ilac-MRA
A2LA ACCREDITED CERT # 6336.01

FCC SAR TEST REPORT

Application No.:	SUCR2408000304AT
Applicant:	Victor Hasselblad Aktiebolag
Manufacturer:	Victor Hasselblad Aktiebolag
Model No.(EUT):	HB722
FCC ID:	2AEFA-HB7220924
Standards:	FCC 47CFR §2.1093
Date of Receipt:	2024-09-09
Date of Test:	2024-09-09 to 2024-09-10
Date of Issue:	2024-09-14
Test conclusion:	**PASS ***

*　In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Leon Liu

Prepared by: Leon Liu/ Project Manager

Nick Hu

Approved by: Nick HU/ Technical Manager (Title)

REVISION HISTORY

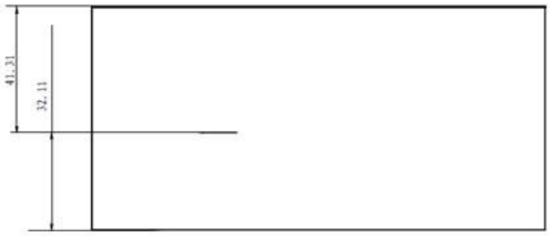
Report Number	Revision	Description	Issue Date
SUCR240800030401	01	Original	2024-09-14

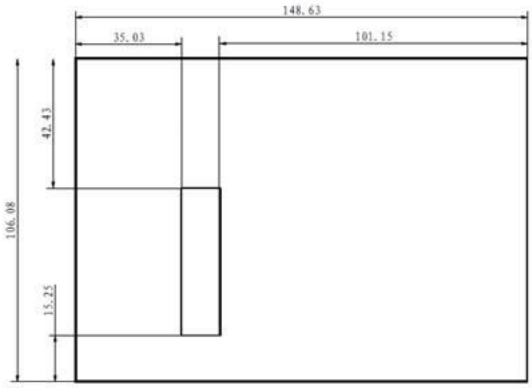
TEST SUMMARY

Frequency Band	Maximum Reported SAR(W/kg)	
	Front-of-face	Product specific 10g SAR
WI-FI (2.4GHz)	0.03	0.02
WI-FI (5GHz)	0.18	0.03
BT	0.04	0.01
SAR Limited(W/kg)	1.6	4.0
Maximum Simultaneous Transmission SAR (W/kg)		
Scenario	Front face 1g SAR	Product specific 10g SAR
Sum SAR	0.121	0.035
SPLSR	/	/
SPLSR Limited	0.04	0.1

CONTENTS

1 DUT Antenna Locations





2 General Information

2.1 Details of Client

Applicant:	Victor Hasselblad Aktiebolag
Address:	Utvecklingsgatan 2, 41756 Göteborg, Sweden
Manufacturer:	Victor Hasselblad Aktiebolag
Address:	Utvecklingsgatan 2, 41756 Göteborg, Sweden

2.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test Engineer:	Bert-Xu

2.3 Test Facility

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

• **A2LA (Certificate No. 6336.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• **FCC –Designation Number: CN1312**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327

2.4 General Description of EUT

Product Phase:	Production unit		
Device Type:	Portable device		
Exposure Category:	Uncontrolled environment / general population		
SN:	8MGDM5U0P00014		
Hardware Version:	V1.00		
Software Version:	V1.00		
Antenna Gain:	2.4G Wi-Fi: ANT0: 2.14dBi, ANT1: 2.07dBi; 5G Wi-Fi: ANT0: 1.34dBi, ANT1: 1.20dBi; 5.8G Wi-Fi: ANT0: 2.45dBi, ANT1: 2.45dBi BLE: 2.14dBi;		
Antenna Type:	IFA Antenna		
Device Operating Configurations:			
Modulation Mode:	WIFI: DSSS, OFDM; BLE: GFSK		
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	WIFI(2.4GHz)	2412~2462	2412~2462
	WIFI(U-NII-1)	5150~5250	5150~5250
	WIFI(U-NII-3)	5725~5850	5725~5850
	BLE	2402~2480	2402~2480
Battery Information:	Model:	VHB1-3400mAh-7.27V	
	Normal Voltage :	7.27V	
	Rated capacity :	3400mAh, 24.7Wh	
	Battery Type :	High Capacity Li-ion Rechargeable Battery	
	Manufacturer	Sunwoda Electronic Co., Ltd.	

Note: *Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, SGS is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.

Remark:
As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information

2.5 Test Specification

Identity	**Document Title**
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
ANSI/IEEE C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
IEC/IEEE 62209-1528:2020	Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Part 1528: Human models, instrumentation, and procedures (Frequency range of 4 MHz to 10 GHz)
KDB 447498 D01	General RF Exposure Guidance v06
KDB 248227 D01	SAR Guidance for IEEE 802 11 Wi-Fi SAR v02r02
KDB 865664 D01	SAR Measurement 100 MHz to 6 GHz v01r04

2.6 RF exposure limits

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

Notes:

* 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

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

*** 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.

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

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 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

