TCT 通测检测
TESTING CENTRE TECHNOLOGY

SAR TEST REPORT

FCC ID................................ :	2A233-AYANEO2
Test Report No..................... :	TCT230104E017
Date of issue......................... :	20th Jan. 2023
Testing laboratory............... :	SHENZHEN TONGCE TESTING LAB
Testing location/ address.....:	2101 & 2201, Zhenchang Factory Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China
Applicant's name................. :	Shenzhen Konkr Technology Co., Ltd.
Address................................ :	Room 215, Building 22, Maker Town, No. 4109, Liuxian Avenue, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China
Manufacturer's name ....:	Shenzhen Konkr Technology Co., Ltd.
Address................................ :	Room 215, Building 22, Maker Town, No. 4109, Liuxian Avenue, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China
Product Name...................... :	tablet computer
Trade Mark.......................... :	AYANEO
Model/Type reference..........:	AYANEO 2
SAR Max. Values..............:	**0.359 W/Kg (1g) for Body**
Date of receipt of test item..:	12th Dec. 2022
Date (s) of performance of test... :	16th Jan. 2023 to 19th Jan. 2023
Tested by (+signature).........:	Karl WANG — Karl Wang
Check by (+signature).........:	Beryl Zhao — Beryl Zhao
Approved by (+signature)...:	Tomsin — Tomsin

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1. General Product Information

1.1. EUT description

Product Name:	tablet computer
Model :	AYANEO 2
Trade Mark:	AYANEO
Sample No.	BTFSN230103E003-1/1
Power Supply:	Rechargeable Li-ion Battery DC 3.3V
Wi-Fi 2.4G	
Supported type:	802.11b/802.11g/802.11n/802.11ax
Modulation:	802.11b: DSSS 802.11g/802.11n/802.11ax: OFDM
Operation frequency:	802.11b/802.11g/802.11n(HT20)/802.11ax(HT20): 2412MHz~2462MHz; 802.11n(HT40)/802.11ax(HT40): 2422MHz~2452MHz;
Channel number:	802.11b/802.11g/802.11n(HT20)/802.11ax(HT20): 11; 802.11n(HT40)/ 802.11ax(HT40): 7;
Channel separation:	5MHz
Wi-Fi 5G	
Operation Frequency:	Band 1: 5180 MHz -5240 MHz Band 4: 5745 MHz -5825 MHz
Channel Bandwidth:	802.11a: 20MHz 802.11n: 20MHz, 40MHz 802.11ac/802.11ax: 20MHz, 40MHz, 80MHz
Modulation Technology:	Orthogonal Frequency Division Multiplexing(OFDM)
Modulation Type	256QAM, 64QAM, 16QAM, BPSK, QPSK
Bluetooth	
Bluetooth Version:	Supported 5.2
Modulation:	GFSK(1Mbps) , π/4-DQPSK(2Mbps) , 8-DPSK(3Mbps)
Operation frequency:	2402MHz~2480MHz
Channel number:	79/40
Channel separation:	1MHz/2MHz

1.2. Model(s) list

No.	Model No.	Tested with
1	AYANEO 2	☒
Other models	AYANEO GEEK	☐

Note: AYANEO 2 is tested model, other models are derivative models. The models are identical in circuit and PCB layout, only different on the model names. So the test data of AYANEO 2 can represent the remaining models.

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2. Test standards

The tests were performed according to following standards:
FCC 47 CFR § 2.1093
IEEE1528-2013: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB447498 D01: General RF Exposure Guidance v06
KDB447498 D04: Interim General RF Exposure Guidance v01
KDB865664 D01: SAR measurement 100MHz to 6GHz v01r04
KDB865664 D02: RF Exposure Reporting v01r02.
KDB248227 D01: 802.11 Wi-Fi SAR v02r02
KDB941225 D06: Hotspot Mode v02r01
KDB616217 D04: SAR for laptop and tablets v01r02
KDB690783 D01: SAR Listings on Grant v01r03

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3. Facilities and Accreditations

3.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098
  Shenzhen Tongce Testing Lab
  The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.
- IC - Registration No.: 10668A-1
  The 3m Semi-anechoic chamber of Shenzhen Tongce Testing Lab.. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

3.2. Location

SHENZHEN TONGCE TESTING LAB.
Address: 2101 & 2201, Zhenchang Factory Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China

3.3. Environment Condition:

Temperature:	18°C ~25°C
Humidity:	35%~75% RH
Atmospheric Pressure:	1011 mbar

4. Test Result Summary

The maximum results of Specific Absorption Rate (SAR) found during test as bellows:

<Highest Reported standalone SAR Summary>

Exposure Position	Frequency Band	Reported SAR (W/kg)	Equipment Class	Highest Reported SAR (W/kg)
Body 1-g SAR (0 mm Gap)	Bluetooth	0.106	DSS	0.359
	WLAN 2.4 GHz	0.242	DTS	
	WLAN 5.2 GHz	0.359	NII	
	WLAN 5.8 GHz	0.135		

<Highest Reported simultaneous SAR Summary>

Exposure Position	Frequency Band	Highest Reported Simultaneous Transmission SAR (W/kg)
Body 1-g SAR (0 mm Gap)	5.2G WIFI ANT 1 side + 5.2G WIFI ANT 2 side	0.698

Note:

1. The highest simultaneous transmission is scalar summation of Reported standalone SAR per FCC KDB 690783 D01 v01r03, and scalar SAR summation of all possible simultaneous transmission scenarios are < 1.6W/kg.
2. This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-2005, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.

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5. RF Exposure Limit

Type Exposure	SAR (W/kg) Uncontrolled Exposure Limit
Spatial Peak SAR (averaged over any 1 g of tissue)	1.60
Spatial Peak SAR (hands/wrists/feet/ankles averaged over 10g)	4.00
Spatial Peak SAR (averaged over the whole body)	0.08

Note:
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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6. SAR Measurement System Configuration

6.1. SAR Measurement Set-up

The OPENSAR system for performing compliance tests consist of the following items:

A standard high precision 6-axis robot (KUKA) with controller and software.

KUKA Control Panel (KCP)

A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with a Video Positioning System (VPS).

The stress sensor is composed with mechanical and electronic when the electronic part detects a change on the electro-mechanical switch; it sends an "Emergency signal" to the robot controller that to stop robot's moves A computer operating Windows XP.

