

FCC SAR TEST REPORT

Application No.: SZCR2504001296AT

Applicant: Shenzhen Creality 3D Technology Co., LTD

Address of Applicant: 18th Floor, JinXiuHongDu Building. Meilong Road, Xinniu Community, Minzhi Street, Longhua District, Shenzhen City, China.

Manufacturer: Shenzhen Creality 3D Technology CO., Ltd

Address of Manufacturer: 18th Floor, JinXiuHongDu Building. Meilong Road, Xinniu Community, Minzhi Street, Longhua District, Shenzhen City, China.

Factory: Orbbec (Shunde, Guangdong) Technology Co., Ltd.

Address of Factory: 81 Hehefang, Jielong Road, Shunde District, Foshan City, 528300 Guangdong P.R. China

EUT Description: Creality Otter Lite

Model No.: CRS10COL

FCC ID: 2AXH6-CRS10COL

Standards: FCC 47CFR §2.1093

Date of Receipt: 2025-04-16

Date of Test: 2025-04-18 to 2025-04-21

Date of Issue: 2025-04-22

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

Keny Xu

Keny Xu
EMC Laboratory Manager



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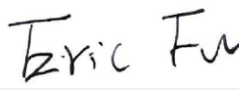
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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2025-04-22		Original

Authorized for issue by:			
			
		<hr/> Bill Chen/Project Engineer	
			
		<hr/> Eric Fu/Reviewer	



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TEST SUMMARY

Frequency Band	Maximum Reported SAR(W/kg)
	Limbs
Wi-Fi 5G	1.86
SAR Limited(W/kg)	4.0



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1 General Information

1.1 General Description of EUT

Product Name:	Creality Otter Lite		
Model No.:	CRS10COL		
Trade Mark:	Creality Otter Lite, Lite Bridge		
Product Phase:	production unit		
Device Type:	Portable device		
Exposure Category:	general population		
SN:	BCNK45D00DM		
Hardware Version:	V1.1		
Software Version:	V1.0.6		
Antenna Type:	Monopole Antenna		
Device Operating Configurations:			
Modulation Mode:	WIFI:DSSS,OFDM;		
Frequency Bands:	Band	Tx(MHz)	
	WIFI 5G	5150~5350	
		5470~5725	
		5725~5850	
RF Cable:	<input checked="" type="checkbox"/> Provided by applicant <input type="checkbox"/> Provided by the laboratory		
Battery Information:	Model:	C1335A5	
	Normal Voltage:	7.3V	
	Rated capacity:	3400mAh	
	Manufacturer:	EVE Energy Co., Ltd.	
<p>Note:</p> <p>*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.</p> <p>Remark:</p> <p>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.</p>			

1.1.1 DUT Antenna Locations (Back View)

The DUT Antenna Locations can be referred to Appendix D



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1.2 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
KDB 248227 D01	SAR Guidance for IEEE 802.11 Wi-Fi SAR v02r02
KDB 447498 D04	Interim General RF Exposure Guidance v01
KDB 865664 D01	SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02	RF Exposure Reporting v01r02



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1.3 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.)



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1.4 Test Location

All tests were performed at:

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No tests were sub-contracted.

1.5 Test Facility

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

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI (Member No. 1937)

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1336

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.



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2 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
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.	



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- 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 system.
- DASY 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.




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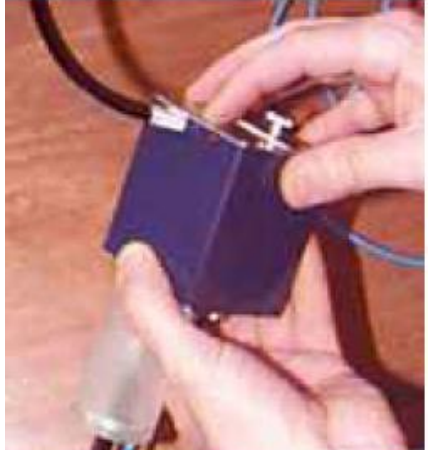
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3.2 Isotropic E-field Probe EX3DV4

	<p>Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)</p>
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY52 SAR and higher, EASY4/MRI