Table 1： The Ambient Conditions

4 SAR Measurements System Configuration

4.1 The SAR Measurement System

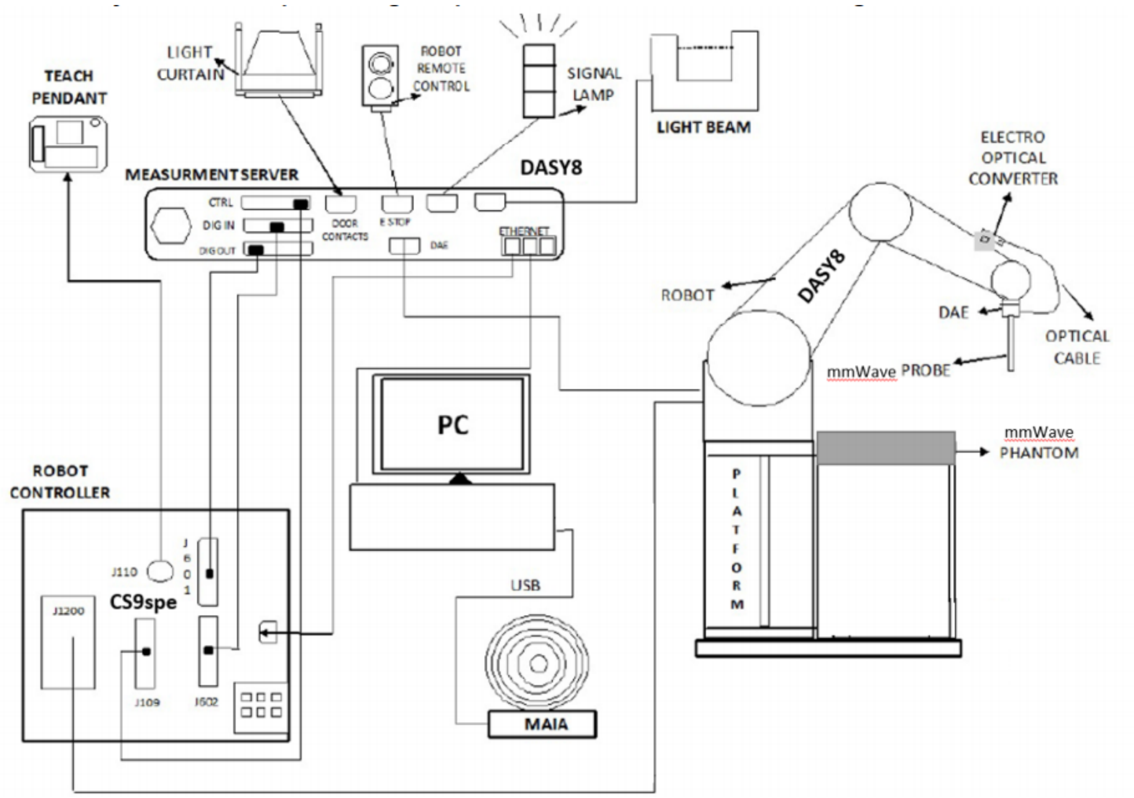
This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-Simulate.

The DASY system for performing compliance tests consists of the following items:
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).

A dosimetric probe, i.e., 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.



F-1. SAR Measurement System Configuration

- 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.
- DASY5 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.

4.2 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 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/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

4.3 Data Acquisition Electronics (DAE)

Model	DAE
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: 4mV,400mV)
Input Offset Voltage	< 5μV (with auto zero)
Input Bias Current	< 50 f A
Dimensions	60 x 60 x 68 mm

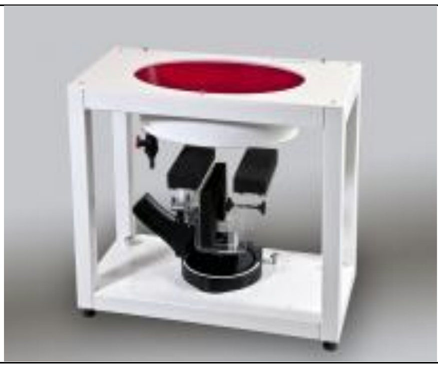
4.4 SAM Twin Phantom

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	approx. 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.

4.5 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 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	
Wooden Support	SPEAG standard phantom table	

The ELI phantom is used for compliance testing of handheld and body-mounted wireless devices in the frequency range of 4 MHz to 10 GHz. ELI is fully compatible with the IEC/IEEE 62209-1528 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 of SPEAG's dosimetric probes and dipoles.

ELI V5.0 and higher has the same shell geometry and is manufactured from the same material as ELI V4.0 but has a reinforced top structure.

4.6 Device Holder for Transmitters

F-2. **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 ε=3 and loss tangent δ=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.

4.7 Measurement procedure

4.7.1 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 32mm*32mm*30mm (f≤2GHz), 30mm*30mm*30mm (f for 2-3GHz) and 24mm*24mm*22mm (f for 5-6GHz) was assessed by measuring 5x5x7 points (f≤2GHz), 7x7x7 points (f for 2-3GHz) and 7x7x12 points (f for 5-6GHz). 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 Std. 1528-2013.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
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 ≤ 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 1st 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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

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. ± 5 %

4.7.2 Data Storage

The DASY 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 with the extension ".DAE4". 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], [m W/g], [m W/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.

4.7.3 Data Evaluation by SEMCAD

The SEMCAD 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 ε
- 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 DASY components. In the direct measuring mode of the multimeter 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:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

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 (DASY parameter)
dcp i = diode compression point (DASY parameter)

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

E-field probes:

$$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$

H-field probes:

$$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$$

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):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

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

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

with SAR = local specific absorption rate in mW/g
Etot = total field strength in V/m
σ= conductivity in [mho/m] or [Siemens/m]
ε= 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.

$$P_{pwe} = E_{tot}{}^2{}_2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}{}^2 \cdot 37.7$$

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

5 SAR measurement variability and uncertainty

5.1 SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

5.2 SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

IEC- 62209-1528 sets out the general test methods to be followed when carrying out an RF exposure compliance assessment of wireless devices implementing device-based time-averaging methods for the management and/or mitigation of specific absorption rate (SAR) in the 4 MHz to 6 GHz frequency band. It does not cover requirements that are based on power density above 6 GHz or requirements to protect against nerve stimulation for the frequency range from 3 kHz to 10MHz.

Measurements and results are all in compliance with the standards listed. All measurements and results are recorded and maintained at the laboratory performing the tests and measurement uncertainties are taken into account when comparing measurements to pass/ fail criteria. The Expanded uncertainty (95% CONFIDENCE INTERVAL) is **23.34%**.

a	b	c	d	e = f(d,k)	g	i = C*g/e	K
Uncertainty Component	Section in P1528	Tol (%)	Prob.Dist.	Div.	Ci (1g)	1g ui (%)	Vi(Veff)