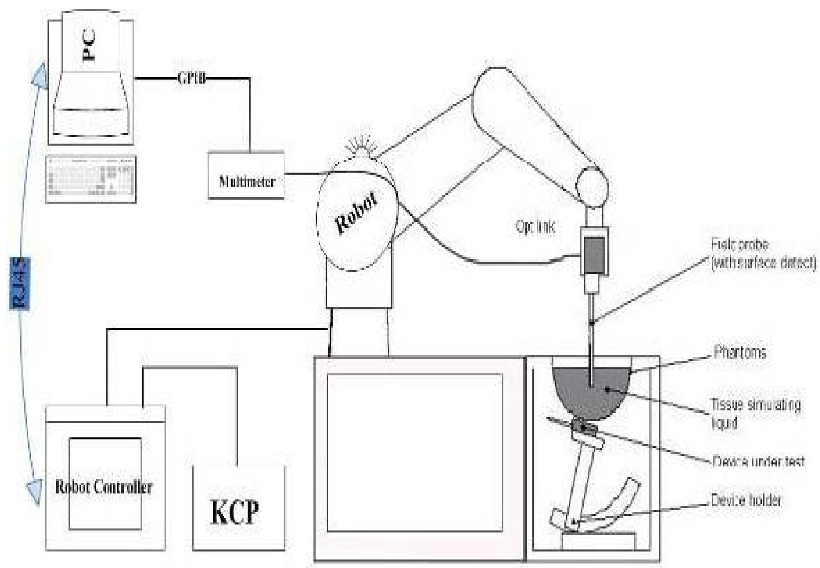
OPENSAR software Remote control with teaches pendant and additional circuitry for robot safety such as warning lamps, etc.

The SAM phantom enabling testing left-hand right-hand and body usage.

The Position device for handheld EUT

Tissue simulating liquid mixed according to the given recipes.

System validation dipoles to validate the proper functioning of the system.



KUKA SAR Test Sysytem Configuration

6.2. E-field Probe

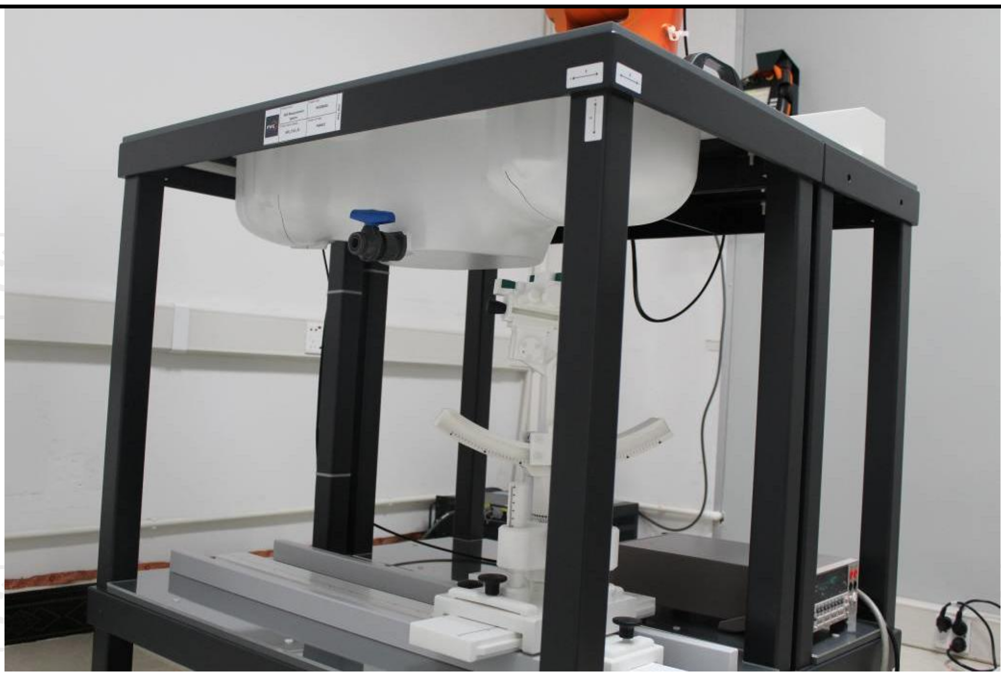
The SAR measurement is conducted with the dosimetric probe (manufactured by MVG). The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.	
Probe Specification Construction Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE) Calibration ISO/IEC 17025 calibration service available.	
Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	SN 36/20 EPGO346
Frequency Range of Probe	0.15GHz-6GHz
Resistance of Three Dipoles at Connector	Dipole 1:R1=0.217MΩ Dipole 2:R3=0.245MΩ Dipole 3:R3=0.219MΩ

Photo of E-Field Probe

6.3. Phantom

The SAM Phantom SAM120 is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is in compliance with the specification set in IEEE P1528 and CENELEC IEC 62209-1, IEC 62209-2:2010.
The phantom 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 the evaporation of the liquid.
Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot
System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections.
Body SAR testing also used the flat section between the head profiles.

Name: COMOSAR IEEE SAM PHANTOM
S/N: SN 19/15 SAM 120
Manufacture: MVG

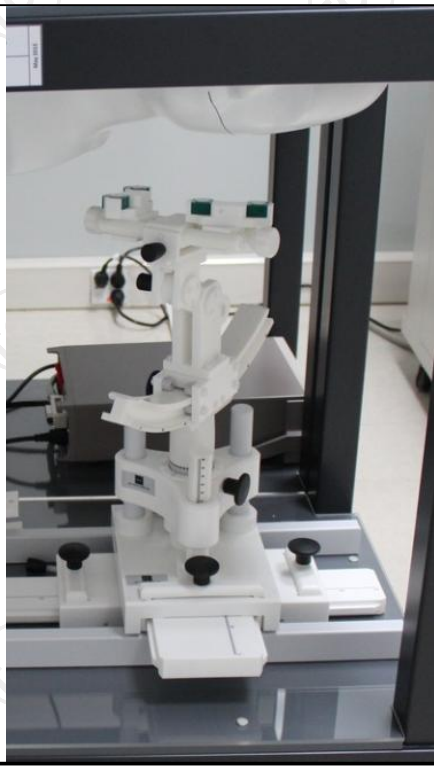


SAM Twin Phantom

6.4. Device Holder

In combination with the Generic Twin Phantom SAM120, the Mounting Device enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatedly positioned according to the FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