3.3 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	

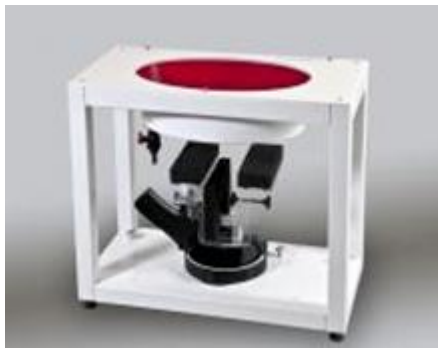
3.4 SAM Twin Phantom

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	pprox.. 25 liters	
Wooden Support	SPEAG standard phantom table	

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

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

3.5 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	pprox.. 30 liters	
Wooden Support	SPEAG standard phantom table	

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

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

3.6 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 $\epsilon=3$ and loss tangent $\delta=0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

3.7 Measurement Procedure

3.7.1 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 ($f \leq 2\text{GHz}$), 30mm*30mm*30mm (f for 2-3GHz) and 24mm*24mm*22mm (f for 5-6GHz) was assessed by measuring 5x5x7 points ($f \leq 2\text{GHz}$), 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.



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		$\leq 3 \text{ GHz}$	$> 3 \text{ GHz}$
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		$5 \pm 1 \text{ mm}$	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5 \text{ mm}$
Maximum probe angle from probe axis to phantom surface normal at the measurement location		$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}	$\leq 2 \text{ GHz: } \leq 15 \text{ mm}$ $2 - 3 \text{ GHz: } \leq 12 \text{ mm}$		$3 - 4 \text{ GHz: } \leq 12 \text{ mm}$ $4 - 6 \text{ GHz: } \leq 10 \text{ mm}$
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be \leq the corresponding x or y dimension of the test device with at least one measurement point on the test device.		
Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}		$\leq 2 \text{ GHz: } \leq 8 \text{ mm}$ $2 - 3 \text{ GHz: } \leq 5 \text{ mm}^*$	$3 - 4 \text{ GHz: } \leq 5 \text{ mm}^*$ $4 - 6 \text{ GHz: } \leq 4 \text{ mm}^*$
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		$3 - 4 \text{ GHz: } \leq 4 \text{ mm}$ $4 - 5 \text{ GHz: } \leq 3 \text{ mm}$ $5 - 6 \text{ GHz: } \leq 2 \text{ mm}$
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	$3 - 4 \text{ GHz: } \leq 3 \text{ mm}$ $4 - 5 \text{ GHz: } \leq 2.5 \text{ mm}$ $5 - 6 \text{ GHz: } \leq 2 \text{ mm}$
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$
Minimum zoom scan volume	x, y, z	$\geq 30 \text{ mm}$	$3 - 4 \text{ GHz: } \geq 28 \text{ mm}$ $4 - 5 \text{ GHz: } \geq 25 \text{ mm}$ $5 - 6 \text{ GHz: } \geq 22 \text{ mm}$

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. $\pm 5 \%$

3.7.2 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 "DAE". 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.

3.7.3 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 V_i = compensated signal of channel I (I = x, y, z)

U_i = 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:



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

H-field probes:

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

With V_i = compensated signal of channel I (I = x, y, z)

$Norm_i$ = sensor sensitivity of channel I (I = x, y, z)

[mV/(V/m)²] for E-field Probes

ConvF = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel I in V/m

H_i = 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.

$$SAR = (E_{tot}^2 \cdot \sigma) / (\epsilon \cdot 1000)$$

with SAR = local specific absorption rate in mW/g

E_{tot} = 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.

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

with P_{pwe} = equivalent power density of a plane wave in mW/cm²

E_{tot} = total electric field strength in V/m

H_{tot} = total magnetic field strength in A/m



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4 SAR measurement variability and uncertainty

4.1 SAR measurement variability

Per KDB 865664 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 ($\sim 10\%$ 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.



4.2 SAR measurement uncertainty

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 21.77%.