Measurement system							
Probe calibration	7.2.2.1	7.4	N	1	1	7.40	∞
Axial isotropy	7.2.2.2	1.2	R	$\sqrt{3}$	1	0.69	∞
hemispherical isotropy	7.2.2.2	3.2	R	$\sqrt{3}$	1	1.85	∞
Linearity	7.2.2.3	0.9	R	$\sqrt{3}$	1	0.52	∞
Probe modulation response	7.2.2.4	0	R	$\sqrt{3}$	1	0.00	∞
Detection limits	7.2.2.5	0.25	R	$\sqrt{3}$	1	0.14	∞
Boundary effect	7.2.2.6	1.0	R	$\sqrt{3}$	1	0.58	∞
Readout electronics	7.2.2.7	0.3	N	1	1	0.30	∞
Response time	7.2.2.8	0	R	$\sqrt{3}$	1	0.00	∞
Integration time	7.2.2.9	2.6	R	$\sqrt{3}$	1	1.50	∞
RF ambient conditions – noise	7.2.4.5	3	R	$\sqrt{3}$	1	1.73	∞
RF ambient conditions – reflections	7.2.4.5	3	R	$\sqrt{3}$	1	1.73	∞
Probe positioner mech. restrictions	7.2.3.1	1.5	R	$\sqrt{3}$	1	0.87	∞
Probe positioning with respect to phantom shell	7.2.3.3	2.9	R	$\sqrt{3}$	1	1.67	∞
Post-processing	7.2.5	1	R	$\sqrt{3}$	1	0.58	∞
Test sample related							
Device holder uncertainty	7.2.3.4.2	3.6	N	1	1	3.60	∞
Test sample positioning	7.2.3.4.3	3.7	N	1	1	3.70	9
Power scaling	L.3	5.0	R	$\sqrt{3}$	1	2.89	∞
Drift of output power (measured SAR drift)	7.2.2.10	5	R	$\sqrt{3}$	1	2.89	∞
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	7.2.3.2	4	R	$\sqrt{3}$	1	2.31	∞
Algorithm for correcting SAR for deviations in permittivity and conductivity	7.2.4.3	1.9	N	1	1	1.90	∞
Liquid conductivity (meas.)	7.2.4.3	5.78	N	1	0.78	4.51	4
Liquid permittivity (meas.)	7.2.4.3	0.62	N	1	0.23	0.14	5

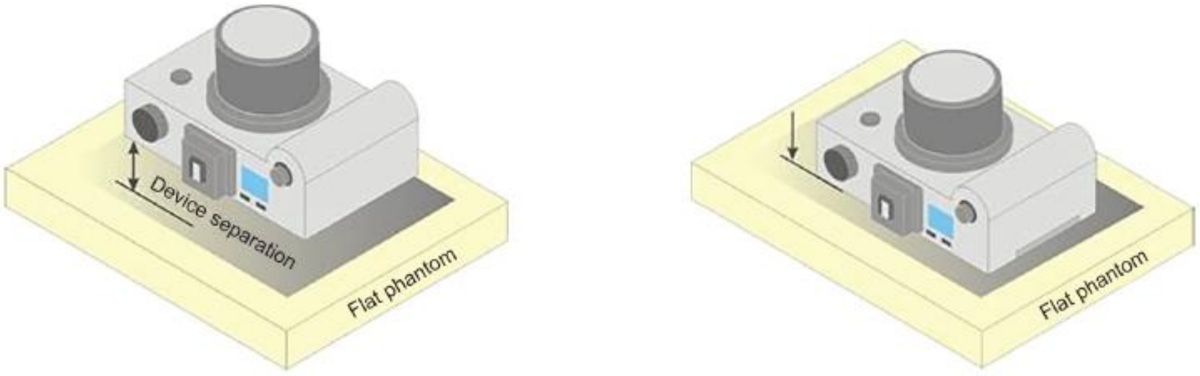
Liquid permittivity – temperature uncertainty	7.2.4.4	0.2	R	$\sqrt{3}$	0.78	0.09	∞
Liquid conductivity – temperature uncertainty	7.2.4.4	5.37	R	$\sqrt{3}$	0.23	0.71	∞
Combined standard uncertainty **RSS**						11.67	417
Expanded uncertainty (95% CONFIDENCE INTERVAL) **K=2**						**23.34**	

6 Description of Test Position

6.1 Test Position

6.1.1 Front-of-face device.

A typical example of a front-of-face device is a two-way radio that is held at a close distance from the face of the user while transmitting. Other devices that fall into this category include wireless-enabled still cameras and video cameras capable of sending data to a network or other device (F-1). According to the actual usage scenario claimed by the customer, the front test distance is 10mm, and the device is a handheld device used normally. Considering its intended use, the test distance is 0mm, with limitations of 10g and 4.0W/Kg.



F-1. **Still cameras and video cameras**

7 SAR System Verification Procedure

7.1 Tissue Simulate Liquid

7.1.1 Recipes for Tissue Simulate Liquid

The bellowing tables give the recipes for tissue simulating liquids to be used in different frequency bands：

Ingredients (% by weight)	Frequency (MHz)				
	450	700-900	1750-2000	2300-2500	2500-2700
Water	38.56	40.30	55.24	55.00	54.92
Salt (NaCl)	3.95	1.38	0.31	0.2	0.23
Sucrose	56.32	57.90	0	0	0
HEC	0.98	0.24	0	0	0
Bactericide	0.19	0.18	0	0	0
Tween	0	0	44.45	44.80	44.85

Salt: 99⁺% Pure Sodium Chloride
Sucrose: 98⁺% Pure Sucrose
Water: De-ionized, 16 MΩ⁺ resistivity
HEC: Hydroxyethyl Cellulose
Tween: Polyoxyethylene (20) sorbitan monolaurate

HSL13MHz is composed of the following ingredients：
Water：50-90%
Non-ionic detergents：5-50%
Nacl：0-2%
Preservative：0.03-0.1%
HSL5GHz is composed of the following ingredients：
Water：50-65%
Mineral oil：10-30%
Emulsifiers：8-25%
Sodium salt：0-1.5%

Table 2：Recipe of Tissue Simulate Liquid

7.1.2 Measurement for Tissue Simulate Liquid

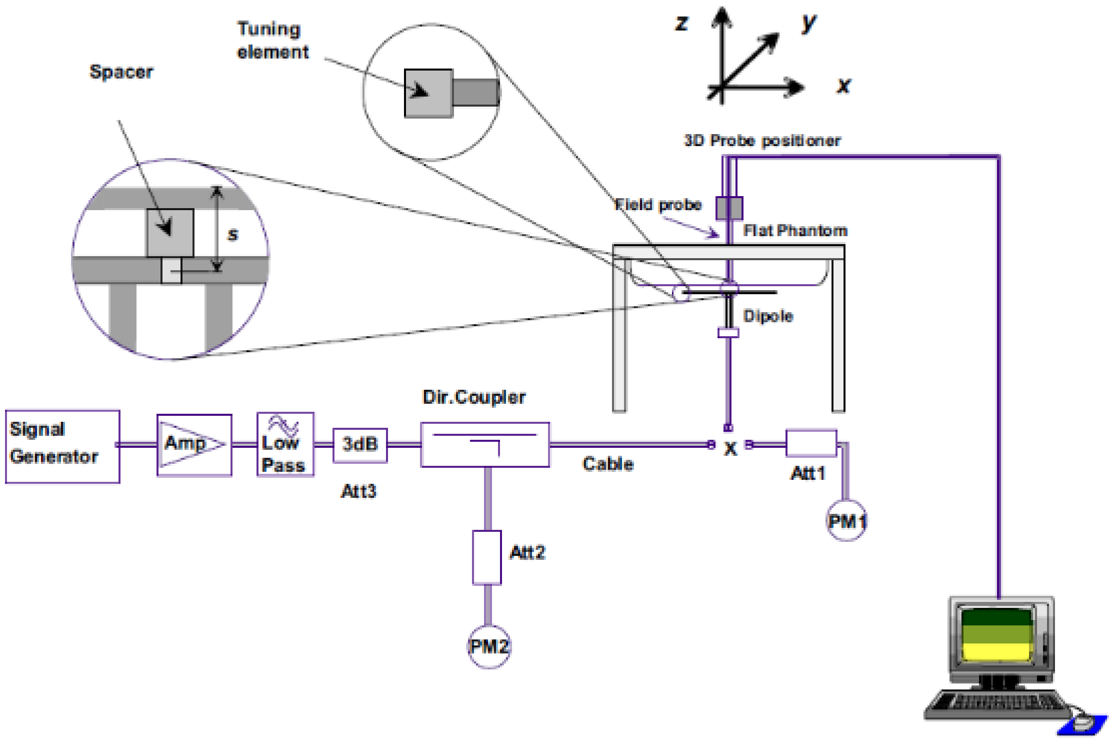
The Conductivity (σ) and Permittivity (ρ) are listed in bellow table. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was 22±2°C.