COMOSAR Mobile phone positioning system



6.5. Data Storage and Evaluation

Data Storage
The OPENSAR software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation
The OPENSAR software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	Normi, ai0, ai1, ai2
	- Conversion factor	ConvFi
	- Diode compression point	Dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the OPENSAR components. In the direct measuring mode of the millimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$Vi = Ui + Ui2 \cdot c\,f / d\,c\,pi$$

With Vi = compensated signal of channel i (i = x, y, z)
Ui = input signal of channel i (i = x, y, z)
cf = crest factor of exciting field (MVG parameter)
dcpi = diode compression point (MVG parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes: $Ei = (Vi / Normi \cdot ConvF)1/2$

H-field probes: $Hi = (Vi)1/2 \cdot (ai0 + ai1\, f + ai2f2) / f$

With Vi = compensated signal of channel i (i = x, y, z)
Normi = sensor sensitivity of channel i (i = x, y, z) [mV/(V/m)2] for E-field Probes
ConvF = sensitivity enhancement in solution
aij = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
Ei = electric field strength of channel i in V/m
Hi = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$Etot = (Ex2+ EY2+ Ez2)1/2$$

The primary field data are used to calculate the derived field units.

$$SAR = (Etot)^2 \cdot \sigma / (\rho \cdot 1000)$$

with SAR = local specific absorption rate in mW/g
Etot = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm3

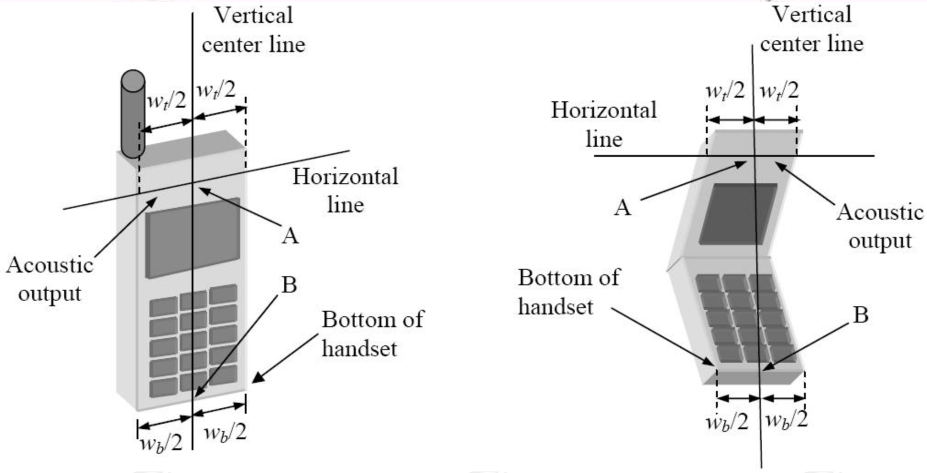
Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

6.6. Position of the wireless device in relation to the phantom

Handset Reference Points

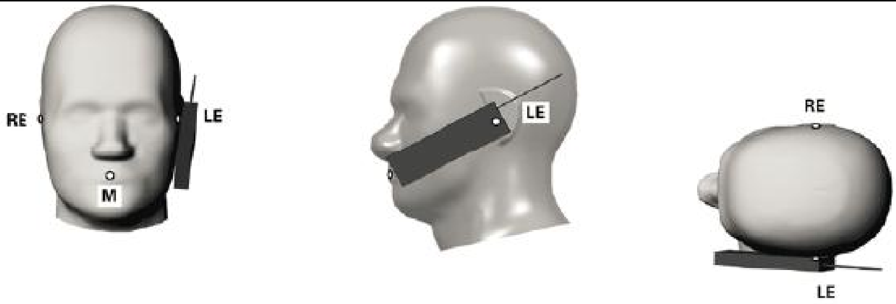
$$Ppwe = Etot^2 / 3770 \text{ or } Ppwe = Htot^2 \cdot 37.7$$

With Ppwe = equivalent power density of a plane wave in mW/cm2
Etot = total electric field strength in V/m
Htot = total magnetic field strength in A/m

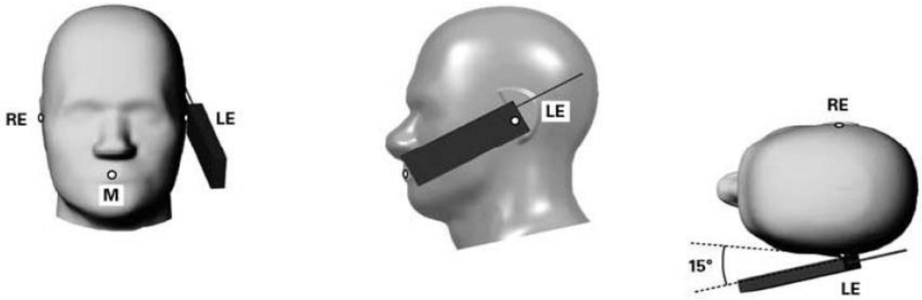


Wt Width of the handset at the level of the acoustic
Wb Width of the bottom of the handset
A Midpoint of the width wt of the handset at the level of the acoustic output
B Midpoint of the width wb of the bottom of the handset

Positioning for Cheek / Touch



Positioning for Ear / 15º Tilt



Body Worn Accessory Configurations
To position the device parallel to the phantom surface with either keypad up or down.
To adjust the device parallel to the flat phantom.
To adjust the distance between the device surface and the flat phantom to 15mm or holster surface and the flat phantom to 0 mm.