A	b1	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)
Probe calibration	E.2.1	6.65	N	1	1	6.65	∞
Axial isotropy	E.2.2	0.5	R	$\sqrt{3}$	$(1 - C_p)^{1/2}$	0.20	∞
hemispherical isotropy	E.2.2	2.6	R	$\sqrt{3}$	$\sqrt{C_p}$	1.06	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	0.58	∞
Linearity	E.2.4	0.6	R	$\sqrt{3}$	1	0.35	∞
System detection limit	E.2.5	0.25	R	$\sqrt{3}$	1	0.14	∞
Readout electronics	E.2.6	0.3	N	1	1	0.30	∞
Response time	E.2.7	0	R	$\sqrt{3}$	1	0.00	∞
Integration time	E.2.8	2.6	R	$\sqrt{3}$	1	1.50	∞
RF ambient Condition – Noise	E.6.1	3	R	$\sqrt{3}$	1	1.73	∞
RF ambient Condition - reflections	E.6.1	3	R	$\sqrt{3}$	1	1.73	∞
Probe positioning- mechanical tolerance	E.6.2	1.5	R	$\sqrt{3}$	1	0.87	∞
Probe positioning- with respect to phantom	E.6.3	2.9	R	$\sqrt{3}$	1	1.67	∞
Max. SAR evaluation	E.5.2	1	R	$\sqrt{3}$	1	0.58	∞
Test sample positioning	E.4.2	3.7	N	1	1	3.70	9
Device holder uncertainty	E.4.1	3.6	N	1	1	3.60	∞
Output power variation – SAR drift measurement	6.6.2	5	R	$\sqrt{3}$	1	2.89	∞
Phantom uncertainty (shape and thickness tolerances)	E.3.1	4	R	$\sqrt{3}$	1	2.31	∞
Liquid conductivity - deviation from target values	E.3.2	5	R	$\sqrt{3}$	0.64	1.85	∞
Liquid conductivity - measurement uncertainty	E.3.2	5.78	N	1	0.64	3.68	5
Liquid permittivity - deviation from target values	E.3.3	5	R	$\sqrt{3}$	0.6	1.73	∞



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Liquid permittivity - measurement uncertainty	E.3.3	0.62	N	1	0.6	0.372	5
Combined standard uncertainty				RSS		10.89	430
Expanded uncertainty (95% CONFIDENCE INTERVAL)				K=2		21.77	



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5 Description of Test Position

5.1 The Limbs Test Position

5.1.1 Hand-held usage of the device

Devices that are designed or intended for use on extremities (i.e., hands, wrists, feet and ankles), or mainly operated in extremity-only exposure conditions, may require extremity SAR evaluation. When extremity SAR testing is required, a flat phantom is typically used. However, when the device also operates in close proximity to the user's body, SAR compliance for the body is also required. Based on user usage scenarios, we conducted Limbs SAR tests on the three sides.



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6 SAR System Verificaion Procedure

6.1 Tissue Simulate Liquid

6.1.1 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	700-1000	1700-2000	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 Water: De-ionized, 16 MΩ+ resistivity Tween: Polyoxyethylene (20) sorbitan monolaurate Sucrose: 98+% Pure Sucrose HEC: Hydroxyethyl Cellulose					
HSL5GHz is composed of the following ingredients: (Manufactured by SPEAG) Water: 50-65% Mineral oil: 10-30% Emulsifiers: 8-25% Sodium salt: 0-1.5%					