Measurement for Tissue Simulate Liquid									
Tissue Type	Measured Frequency （MHz）	Target Tissue (±5%)		Measured Tissue		Deviation (Within ±5%)		Liquid Temp. (℃)	Test Date
		ε_r	σ(S/m)	ε_r	σ(S/m)	ε_r	σ(S/m)		
2450 Head	2450	39.2	1.80	38.800	1.880	-1.02%	4.44%	22.6	2024-09-09
5250 Head	5250	35.9	4.71	35.900	4.780	0.00%	1.49%	22.9	2024-09-10
5750 Head	5750	35.4	5.22	34.900	5.340	-1.41%	2.30%	22.9	2024-09-10

Table 3：Measurement result of Tissue electric parameters.

7.2 SAR System Check

The microwave circuit arrangement for system Check is sketched in F-12. 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 +/- 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 following table (A power level of 250mW (below 3GHz) or 100mW (3-6GHz) was input to the dipole antenna). During the tests, the ambient temperature of the laboratory was in the range 22±2°C, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 15±0.5 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.



F-3. the microwave circuit arrangement used for SAR system check

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.
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 Summary System Check Result(s)

SAR System Validation Result(s)												
Validation Kit		Measured SAR 250mW	Measured SAR 250mW	Measured SAR (normalized to 1W)	Measured SAR (normalized to 1W)	Target SAR (normalized to 1W) (±10%)	Target SAR (normalized to 1W) (±10%)	Deviation (Within ±10%)		Liquid Temp. (℃)	Test Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)	1-g(W/kg)	10-g(W/kg)		
D2450V2	Head	13.20	6.29	52.80	25.16	52.7	24.6	0.19%	2.28%	22.6	2024-09-09
Validation Kit		Measured SAR 100mW	Measured SAR 100mW	Measured SAR (normalized to 1W)	Measured SAR (normalized to 1W)	Target SAR (normalized to 1W) (±10%)	Target SAR (normalized to 1W) (±10%)	Deviation (Within ±10%)		Liquid Temp. (℃)	Test Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)	1-g(W/kg)	10-g(W/kg)		
D5GHzV2	Head(5.25GHz)	8.02	2.31	80.20	23.10	77.2	21.9	3.89%	5.48%	22.9	2024-09-10
	Head(5.75GHz)	8.01	2.28	80.10	22.80	77.8	21.7	2.96%	5.07%	22.9	2024-09-10

Table 4: SAR System Check Result.