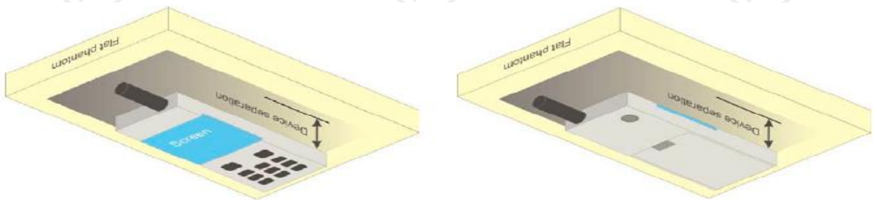


Illustration for Body Worn Position

Wireless Router（Hotspot）Configurations
Some battery-operated handsets have the capability to transmit and receive internet connectivity through simultaneous transmission of WIFI in conjunction with a separate licensed transmitter. The FCC has provided guidance in KDB Publication 941225 D06 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device with antennas 2.5 cm or closer to the edge of the device, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. Therefore, SAR must be evaluated for each frequency transmission and mode separately and summed with the WIFI transmitter according to KDB 648474 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

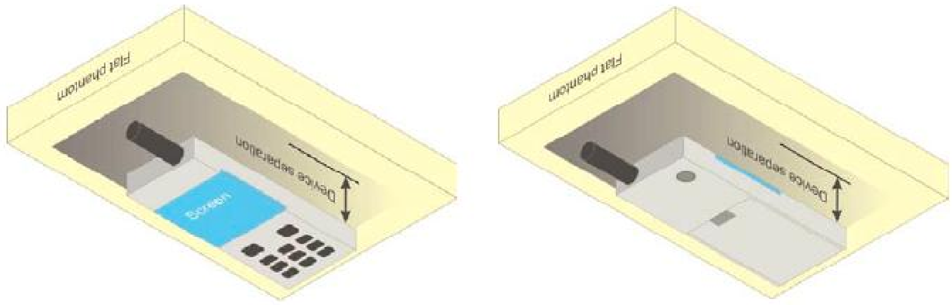
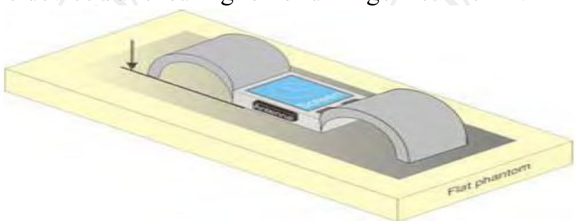


Illustration for Hotspot Position

Limb-worn device

A limb-worn device is a unit whose intended use includes being strapped to the arm or leg of the user while transmitting (except in idle mode). It is similar to a body-worn device. Therefore, the test positions of 6.1.4.4 also apply. The strap shall be opened so that it is divided into two parts as shown in Figure 9. The device shall be positioned directly against the phantom surface with the strap straightened as much as possible and the back of the device towards the phantom.

If the strap cannot normally be opened to allow placing in direct contact with the phantom surface, it may be necessary to break the strap of the device but ensuring to not damage the antenna.



Test position for limb-worn devices

6.7. Tissue Dielectric Parameters

The liquid used for the frequency range of 100MHz-6G consisted of water, sugar, salt and Cellulose. The liquid has been previously proven to be suited for worst-case. The following Table shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528 and IEC 62209.
The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the determine of the dielectric parameter are within the tolerances of the specified target values. The measured conductivity and relative permittivity should be within ±5% of the target values.
The following materials are used for producing the tissue-equivalent materials

Targets for tissue simulating liquid

Frequency (MHz)	Liquid Type	Liquid Type (σ)	± 5% Range	Permittivity (ε)	± 5% Range
750	Head	0.89	0.85~0.93	41.90	39.81~44.00
835	Head	0.90	0.86~0.95	41.50	39.43~43.58
1800-2000	Head	1.40	1.33~1.47	40.00	38.00~42.00
2450	Head	1.80	1.71~1.89	39.20	37.24~41.16
2600	Head	1.96	1.86~2.06	39.00	37.05~40.95
750	Body	0.96	0.91~1.01	55.50	52.73~58.28
835	Body	0.97	0.92~1.02	55.20	52.44~57.96
1800-2000	Body	1.52	1.44~1.60	53.30	50.64~55.97
2450	Body	1.95	1.85~2.05	52.70	50.07~55.34
2600	Body	2.16	2.05~2.27	52.50	49.88~55.13
5200	Body	5.30	5.04~5.57	49.00	46.55~51.45
5300	Body	5.42	5.15~5.69	48.90	46.46~51.35
5600	Body	5.77	5.48~6.06	48.50	46.08~50.93
5800	Body	6.00	5.70~6.30	48.20	45.79~50.61

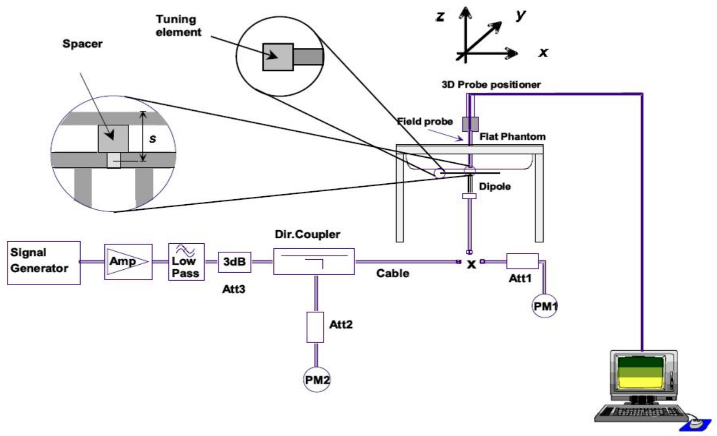
(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m3)

6.8. Tissue-equivalent Liquid Properties

Test Date dd/mm/yy	Temp ℃	Tissue Type	Measured Frequency (MHz)	εr	σ(s/m)	Dev εr(%)	Dev σ(%)
01/16/2023	22℃	2450B	2410	51.96	1.97	-1.78	1.03
			2435	51.94	1.98	-1.44	1.54
			2450	51.92	2.01	-1.48	3.08
			2460	51.91	2.03	-1.50	4.10
01/17/2023	22℃	5200B	5200	49.52	5.40	1.06	1.89
01/17/2023	22℃	5800B	5800	47.59	5.95	-1.27	-0.83

6.9. System Check

The SAR system must be validated against its performance specifications before it is deployed. When SAR probe and system component or software are changed, upgraded or recalibrated, these must be validated with the SAR system(s) that operates with such component. Reference dipoles are used with the required tissue-equivalent media for system validation. System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %).
System check is performed regularly on all frequency bands where tests are performed with the OPENSAR system.



