	2437	0.9964	0.588	0.15	10.34	11.6	1.341	0.789	20.7	1.6

ANT2 2.4G WiFi Body 0mm SAR 1-g											
Test position	Test mode	Test Freq (MHz)	Duty Cycle	SAR 1-g (W/kg)	Power drift (dB)	E.I.R.P Power (dBm)	Max. Tune-up E.I.R.P Power (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp. (°C)	SAR limit 1-g (W/kg)
Top	11B	2462	0.9941	0.143	0.15	10.69	11.6	1.240	0.177	20.7	1.6
Bottom	11B	2462	0.9941	0.116	0.09	10.69	11.6	1.240	0.144	20.7	1.6
Front	11B	2462	0.9941	0.038	0.13	10.69	11.6	1.240	0.047	20.7	1.6
Back	11B	2462	0.9941	0.0051	0.15	10.69	11.6	1.240	0.006	20.7	1.6
Left	11B	2462	0.9941	0.0031	0.11	10.69	11.6	1.240	0.004	20.7	1.6
Right	11B	2462	0.9941	0.199	-0.14	10.69	11.6	1.240	0.247	20.7	1.6
Right	11B	2412	0.9964	0.037	-0.14	9.34	10.39	1.278	0.047	20.7	1.6
Right	11B	2437	0.9953	0.045	0.13	9.83	10.39	1.143	0.051	20.7	1.6

ANT1 5G WIFI U-NII-2A Body 0mm SAR 1-g											
Test position	Test mode	Test Freq (MHz)	Duty Cycle	SAR 1-g (W/kg)	Power drift (dB)	E.I.R.P Power (dBm)	Max. Tune-up E.I.R.P Power (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp. (°C)	SAR limit 1-g (W/kg)
Top	11A	5260	0.9722	0.168	0.06	15.64	16.79	1.340	0.225	21.4	1.6
Bottom	11A	5260	0.9722	0.094	0.14	15.64	16.79	1.340	0.126	21.4	1.6
Front	11A	5260	0.9722	0.355	0.13	15.64	16.79	1.340	0.476	21.4	1.6
Back	11A	5260	0.9722	0.059	0.11	15.64	16.79	1.340	0.079	21.4	1.6
Left	11A	5260	0.9722	0.036	-0.09	15.64	16.79	1.340	0.048	21.4	1.6
Right	11A	5260	0.9722	0.168	-0.05	15.64	16.79	1.340	0.225	21.4	1.6

ANT1 5G WIFI U-NII-2C Body 0mm SAR 1-g											
Test position	Test mode	Test Freq (MHz)	Duty Cycle	SAR 1-g (W/kg)	Power drift (dB)	E.I.R.P Power (dBm)	Max. Tune-up E.I.R.P Power (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp. (°C)	SAR limit 1-g (W/kg)
Top	11N40	5550	0.8974	0.356	-0.11	14.44	14.79	1.208	0.430	21.4	1.6
Bottom	11N40	5550	0.8974	0.405	0.13	14.44	14.79	1.208	0.489	21.4	1.6
Front	11N40	5550	0.8974	0.721	-0.17	14.44	14.79	1.208	0.871	21.4	1.6
Back	11N40	5550	0.8974	0.105	0.06	14.44	14.79	1.208	0.127	21.4	1.6
Left	11N40	5550	0.8974	0.096	-0.14	14.44	14.79	1.208	0.116	21.4	1.6
Right	11N40	5550	0.8974	0.216	0.17	14.44	14.79	1.208	0.261	21.4	1.6
Front	11N40	5510	0.8718	0.561	0.12	14.21	14.79	1.311	0.735	21.4	1.6

ANT1 5G WIFI U-NII-3 Body 0mm SAR 1-g											
Test position	Test mode	Test Freq (MHz)	Duty Cycle	SAR 1-g (W/kg)	Power drift (dB)	E.I.R.P Power (dBm)	Max. Tune-up E.I.R.P Power (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp. (°C)	SAR limit 1-g (W/kg)
Top	11AC20	5785	0.944	0.316	-0.11	13.39	14.29	1.303	0.412	21.4	1.6
Bottom	11AC20	5785	0.944	0.273	0.16	13.39	14.29	1.303	0.356	21.4	1.6
Front	11AC20	5785	0.944	0.761	0.17	13.39	14.29	1.303	0.992	21.4	1.6
Back	11AC20	5785	0.944	0.0779	0.03	13.39	14.29	1.303	0.102	21.4	1.6
Left	11AC20	5785	0.944	0.0692	-0.06	13.39	14.29	1.303	0.090	21.4	1.6
Right	11AC20	5785	0.944	0.367	0.17	13.39	14.29	1.303	0.478	21.4	1.6
Front	11AC20	5745	0.944	0.346	-0.12	11.27	11.79	1.194	0.413	21.4	1.6