7.2.3 Detailed System Check Results

Please see the Appendix A

8 Test Configuration

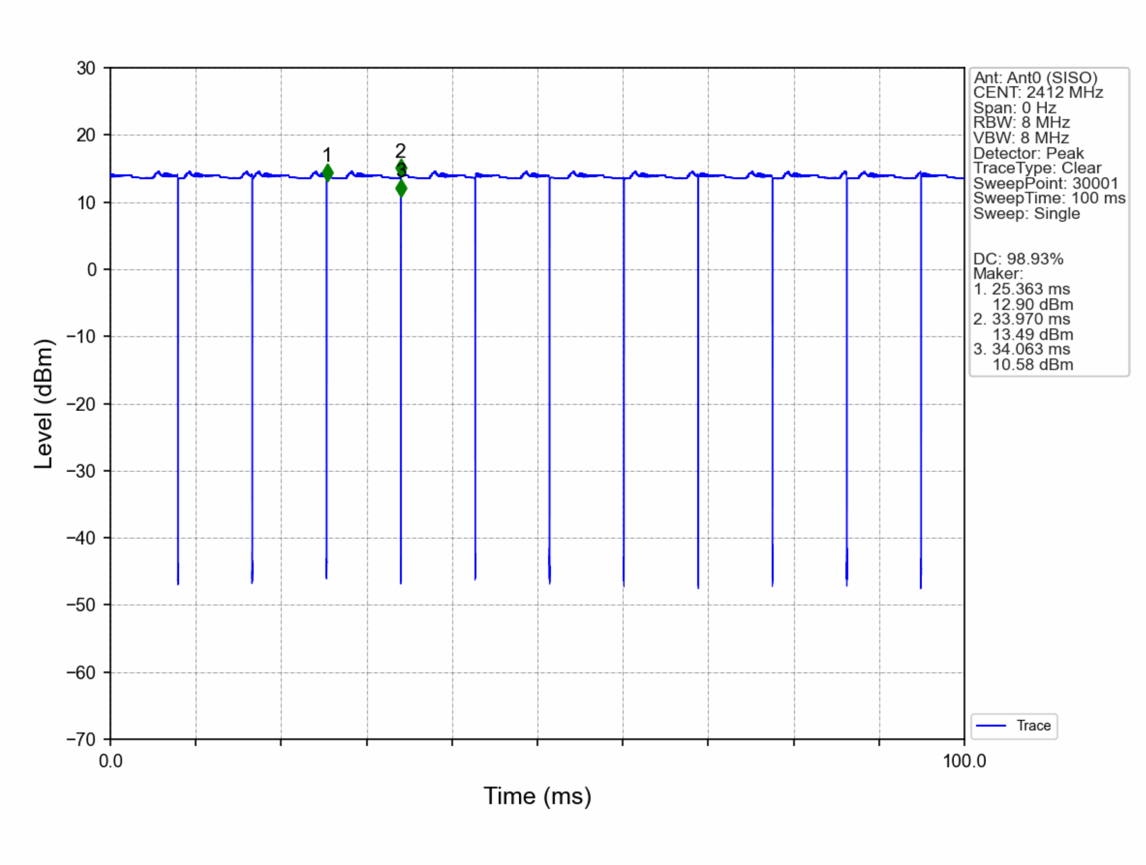
8.1 Operation Configurations

8.1.1 WiFi Test Configuration

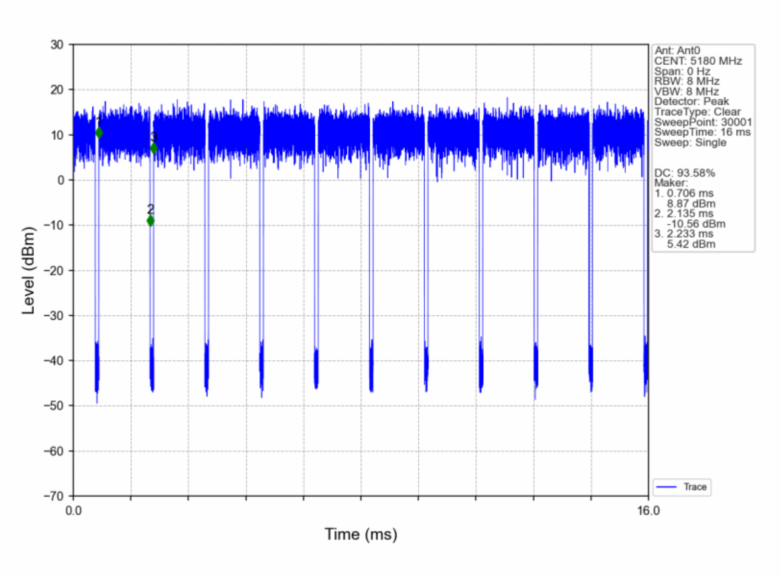
A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

8.1.1.1 Duty cycle

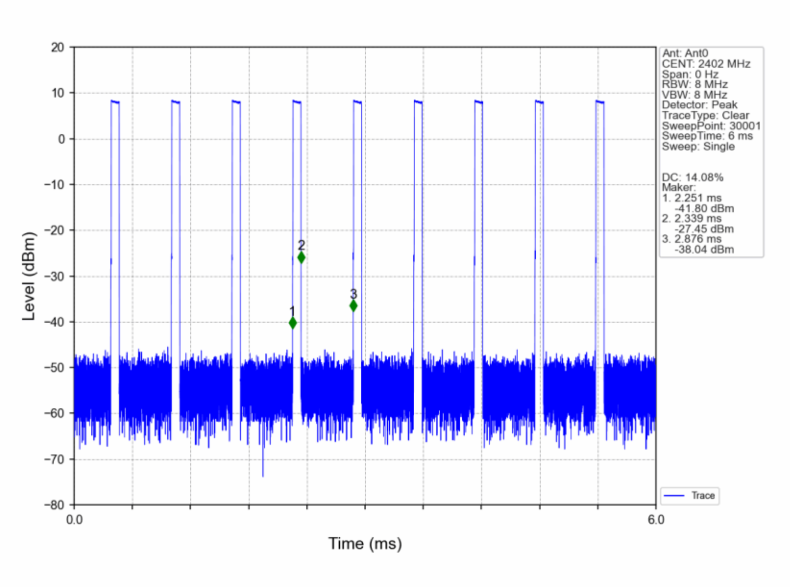
Wi-Fi 2.4GHz 802.11b:
Duty cycle=98.93%



Wi-Fi 5GHz 802.11a:
Duty cycle=93.58%



Bluetooth BLE 1M :
Duty cycle=14.08%



8.1.1.2 Initial Test Position SAR Test Reduction Procedure

DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures. The initial test position procedure is described in the following:

1）. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).

2）. When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

3）. For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested. a) Additional power measurements may be required for this step, which should be limited to those necessary for identifying the subsequent highest output power channels.

8.1.1.3 Initial Test Configuration Procedures

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required. SAR test reduction for subsequent highest output test channels is determined according to *reported* SAR of the initial test configuration.

For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration.

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

8.1.1.4 Subsequent Test Configuration Procedures

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. The initial test position procedure is applied to next to the ear, UMPC mini-tablet and hotspot mode configurations. When the same maximum output power is specified for multiple transmission modes, additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. The subsequent test configuration and SAR measurement procedures are described in the following.

1）. When SAR test exclusion provisions of KDB Publication 447498 are applicable and SAR measurement is not required for the initial test configuration, SAR is also not required for the next highest maximum output power transmission mode subsequent test configuration(s) in that frequency band or aggregated band and exposure configuration.

2）. When the highest *reported* SAR for the initial test configuration (when applicable, include subsequent highest output channels), according to the initial test position or fixed exposure position requirements, 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 is not required for that subsequent test configuration.

3）. The number of channels in the initial test configuration and subsequent test configuration can be different due to differences in channel bandwidth. When SAR measurement is required for a subsequent test configuration and the channel bandwidth is smaller than that in the initial test configuration, all channels in the subsequent test configuration that overlap with the larger bandwidth channel tested in the initial test configuration should be used to determine the highest maximum output power channel. This step requires additional power measurement to identify the highest maximum output power channel in the subsequent test configuration to determine SAR test reduction.

   a) SAR should first be measured for the channel with highest measured output power in the subsequent test configuration.
   b) SAR for subsequent highest measured maximum output power channels in the subsequent test configuration is required only when the *reported* SAR of the preceding higher maximum output power channel(s) in the subsequent test configuration is > 1.2 W/kg or until all required channels are tested. i) For channels with the same measured maximum output power, SAR should be measured using the channel closest to the center frequency of the larger channel bandwidth channel in the initial test configuration.

4）. SAR measurements for the remaining highest specified maximum output power OFDM transmission mode configurations that have not been tested in the initial test configuration (highest maximum output) or subsequent test configuration(s) (subsequent next highest maximum output power) is determined by recursively applying the subsequent test configuration procedures in this section to the remaining configurations according to the following:

   a) replace “subsequent test configuration” with “next subsequent test configuration” (i.e., subsequent next highest specified maximum output power configuration)
   b) replace “initial test configuration” with “all tested higher output power configurations”

8.1.1.5 2.4 GHz WiFi SAR Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions. When SAR measurement is required for an OFDM configuration, the initial test configuration, subsequent test configuration and initial test position procedures are applied. The SAR test exclusion requirements for 802.11g/n OFDM configurations are described in following.