System Check Set-up

Verification Results

Frequency (MHz)	Liquid Type	Measured Value in 100mW (W/kg)		Normalized to 1W (W/kg)		Target Value (W/kg)		Deviation (%)	
		1 g Average	10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average	10 g Average
2450	Body	5.07	2.42	50.70	24.16	50.63	23.40	0.14	3.25
5200	Body	15.47	5.51	154.70	55.10	158.49	55.40	-2.39	-0.54
5800	Body	18.30	6.18	183.00	61.80	183.06	61.62	-0.03	0.29

Comparing to the original SAR value provided by MVG, the verification data should be within its specification of 10%. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table as below indicates the system performance check can meet the variation criterion and the plots can be referred to Section 10 of this report.

7. Measurement Procedure

Conducted power measurement

For WWAN power measurement, use base station simulator to configure EUT WWAN transition in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
Read the WWAN RF power level from the base station simulator.
For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band.
Connect EUT RF port through RF cable to the power meter or spectrum analyser, and measure WLAN/BT output power.

Conducted power measurement

Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
Place the EUT in positions as Appendix B demonstrates.
Set scan area, grid size and other setting on the MVG software.
Measure SAR results for the highest power channel on each testing position.
Find out the largest SAR result on these testing positions of each band.
Measure SAR results for other channels in worst SAR testing position if the Reported SAR or highest power channel is larger than 0.8 W/kg.

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

Power reference measurement
Area scan
Zoom scan
Power drift measurement

Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The MVG software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a “cube” measurement. The measured volume must include the 1g and 10 g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:
Extraction of the measured data (grid and values) from the Zoom Scan.

Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters).

Generation of a high-resolution mesh within the measured volume.

Interpolation of all measured values form the measurement grid to the high-resolution grid

Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface

Calculation of the averaged SAR within masses of 1g and 10g.

Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties

Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r03 quoted below.

<table>
<tr><th colspan="3"></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 mm ± 1 mm</td><td>$\frac{1}{2}\cdot\delta\cdot\ln(2)$ mm ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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 ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ $1.5\cdot\Delta z_{Zoom}(n-1)$ mm</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">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 *area scan based 1-g SAR estimation* 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.</td></tr>
</table>

Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD post-processor scan combine and subsequently superpose these measurement data to calculating the multiband SAR.

SAR Averaged Methods

In MVG, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1g and 10g cubes, the extrapolation distance should not be larger than 5 mm.

Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In MVG measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

Power Drift measurement

The drift job measures the field at the same location as the most recent reference job within the same procedure, and with the same settings. The drift measurement gives the field difference in dB from the reading conducted within the last reference measurement. Several drift measurements are possible for

Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100KHz to 6GHz ,when the highest measurement 1-g SAR within a frequency band is <1.5W/kg, the extensive SAR measurement uncertainty analysis described IEEE Std 1528-2013 is not required in SAR report submitted for equipment approval.

8. Conducted Output Power

WLAN 2.4G								
Mode	Maximum Tune-up (dBm)	802.11b (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)			Maximum Tune-up (dBm)	802.11g (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)		
Channel		1	6	11		1	6	11
Frequency		2412	2437	2462		2412	2437	2462
Average Power (dBm)	11.50	**11.36**	11.16	11.19	12.00	9.93	11.60	11.70
	11.00	10.67	10.63	**10.74**	11.50	9.22	11.13	11.24
	14.50	**14.04**	13.91	13.98	14.50	12.60	14.38	14.49
Mode	Maximum Tune-up (dBm)	802.11n(HT20) (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)			Maximum Tune-up (dBm)	802.11n(HT40) (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)		
Channel		1	6	11		3	6	9
Frequency		2412	2437	2462		2422	2437	2452
Average Power (dBm)	14.00	12.58	13.62	13.41	13.50	13.10	13.14	13.11
	13.50	11.95	13.00	13.08	13.00	12.63	12.56	12.51
	16.50	15.29	16.33	16.26	16.00	15.88	15.87	15.83
Mode	Maximum Tune-up (dBm)	802.11ax(HT20) (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)			Maximum Tune-up (dBm)	802.11ax(HT40) (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)		
Channel		1	6	11		3	6	9
Frequency		2412	2437	2462		2422	2437	2452
Average Power (dBm)	14.00	12.74	13.43	13.64	13.00	12.86	12.06	12.01
	13.50	12.00	13.10	13.16	12.50	12.35	12.15	12.14
	16.50	15.40	16.28	16.42	16.00	15.62	15.12	15.09

Note
1. Per KDB 248227 D01 v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
2. The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.

WLAN 5.2G								
Mode	Maximum Tune-up (dBm)	IEEE 802.11a (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)			Maximum Tune-up (dBm)	IEEE 802.11n HT20 (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)		
Channel		36	40	48		36	40	48
Frequency		5180	5200	5240		5180	5200	5240
Average Power (dBm)	11.00	10.84	8.66	8.48	11.50	11.03	10.99	11.36
	10.50	10.29	8.28	8.36	11.00	10.62	10.59	10.60
	14.00	13.58	11.48	11.43	14.50	13.84	13.80	14.01
Mode	Maximum Tune-up (dBm)	IEEE 802.11n HT40 (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)			Maximum Tune-up (dBm)	IEEE 802.11ac VHT20 (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)		
Channel		38	46			36	40	48
Frequency		5190	5230			5180	5200	5240
Average Power (dBm)	14.00	**13.79**	13.02		13.00	12.74	11.58	11.67
	14.00	13.60	11.90		13.00	12.64	11.81	11.82
	17.00	16.71	15.51		16.00	15.70	14.71	14.76
Mode	Maximum Tune-up (dBm)	IEEE 802.11ac VHT40 (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)			Maximum Tune-up (dBm)	IEEE 802.11ac VHT80 (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)		
Channel		38	46			42		
Frequency		5190	5230			5210		
Average Power (dBm)	12.50	12.43	12.19		11.50	11.25		
	12.50	12.41	11.88		11.50	11.19		
	15.50	15.43	15.05		14.50	14.23		
Mode	Maximum Tune-up (dBm)	IEEE 802.11ax HT20 (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)			Maximum Tune-up (dBm)	IEEE 802.11ax VHT40 (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)		
Channel		36	40	48		38	46	
Frequency		5180	5200	5240		5190	5230	
Average Power (dBm)	12.50	10.42	10.56	12.02	12.50	12.34	12.32	
	12.00	10.52	10.55	11.81	12.50	12.26	11.61	
	15.00	13.48	13.57	14.93	15.50	15.31	14.99	
Mode	Maximum Tune-up (dBm)	IEEE 802.11ax VHT80 (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)						
Channel		42						
Frequency		5210						
Average Power (dBm)	14.00	13.62						
	14.50	**14.10**						
	17.00	**16.88**						