ANT2 5G WIFI U-NII-1 Body 0mm SAR 1-g											
Test position	Test mode	Test Freq (MHz)	Duty Cycle	SAR 1-g (W/kg)	Power drift (dB)	E.I.R.P Power (dBm)	Max. Tune-up E.I.R.P Power (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp. (°C)	SAR limit 1-g (W/kg)
Top	11A	5180	0.9653	0.108	-0.14	15.03	16.01	1.298	0.140	21.4	1.6
Bottom	11A	5180	0.9653	0.119	0.02	15.03	16.01	1.298	0.154	21.4	1.6
Front	11A	5180	0.9653	0.0328	-0.07	15.03	16.01	1.298	0.043	21.4	1.6
Back	11A	5180	0.9653	0.0307	0.12	15.03	16.01	1.298	0.040	21.4	1.6
Left	11A	5180	0.9653	0.0004	-0.18	15.03	16.01	1.298	0.001	21.4	1.6
Right	11A	5180	0.9653	0.580	-0.19	15.03	16.01	1.298	0.753	21.4	1.6

ANT2 5G WIFI U-NII-2C Body 0mm SAR 1-g											
Test position	Test mode	Test Freq (MHz)	Duty Cycle	SAR 1-g (W/kg)	Power drift (dB)	E.I.R.P Power (dBm)	Max. Tune-up E.I.R.P Power (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp. (°C)	SAR limit 1-g (W/kg)
Top	11N40	5550	0.8947	0.096	0.14	13.97	14.01	1.128	0.108	21.4	1.6
Bottom	11N40	5550	0.8947	0.057	0.17	13.97	14.01	1.128	0.064	21.4	1.6
Front	11N40	5550	0.8947	0.0091	0.14	13.97	14.01	1.128	0.010	21.4	1.6
Back	11N40	5550	0.8947	0.0024	0.13	13.97	14.01	1.128	0.003	21.4	1.6
Left	11N40	5550	0.8947	0.0005	0.17	13.97	14.01	1.128	0.001	21.4	1.6
Right	11N40	5550	0.8947	0.231	0.13	13.97	14.01	1.128	0.261	21.4	1.6

ANT2 5G WIFI U-NII-3 Body 0mm SAR 1-g											
Test position	Test mode	Test Freq (MHz)	Duty Cycle	SAR 1-g (W/kg)	Power drift (dB)	E.I.R.P Power (dBm)	Max. Tune-up E.I.R.P Power (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp. (℃)	SAR limit 1-g (W/kg)
Top	11AC20	5785	0.9315	0.156	-0.03	12.66	13.51	1.306	0.204	21.4	1.6
Bottom	11AC20	5785	0.9315	0.124	-0.12	12.66	13.51	1.306	0.162	21.4	1.6
Front	11AC20	5785	0.9315	0.098	0.14	12.66	13.51	1.306	0.128	21.4	1.6
Back	11AC20	5785	0.9315	0.0052	0.17	12.66	13.51	1.306	0.007	21.4	1.6
Left	11AC20	5785	0.9315	0.0026	0.10	12.66	13.51	1.306	0.0034	21.4	1.6
Right	11AC20	5785	0.9315	0.364	-0.12	12.66	13.51	1.306	0.475	21.4	1.6

Note:

- 1)The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix B
- 2)Scaled factor= (Max. Tune-up. E.I.R.P power in mW) / (E.I.R.P Power in mW) / (Duty Cycle)
- 3)Scaled SAR=Test SAR * Scaled factor

10.3. Simultaneous transmission SAR

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.

Mode	Combination
1	WIFI_2.4G ANT 1+ WIFI_2.4G ANT 2
2	WIFI_5G ANT 1+ WIFI_5G ANT 2

Mode1	Simultaneous transmission SAR						
	BT ANT	WIFI ANT 1		WIFI ANT 2		/	
Test Position	BT 1-g SAR (W/kg)	WIFI_2.4G 1-g SAR (W/kg)	WIFI_5G 1-g SAR (W/kg)	WIFI_2.4G 1-g SAR (W/kg)	WIFI_5G 1-g SAR (W/kg)	SUM 1-g SAR (W/kg)	SPLSR
Top	/	0.216	/	0.177	/	0.393	Excluded
Bottom	/	0.219	/	0.144	/	0.363	Excluded
Front	/	0.789	/	0.047	/	0.836	Excluded
Back	/	0.010	/	0.006	/	0.016	Excluded
Left	/	0.011	/	0.004	/	0.015	Excluded
Right	/	0.001	/	0.247	/	0.248	Excluded

Mode1	Simultaneous transmission SAR						
	BT ANT	WIFI ANT 1		WIFI ANT 2		/	
Test Position	BT 1-g SAR (W/kg)	WIFI_2.4G 1-g SAR (W/kg)	WIFI_5G 1-g SAR (W/kg)	WIFI_2.4G 1-g SAR (W/kg)	WIFI_5G 1-g SAR (W/kg)	SUM 1-g SAR (W/kg)	SPLSR
Top	/	/	0.412	/	0.140	0.552	Excluded
Bottom	/	/	0.356	/	0.154	0.51	Excluded
Front	/	/	0.992	/	0.043	1.035	Excluded
Back	/	/	0.102	/	0.040	0.142	Excluded
Left	/	/	0.090	/	0.001	0.091	Excluded
Right	/	/	0.478	/	0.753	1.231	Excluded

Appendix

Appendix A: System Validation Plots

Appendix B: Highest Test Plots

Appendix C: Calibration Certification

Appendix D: Test setup photograph

Appendix E: Dipole Antenna self-calibration

Appendix F: RF conducted power

END REPORT