- **802.11b DSSS SAR Test Requirements**

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

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

2）. When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

- **2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements**

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3, including sub-sections). SAR is not required for the following 2.4 GHz OFDM conditions.

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

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

- **SAR Test Requirements for OFDM configurations**

When SAR measurement is required for 802.11 g/n OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

9 Test Result

9.1 Measurement of RF conducted Power

9.1.1 Conducted Power of WIFI2.4G

WIFI 2.4G				WIFI 2.4G Ant1		WIFI 2.4G Ant1		WIFI 2.4G MIMO	
Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11b	1	2412	1	17.45	19.00	17.09	19.00	/	/
	6	2437		18.22	19.00	17.61	19.00	/	/
	11	2462		18.04	19.00	17.57	19.00	/	/
802.11g	1	2412	6	15.16	17.00	15.37	17.00	/	/
	6	2437		16.63	17.00	15.18	17.00	/	/
	11	2462		16.33	17.00	15.98	17.00	/	/
802.11n HT20	1	2412	6.5	17.18	18.00	16.12	18.00	19.69	20.50
	6	2437		17.50	18.00	16.34	18.00	19.97	20.50
	11	2462		17.09	18.00	16.27	18.00	19.71	20.50
802.11n HT40	3	2422	MCS0	13.64	14.00	12.43	14.00	16.09	17.00
	6	2437		17.86	18.00	16.24	18.00	20.14	20.50
	9	2452		12.42	14.00	10.86	12.00	14.72	15.00
802.11ax HE20	1	2412	MCS0	16.57	17.00	15.98	17.00	19.30	20.00
	6	2437		17.00	18.00	16.31	18.00	19.68	20.00
	11	2462		16.65	17.00	16.26	17.00	19.47	20.00
802.11ax HE40	3	2422	MCS0	13.52	14.00	12.31	14.00	15.97	17.00
	6	2437		17.74	18.00	16.37	18.00	20.12	20.50
	9	2452		12.85	14.00	11.27	12.00	15.14	16.00

9.1.2 Conducted Power of WIFI5G

WIFI 5G				WIFI 5G Ant0		WIFI 5G Ant1		WIFI 5G MIMO	
Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11a	36	5180	6	16.16	17.00	15.97	17.00	/	/
	40	5200		16.27	17.00	15.93	17.00	/	/
	48	5240		16.45	17.00	16.21	17.00	/	/
	149	5745		16.12	17.00	16.60	17.00	/	/
	157	5785		16.34	17.00	16.56	17.00	/	/
	165	5825		16.17	17.00	16.42	17.00	/	/
Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11n-HT20	36	5180	MCS0	14.81	15.00	14.53	15.00	17.68	18.00
	40	5200		14.29	15.00	14.09	15.00	17.20	18.00
	48	5240		14.56	15.00	14.32	15.00	17.45	18.00
	149	5745		14.07	15.00	16.47	17.00	18.44	19.00
	157	5785		14.31	15.00	16.42	17.00	18.50	19.00
	165	5825		13.94	15.00	16.38	17.00	18.34	19.00
Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11n-HT40	38	5190	MCS0	16.30	16.50	15.81	16.50	19.07	20.00
	46	5230		15.65	16.50	16.30	16.50	19.00	20.00
	151	5755		14.20	15.00	16.96	17.00	18.81	20.00
	159	5795		14.36	15.00	16.75	17.00	18.73	20.00
Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11ac VHT20	36	5180	MCS0	14.97	15.50	16.92	17.00	19.06	20.00
	40	5200		14.99	15.50	16.72	17.00	18.95	20.00
	48	5240		15.14	15.50	17.06	17.50	19.22	20.00
	149	5745		13.31	14.00	17.13	17.50	18.64	20.00
	157	5785		13.55	14.00	17.24	17.50	18.79	20.00
	165	5825		13.49	14.00	17.07	17.50	18.65	20.00

Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11ac VHT40	38	5190	MCS0	15.93	16.50	15.57	16.50	18.76	20.00
	46	5230		16.04	16.50	15.69	16.50	18.88	20.00
	151	5755		13.45	14.00	17.79	18.00	19.15	20.00
	159	5795		13.68	14.00	17.57	18.00	19.06	20.00
Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11ac VHT80	42	5210	MCS0	15.72	16.50	15.41	16.50	18.58	20.00
	155	5775		13.50	14.00	17.64	18.00	19.06	20.00
Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11ax HEW20	36	5180	MCS0	16.22	17.00	15.98	17.00	19.11	20.00
	40	5200		16.19	17.00	16.11	17.00	19.16	20.00
	48	5240		16.64	17.00	16.25	17.00	19.46	20.00
	149	5745		13.78	14.00	17.54	18.00	19.07	20.00
	157	5785		13.76	14.00	17.40	18.00	18.96	20.00
	165	5825		13.86	14.00	17.32	18.00	18.94	20.00
Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11ax HEW40	38	5190	MCS0	16.28	16.50	15.79	16.50	19.05	20.00
	46	5230		16.36	16.50	16.00	16.50	19.19	20.00
	151	5755		13.54	14.00	17.81	18.00	19.19	20.00
	159	5795		13.86	14.00	17.75	18.00	19.24	20.00
Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up	Average Power (dBm)	Tune up
802.11ax HEW80	42	5210	MCS0	16.27	16.50	15.62	16.50	18.97	20.00
	155	5775		13.67	14.00	17.94	18.00	19.32	20.00

9.1.3 Conducted Power of BT

BLE				
Mode	Channel	Frequency(MHz)	Average Power (dBm)	Tune up
1M	0	2402	7.75	8.50
	19	2440	7.93	8.50
	39	2480	7.49	8.50
2M	0	2402	7.76	8.50
	19	2440	7.87	8.50
	39	2480	7.52	8.50

9.2 Measurement of SAR Data

Note:

1) The maximum Scaled SAR value is select the worst presentation of the original report SEWM2304000137RG09 and this report. Graph results refer to Appendix B.

2) Per KDB447498 D01, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

- ≤ 0.8W/kg for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is ≤ 100MHz.
- ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.
- ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz.

3) Maximum bandwidth does not support at least three non-overlapping channels in certain channel bandwidths. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

WiFi 2.4G:

1) When 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.