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WLAN 5.8G								
Mode	Maximum Tune-up (dBm)	IEEE 802.11a			Maximum Tune-up (dBm)	IEEE 802.11n HT20		
Channel		149	157	165		149	157	165
Frequency		5745	5785	5825		5745	5785	5825
Average Power (dBm)	12.50	12.40	11.05	11.16	11.50	10.88	11.19	11.32
	11.00	10.62	10.41	10.45	11.00	10.50	10.38	10.40
	15.00	14.61	13.75	13.83	14.00	13.70	13.81	13.89
Mode	Maximum Tune-up (dBm)	IEEE 802.11n HT40			Maximum Tune-up (dBm)	IEEE 802.11ac VHT20		
Channel		151	159			149	157	165
Frequency		5755	5795			5745	5785	5825
Average Power (dBm)	14.00	13.71	**13.84**		12.00	11.66	11.78	11.86
	13.50	**13.48**	13.34		12.00	11.86	11.77	11.74
	17.00	16.61	**16.61**		15.00	14.77	14.79	14.81
Mode	Maximum Tune-up (dBm)	IEEE 802.11ac VHT40			Maximum Tune-up (dBm)	IEEE 802.11ac VHT80		
Channel		151	159			155		
Frequency		5755	5795			5775		
Average Power (dBm)	12.50	12.12	12.35		11.00	11.00		
	12.50	12.22	12.10		10.00	9.54		
	15.50	15.18	15.24		13.50	13.34		
Mode	Maximum Tune-up (dBm)	IEEE 802.11ax HT20 (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)			Maximum Tune-up (dBm)	IEEE 802.11ax VHT40 (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)		
Channel		149	157	165		151	159	
Frequency		5745	5785	5825		5755	5795	
Average Power (dBm)	12.00	11.66	11.83	11.98	13.50	12.07	13.33	
	12.00	11.78	11.59	11.67	13.50	12.07	13.47	
	15.00	14.73	14.72	14.84	16.50	15.08	16.41	
Mode	Maximum Tune-up (dBm)	IEEE 802.11ax VHT80 (1st row: ANT 1, 2nd row ANT 2, 3rd MIMO)						
Channel		155						
Frequency		5775						
Average Power (dBm)	12.50	12.03						
	12.50	12.37						
	15.50	15.21						

Bluetooth								
Mode	Maximum Tune-up (dBm)	GFSK			Maximum Tune-up (dBm)	Pi/4DQPSK		
Channel		1	40	79		1	40	79
Frequency		2402	2441	2480		2402	2441	2480
Average Power (dBm)	5.00	4.51	4.09	3.87	6.50	6.45	6.22	6.00
Mode	Maximum Tune-up (dBm)	8DPSK			Maximum Tune-up (dBm)	BLE(Up: 1Mbps, Down: 2Mbps)		
Channel		1	40	79		0	20	39
Frequency		2402	2441	2480		2402	2440	2480
Average Power (dBm)	7.00	**6.79**	6.24	6.18	6.00	5.82	5.64	5.31
					6.00	5.92	5.58	5.31

Channel	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Exclusion thresholds for 1-g SAR	RF exposure evaluation required
1	2.402	7.00	5.01	0	2.79	Yes

Note

1. Per KDB 447498 D04 Interim General RF Exposure Guidance v01, the 1-g SAR test exclusion thresholds for 300 MHz to 6 GHz at *test separation distances* ≤ 40 cm are determined by:

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

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

where

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

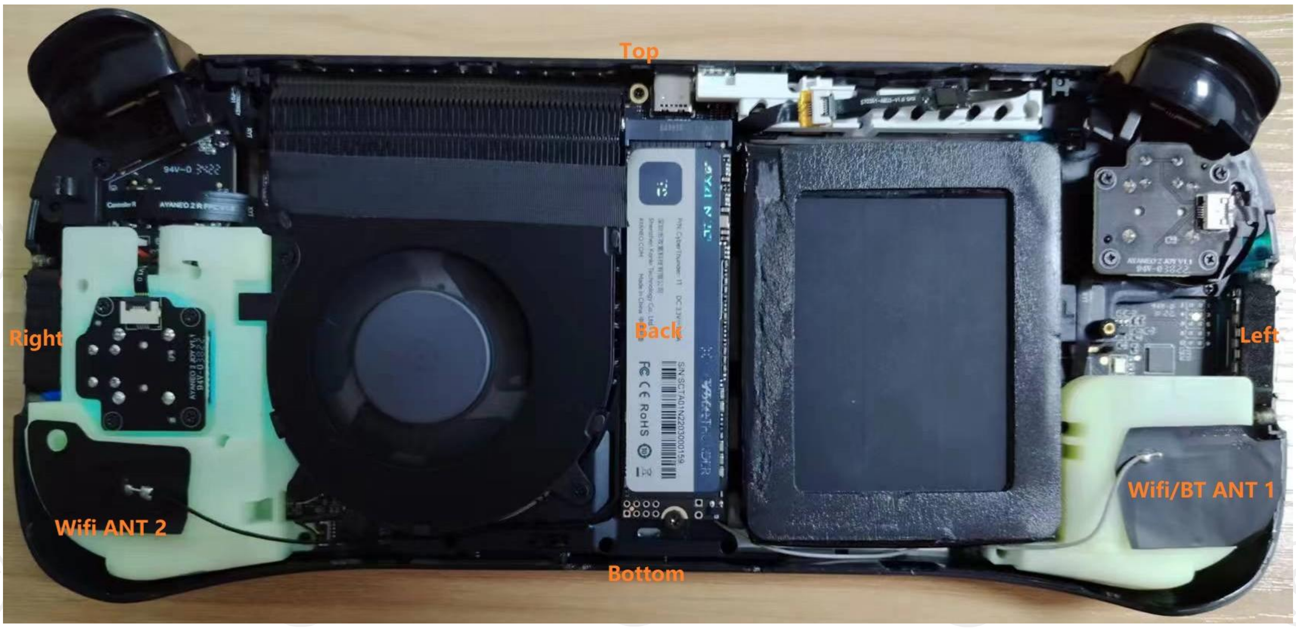
and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1).