WiFi 5G:

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. As the highest reported SAR for a test configuration is ⩽ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration.
2) For Wi-Fi 5G, U-NII-2A (5250-5350 MHz) and U-NII-2C (5470-5725 MHz) bands does not support hotspot function.
3) When 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.

9.2.1 SAR Result of WIFI 2.4G

Wi-Fi 2.4G SAR Test Record											
Ant0 Test Record											
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**Duty Cycle Scaled factor**	**SAR (W/kg) 1-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 1-g (W/kg)**	**Liquid Temp.(℃)**
Front face 1g SAR Test data(Separate 0mm)											
Front side	802.11b	6/2437	98.93%	1.011	0.000	-0.06	18.22	19.00	1.197	0.000	22.6
Front side	802.11b	1/2412	98.93%	1.011	0.009	-0.03	17.45	19.00	1.429	0.013	22.6
Front side	802.11b	11/2462	98.93%	1.011	0.006	0.03	18.04	19.00	1.247	0.008	22.6
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**Duty Cycle Scaled factor**	**SAR (W/kg) 10-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 10-g (W/kg)**	**Liquid Temp.(℃)**
Product specific 10g SAR Test data(Separate 0mm)											
Left side	802.11b	6/2437	98.93%	1.011	0.002	-0.07	18.22	19.00	1.197	0.002	22.6
Right side	802.11b	6/2437	98.93%	1.011	0.003	-0.03	18.22	19.00	1.197	0.004	22.6
Right side	802.11b	1/2412	98.93%	1.011	0.009	-0.08	17.45	19.00	1.429	0.013	22.6
Right side	802.11b	11/2462	98.93%	1.011	0.007	-0.01	18.04	19.00	1.247	0.009	22.6
Ant1 Test Record											
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**Duty Cycle Scaled factor**	**SAR (W/kg) 1-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 1-g (W/kg)**	**Liquid Temp.(℃)**
Front face 1g SAR Test data(Separate 0mm)											
Front side	802.11b	6/2437	98.93%	1.011	0.009	0.01	17.61	19.00	1.377	0.013	22.6
Front side	802.11b	1/2412	98.93%	1.011	0.021	0.09	17.09	19.00	1.552	**0.033**	22.6
Front side	802.11b	11/2462	98.93%	1.011	0.013	0.03	17.57	19.00	1.390	0.018	22.6
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**Duty Cycle Scaled factor**	**SAR (W/kg) 10-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 10-g (W/kg)**	**Liquid Temp.(℃)**
Product specific 10g SAR Test data(Separate 0mm)											
Left side	802.11b	6/2437	98.93%	1.011	0.002	0.09	17.61	19.00	1.377	0.003	22.6
Right side	802.11b	6/2437	98.93%	1.011	0.008	0.01	17.61	19.00	1.377	0.011	22.6
Right side	802.11b	1/2412	98.93%	1.011	0.013	0.08	17.09	19.00	1.552	**0.020**	22.6
Right side	802.11b	11/2462	98.93%	1.011	0.011	0.06	17.57	19.00	1.390	0.015	22.6

Table 5： SAR of WIFI 2.4G for Front-of-face,Body.

9.2.1 SAR Result of WIFI 5G

Wi-Fi 5G SAR Test Record											
Ant0 Test Record											
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**Duty Cycle Scaled factor**	**SAR (W/kg) 1-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 1-g (W/kg)**	**Liquid Temp.(℃)**
Front face 1gSAR Test data of U-NII-1(Separate 0mm)											
Front side	802.11a	48/5240	93.58%	1.069	0.085	0.03	16.45	17.00	1.135	0.103	22.9
Front side	802.11a	36/5180	93.58%	1.069	0.101	-0.08	16.16	17.00	1.213	**0.131**	22.9
Front side	802.11a	40/5200	93.58%	1.069	0.092	0.06	16.27	17.00	1.183	0.116	22.9
Front face 1gSAR Test data of U-NII-3(Separate 0mm)											
Front side	802.11a	157/5785	93.58%	1.069	0.147	0.03	16.34	17.00	1.164	**0.183**	22.9
Front side	802.11a	149/5745	93.58%	1.069	0.135	0.09	16.12	17.00	1.225	0.177	22.9
Front side	802.11a	165/5825	93.58%	1.069	0.119	0.01	16.17	17.00	1.211	0.154	22.9
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**Duty Cycle Scaled factor**	**SAR (W/kg) 10-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 10-g (W/kg)**	**Liquid Temp.(℃)**
Product specific 10gSAR Test data of U-NII-1(Separate 0mm)											
Left side	802.11a	48/5240	93.58%	1.069	0.003	0.06	16.45	17.00	1.135	0.004	22.9
Right side	802.11a	48/5240	93.58%	1.069	0.006	0.01	16.45	17.00	1.135	0.007	22.9
Right side	802.11a	36/5180	93.58%	1.069	0.007	0.03	16.16	17.00	1.213	0.009	22.9
Right side	802.11a	40/5200	93.58%	1.069	0.003	-0.06	16.27	17.00	1.183	0.004	22.9
Product specific 10gSAR Test data of U-NII-3(Separate 0mm)											
Left side	802.11a	157/5785	93.58%	1.069	0.009	0.01	16.34	17.00	1.164	0.011	22.9
Right side	802.11a	157/5785	93.58%	1.069	0.016	0.03	16.34	17.00	1.164	0.020	22.9
Right side	802.11a	149/5745	93.58%	1.069	0.011	0.08	16.12	17.00	1.225	0.014	22.9
Right side	802.11a	165/5825	93.58%	1.069	0.014	0.01	16.17	17.00	1.211	0.018	22.9
Ant1 Test Record											
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**Duty Cycle Scaled factor**	**SAR (W/kg) 1-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 1-g (W/kg)**	**Liquid Temp.(℃)**
Front face 1gSAR Test data of U-NII-1(Separate 0mm)											
Front side	802.11a	48/5240	93.58%	1.069	0.031	0.03	16.21	17.00	1.199	0.040	22.9
Front side	802.11a	36/5180	93.58%	1.069	0.048	0.04	15.97	17.00	1.268	0.065	22.9
Front side	802.11a	40/5200	93.58%	1.069	0.046	0.09	15.93	17.00	1.279	0.063	22.9
Front face 1gSAR Test data of U-NII-3(Separate 0mm)											
Front side	802.11a	149/5745	93.58%	1.069	0.049	0.09	16.60	17.00	1.096	0.057	22.9
Front side	802.11a	157/5785	93.58%	1.069	0.067	0.01	16.56	17.00	1.107	0.079	22.9
Front side	802.11a	165/5825	93.58%	1.069	0.034	0.03	16.42	17.00	1.143	0.042	22.9

Test position	Test mode	Test ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 10-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 10-g (W/kg)	Liquid Temp.(℃)
Product specific 10gSAR Test data of U-NII-1(Separate 0mm)											
Left side	802.11a	48/5240	93.58%	1.069	0.003	0.09	16.21	17.00	1.199	0.004	22.9
Right side	802.11a	48/5240	93.58%	1.069	0.015	0.01	16.21	17.00	1.199	0.019	22.9
Right side	802.11a	36/5180	93.58%	1.069	0.017	0.09	15.97	17.00	1.268	**0.023**	22.9
Right side	802.11a	40/5200	93.58%	1.069	0.011	0.03	15.93	17.00	1.279	0.015	22.9
Product specific 10gSAR Test data of U-NII-3(Separate 0mm)											
Left side	802.11a	149/5745	93.58%	1.069	0.007	0.01	16.60	17.00	1.096	0.008	22.9
Right side	802.11a	149/5745	93.58%	1.069	0.021	0.08	16.60	17.00	1.096	0.025	22.9
Right side	802.11a	157/5785	93.58%	1.069	0.023	0.03	16.56	17.00	1.107	**0.027**	22.9
Right side	802.11a	165/5825	93.58%	1.069	0.019	0.03	16.42	17.00	1.143	0.023	22.9

Table 6： SAR of WIFI 5G for Front-of-face,Body.

9.2.2 SAR Result of BT

Bluetooth SAR Test Record											
BLE Test Record											
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**Duty Cycle Scaled factor**	**SAR (W/kg) 1-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 1-g (W/kg)**	**Liquid Temp.(℃)**
Front face 1g SAR Test data(Separate 0mm)											
Front side	BLE 1M	19/2440	14.08%	7.102	0.001	0.05	7.93	8.50	1.140	0.008	22.6
Front side	BLE 1M	0/2402	14.08%	7.102	0.005	0.06	7.75	8.50	1.189	**0.042**	22.6
Front side	BLE 1M	78/2480	14.08%	7.102	0.003	0.01	7.49	8.50	1.262	0.027	22.6
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**Duty Cycle Scaled factor**	**SAR (W/kg) 10-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 10-g (W/kg)**	**Liquid Temp.(℃)**
Product specific 10g SAR Test data(Separate 0mm)											
Left side	BLE 1M	19/2440	14.08%	7.102	0.000	0.01	7.93	8.50	1.140	0.000	22.6
Right side	BLE 1M	19/2440	14.08%	7.102	0.000	0.08	7.93	8.50	1.140	0.000	22.6
Right side	BLE 1M	0/2402	14.08%	7.102	0.001	0.02	7.75	8.50	1.189	**0.008**	22.6
Right side	BLE 1M	78/2480	14.08%	7.102	0.000	0.09	7.49	8.50	1.262	0.000	22.6

Table 7： SAR of BT for Front-of-face,Body.

9.3 Multiple Transmitter Evaluation

9.3.1 Simultaneous SAR SAR test evaluation

•Simultaneous Transmission Possibilities

NO.	Simultaneous Transmission Configuration	Body
1	WIFI5G+BT	Yes

9.3.2 Simultaneous Transmission SAR Summation Scenario

Front-of-face:

Test position	WiFi 2.4G Ant0	WiFi 2.4G Ant1	WiFi 5G Ant0	WiFi 5G Ant1	BT	Summed SAR	
	1	2	3	4	5	2+5	4+5
Front side	0.013	0.033	0.183	0.079	0.042	0.075	0.121

Product specific 10gSAR:

Test position	WiFi 2.4G Ant0	WiFi 2.4G Ant1	WiFi 5G Ant0	WiFi 5G Ant1	BT	Summed SAR	
	1	2	3	4	5	2+5	4+5
Left side	0.002	0.003	0.011	0.008	0.000	0.003	0.008
Right side	0.013	0.020	0.020	0.027	0.008	0.028	0.035

10 Equipment list

Test Platform		SPEAG DASY8 Professional				
Description		SAR Test System (Frequency range 10MHz-10GHz)				
Software Reference		Measurement Software: cDASY8 V16.2.4.2524				
Hardware Reference						
Equipment		Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	DAE	SPEAG	DAE4ip	SUWI-02-04-34	2023-12-27	2024-12-26
☒	E-Field Probe	SPEAG	EX3DV4	SUWI-01-23-04	2023-10-17	2024-10-16
☒	Twin Phantom	SPEAG	Twin-SAM V8.0	SUWI-02-04-35	NCR	NCR
☒	Validation Kits	SPEAG	D2450V2	SUWI-03-20-04	2023-08-28	2026-08-27
☒	Validation Kits	SPEAG	D5GHzV2	SUWI-03-20-08	2023-08-23	2026-08-22
☒	DAK-3.5 probe	SPEAG	DAK-3.5	SUWI-02-04-28	N/A	N/A
☒	Universal Radio Communication Tester	R&S	CMW500	SUWI-01-27-01	2023-09-13	2024-09-12
☒	RF Bi-Directional Coupler	Agilent	86205-60001	SUWI-02-04-29	NCR	NCR
☒	Signal Generator	R&S	SMB100A	SUWI-01-08-01	2024-02-04	2025-02-03
☒	Preamplifier	Qiji	YX28980933	SUWI-02-04-35	NCR	NCR
☒	Power Sensor	Keysight	U2002H	SUWI-01-40-02	2023-09-13	2024-09-12
☒	Attenuator	SHX	TS2-3dB	SUWI-02-04-30	NCR	NCR
☒	Coaxial low pass filter	Mini-Circuits	VLF-2500(+)	SUWI-02-04-31	NCR	NCR
☒	Coaxial low pass filter	Microlab Fxr	LA-F13	SUWI-02-04-32	NCR	NCR
☒	DC POWER SUPPLY	SAKO	SK1730SL5A	SUWI-02-04-33	NCR	NCR
☒	Speed reading thermometer	LKM	DTM3000	SUWI-01-30-01	2023-09-15	2024-09-14
☒	Humidity and Temperature Indicator	MingGao	MingGao	SUWI-01-01-10	2023-09-15	2024-09-14

Note: Remark: NCR=No Calibration Requirement.

11 Calibration certificate

Please see the Appendix C

12 Photographs

Please see the Appendix D

Appendix A: Detailed System Check Results

Appendix B: Detailed Test Results

Appendix C: Calibration certificate

Appendix D: Photograph

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