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine estimated SAR.

2. Per KDB 248227 D01 v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
3. The output power of all data rate were prescan, just the worst case (the lowest data rate) of all mode were shown in report.

9. Exposure Position Consideration

9.1. Antenna information



WLAN/BT Antenna	WLAN/BT TX/RX
WLAN Antenna	WLAN TX/RX

Distance of The Antenna to the EUT surface and edge (mm)						
Antenna	Front Side (mm)	Back Side (mm)	Left Edge (mm)	Right Edge (mm)	Top Edge (mm)	Bottom Edge (mm)
BT/Wifi ANT 1	30	<5	30	230	84	30
Wifi ANT 2	30	<5	232	28	91	23

9.2. Test Position Consideration

Positions for SAR tests: Hotspot mode						
Antenna	Front Side (mm)	Back Side (mm)	Left Edge (mm)	Right Edge (mm)	Top Edge (mm)	Bottom Edge (mm)
BT/Wifi ANT 1	No	Yes	Yes	No	No	Yes
Wifi ANT 2	No	Yes	No	Yes	No	Yes

Note

1. KDB 447498 D04 Interim General RF Exposure Guidance v01, sar tests are decided by Appendix B SAR-based Exemption for your reference.
2. KDB 616217 D04 SAR for laptop and tablets v01r02, it doesn't require SAR evaluation for the front surface of a tablet.
3. Per KDB648474 D04, 10-g extremity SAR is not required when Body-Worn mode 1-g reported SAR<1.2W/Kg.

Table B.2—Example Power Thresholds (mW)

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

10. SAR Test Results Summary

10.1. Body 1g SAR Data

Band	Mode	Test Position with 0 mm	CH.	Freq. (MHz)	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)	Limit (W/Kg)
2.4G -ANT 1	802.11b	Back	1	2412	11.36	11.50	-1.200	0.195	1.033	0.201	
		Left	1	2412	11.36	11.50	1.025	0.162	1.033	0.167	
		Bottom	1	2412	11.36	11.50	1.094	0.160	1.033	0.165	
2.4G -ANT 2	802.11b	Back	11	2462	10.74	11.00	1.025	0.165	1.062	0.175	
		Right	11	2462	10.74	11.00	-0.566	0.147	1.062	0.156	
		Bottom	11	2462	10.74	11.00	-1.880	0.150	1.062	0.159	
2.4G MIMO -ANT 1 side	802.11b	Back	1	2412	14.04	14.50	-3.570	0.218	1.112	**0.242**	
		Left	1	2412	14.04	14.50	-0.298	0.188	1.112	0.209	
		Bottom	1	2412	14.04	14.50	2.063	0.185	1.112	0.206	
2.4G MIMO -ANT 2 side	802.11b	Back	1	2412	14.04	14.50	-2.360	0.206	1.112	0.229	
		Right	1	2412	14.04	14.50	1.840	0.149	1.112	0.166	
		Bottom	1	2412	14.04	14.50	2.880	0.156	1.112	0.173	
5.2G -ANT 1	802.11n (HT40)	Back	38	5190	13.79	14.00	1.500	0.298	1.050	0.313	
		Left	38	5190	13.79	14.00	-1.330	0.256	1.050	0.269	
		Bottom	38	5190	13.79	14.00	2.052	0.260	1.050	0.273	
5.2G -ANT 2	802.11ax (VHT80)	Back	42	5210	14.10	14.50	0.800	0.280	1.096	0.307	
		Right	42	5210	14.10	14.50	-1.512	0.269	1.096	0.295	
		Bottom	42	5210	14.10	14.50	2.851	0.284	1.096	0.311	
5.2G MIMO -ANT 1 side	802.11ax (VHT80)	Back	42	5210	16.88	17.00	0.700	0.349	1.028	**0.359**	
		Left	42	5210	16.88	17.00	2.150	0.311	1.028	0.320	**1.60**
		Bottom	42	5210	16.88	17.00	-0.322	0.317	1.028	0.326	
5.2G MIMO -ANT 2 side	802.11ax (VHT80)	Back	42	5210	16.88	17.00	1.360	0.330	1.028	0.339	
		Right	42	5210	16.88	17.00	-3.004	0.284	1.028	0.292	
		Bottom	42	5210	16.88	17.00	2.011	0.289	1.028	0.297	
5.8G -ANT 1	802.11n (HT40)	Back	159	5795	13.84	14.00	-1.005	0.119	1.038	0.124	
		Left	159	5795	13.84	14.00	-1.260	0.112	1.038	0.116	
		Bottom	159	5795	13.84	14.00	2.500	0.110	1.038	0.114	
5.8G -ANT 2	802.11n (HT40)	Back	151	5755	13.48	13.50	1.650	0.108	1.005	0.109	
		Right	151	5755	13.48	13.50	0.850	0.092	1.005	0.092	
		Bottom	151	5755	13.48	13.50	0.603	0.094	1.005	0.094	
5.8G MIMO -ANT 1 side	802.11n (HT40)	Back	159	5795	16.61	17.00	-1.334	0.123	1.094	**0.135**	
		Left	159	5795	16.61	17.00	-1.260	0.116	1.094	0.127	
		Bottom	159	5795	16.61	17.00	2.053	0.115	1.094	0.126	
5.8G MIMO -ANT 2 side	802.11n (HT40)	Back	159	5795	16.61	17.00	3.250	0.118	1.094	0.129	
		Right	159	5795	16.61	17.00	0.259	0.101	1.094	0.110	
		Bottom	159	5795	16.61	17.00	3.100	0.106	1.094	0.116	
Bluetooth	Classic	Back	1	2402	6.79	7.00	-3.030	0.101	1.050	**0.106**	
		Left	1	2402	6.79	7.00	2.065	0.085	1.050	0.089	
		Bottom	1	2402	6.79	7.00	2.004	0.087	1.050	0.091	

Note:

1. Per KDB 447498 D01 v06, for each exposure position, if the highest output power channel Reported SAR ≤ 0.8W/kg, other channels SAR testing is not necessary.
2. Per KDB 447498 D01 v06, Body use is evaluated with the device positioned at 0 mm from a flat phantom filled with body tissue-equivalent medium.
3. Per KDB 447498 D01 v06, the report SAR is measured SAR value adjusted for maximum tune-up tolerance.
   Scaling Factor=10^[(tune-up limit power(dBm) - Ave.power power (dBm))/10],
   where tune-up limit is the maximum rated power among all production units.
   Reported SAR(W/kg)=Measured SAR (W/kg)*Scaling Factor.
4. Per KDB865664D01 v01r04 perform a second repeated measurement only the ratio of largest to smallest SAR for the original and first repeated measurement is >1.20 or when the original or repeated measurement is ≥ 1.45W/kg.
5. Perform a second measurement only if the original, first and second repeated measurement is ≥1.5w/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurement is >1.20.

10.2. Simultaneous Transmission Conclusion

Multi-Band Simultaneous Transmission Considerations

According to FCC KDB Publication 447498 D01v05r02, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the EUT are shown in below Figure and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Path 1 WIFI/BT	Path 2 WIFI

Simultaneous Transmission Paths

Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05r02, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05r02 4.3.2.2), the following equation must be used to estimate the standalone 1g SAR and 10g extremity SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(GHz)}}{7.5(18.75)} \cdot \frac{\text{Max. power of channel, mW}}{\text{Min. Separation Distance, mm}}$$

Note:

1. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine estimated SAR.
2. (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm; where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.
3. Per KDB 648474 D04 require when the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, using the same wireless mode test configuration for voice and data, such as UMTS, LTE and Wi-Fi, and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration.

Simultaneous Transmission Possibilities

The Simultaneous Transmission Possibilities of this device are as below:

NO.	Configuration	Body
1	WLAN+BT	Yes
2	WLAN+WLAN (MIMO)	Yes

Body

Test Position	Scaled SAR			Σ SAR (W/kg) WIFI 2.4G + BT	Σ SAR (W/kg) WIFI 5G + BT	SPLSR	Remark
	WIFI 2.4G	WIFI 5G	BT				
Back	**0.242**	**0.359**	**0.106**	0.348	0.465	N/A	N/A
Left	0.209	0.320	0.089	0.298	0.409	N/A	N/A
Right	0.166	0.295	/	0.166	0.295	N/A	N/A
Bottom	0.173	0.311	0.091	0.264	0.402	N/A	N/A

Test Position	Scaled SAR		Σ SAR (W/kg) WIFI 2.4G	SPLSR	Remark
	WIFI 2.4G ANT 1 side	WIFI 2.4G ANT 2 side			
Back	**0.242**	0.229	0.471	N/A	N/A
Left	0.209	/	0.209	N/A	N/A
Right	/	0.166	0.166	N/A	N/A
Bottom	0.206	0.173	0.379	N/A	N/A

Test Position	Scaled SAR		Σ SAR (W/kg) WIFI 5.2G	SPLSR	Remark
	WIFI 5.2G ANT 1 side	WIFI 5.2G ANT 2 side			
Back	**0.359**	0.339	**0.698**	N/A	N/A
Left	0.320	/	0.320	N/A	N/A
Right	/	0.292	0.292	N/A	N/A
Bottom	0.326	0.297	0.623	N/A	N/A

Test Position	Scaled SAR		Σ SAR (W/kg) WIFI 5.8G	SPLSR	Remark
	WIFI 5.8G ANT 1 side	WIFI 5.8G ANT 2 side			
Back	**0.135**	0.129	0.264	N/A	N/A
Left	0.127	/	0.127	N/A	N/A
Right	/	0.11	0.110	N/A	N/A
Bottom	0.126	0.116	0.242	N/A	N/A

Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore measured volumetric simultaneous SAR summation is not required per FCC KDB Publication 447498 D01v05r02.

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10.3. Measurement Uncertainty (450MHz-3GHz)

UNCERTAINTY EVALUATION FOR HEADSET SAR									
Uncertainty Component	Description	Uncertainty Value(%)	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. 1g(%)	Std. Unc. 10g(%)	v
Measurement system									
Probe calibration	7.2.1	5.8	N	1	1	1	5.8	5.8	∞
Axial isotropy	7.2.1.1	3.5	R	$\sqrt{3}$	$(1-C_p)^{1/2}$	$(1-C_p)^{1/2}$	1.43	1.43	∞
Hemispherical isotropy	7.2.1.1	5.9	R	$\sqrt{3}$	$\sqrt{C_p}$	$\sqrt{C_p}$	2.41	2.41	∞
Boundary Effects	7.2.1.4	1.00	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	7.2.1.2	4.70	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	7.2.1.2	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation Response	7.2.1.3	3	N	1	1	1	3.00	3.00	∞
Readout Electronics	7.2.1.5	0.5	N	1	1	1	0.50	0.50	∞
Response Time	7.2.1.6	0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	7.2.1.7	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF Ambient Conditions-Noise	7.2.3.7	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF Ambient Conditions-Reflection	7.2.3.7	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioned mechanical Tolerance	7.2.2.1	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	7.2.2.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation interpolation and integration algorithms for Max.SAR evaluation	7.2.4	2.3	R	1	1	1	1.33	1.33	∞
Test sample related									
Test sample positioning	7.2.2.4.4	2.6	N	1	1	1	2.60	2.60	∞
Device holder uncertainty	7.2.2.4.2 7.2.2.4.3	3	N	1	1	1	3.00	3.00	∞
output power variation-SAR drift measurement	7.2.3.6	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
SAR scaling	7.2.5	2	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Phantom and tissue parameters									
Phantom uncertainty (shape and thickness tolerances)	7.2.2.2	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
uncertainty in SAR correction for deviation (in permittivity and conductivity)	7.2.6	2	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	7.2.3.5	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid conductivity -measurement uncertainty	7.2.3.3	4	N	1	0.23	0.26	0.92	1.04	∞
Liquid permittivity (temperature uncertainty)	7.2.3.5	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid permittivity measurement uncertainty	7.2.3.4	5	N	1	0.23	0.26	1.15	1.30	∞
Combined standard uncertainty			RSS				10.83	10.54	
Expanded uncertainty (95%CONFIDENCEINTERVAL			k				21.26	21.08	