Table 1 : Recipe of Tissue Simulate Liquid

6.1.2 Measurement for Tissue Simulate Liquid

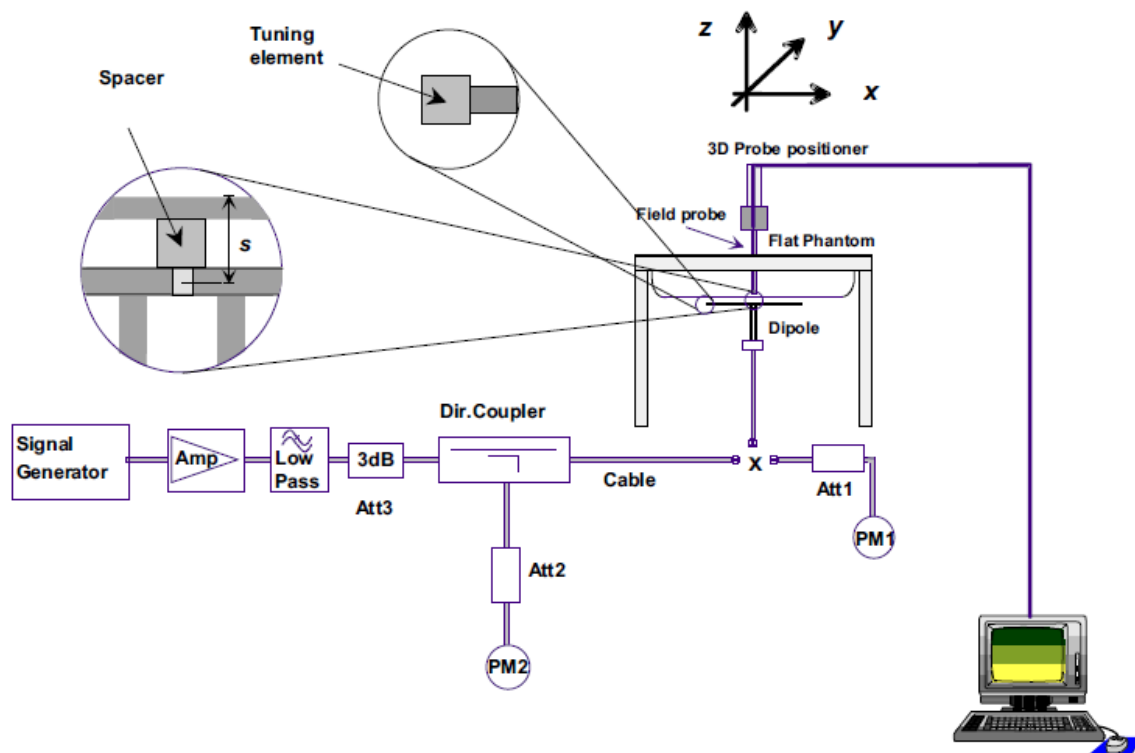
The Conductivity (σ) and Permittivity (ϵ_r) are listed in Table 2. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was $22 \pm 2^\circ\text{C}$.

Measurement for Tissue Simulate Liquid									
Tissue Type	Measured Frequency (MHz)	Measured Tissue		Target Tissue ($\pm 5\%$)		Deviation (Within $\pm 5\%$)		Liquid Temp. ($^\circ\text{C}$)	Test Date
		ϵ_r	$\sigma(\text{S/m})$	ϵ_r	$\sigma(\text{S/m})$	ϵ_r	$\sigma(\text{S/m})$		
5250 Head	5250	36.172	4.670	35.90	4.71	0.76%	-0.85%	22.1	2025/4/18
5600 Head	5600	35.304	5.050	35.50	5.07	-0.55%	-0.39%	22.1	2025/4/18
5750 Head	5750	35.123	5.242	35.40	5.22	-0.78%	0.42%	22.1	2025/4/18

Table 2 : Measurement result of Tissue electric parameters

6.2 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 $\pm 10\%$ from the target SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the 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 $22\pm 2^\circ\text{C}$, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above $15\pm 0.5\text{ cm}$ 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-12.The microwave circuit arrangement used for SAR system Check

6.2.1 Justification for Extended SAR Dipole Calibrations

1) 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 20% 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.



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6.2.2 Summary System Check Result(s)

SAR System Validation Result(s)											
Validation Kit		Measured SAR 100mW	Measured SAR 100mW	Measured SAR (normalized to 1W)	Measured SAR (normalized to 1W)	Target SAR (normalized to 1W)	Target SAR (normalized to 1W)	Deviation (Within ±10%)		Liquid Temp. (°C)	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)	7.34	2.09	73.40	20.90	77.30	22.10	-5.05%	-5.43%	22.1	2025/4/18
	Head(5.6GHz)	8.10	2.30	81.00	23.00	81.30	23.10	-0.37%	-0.43%	22.1	2025/4/18
	Head(5.75GHz)	7.93	2.23	79.30	22.30	77.10	21.30	2.85%	4.69%	22.1	2025/4/18

Table 3 : SAR System Check Result

6.2.3 Detailed System Check Results

Please see the Appendix A



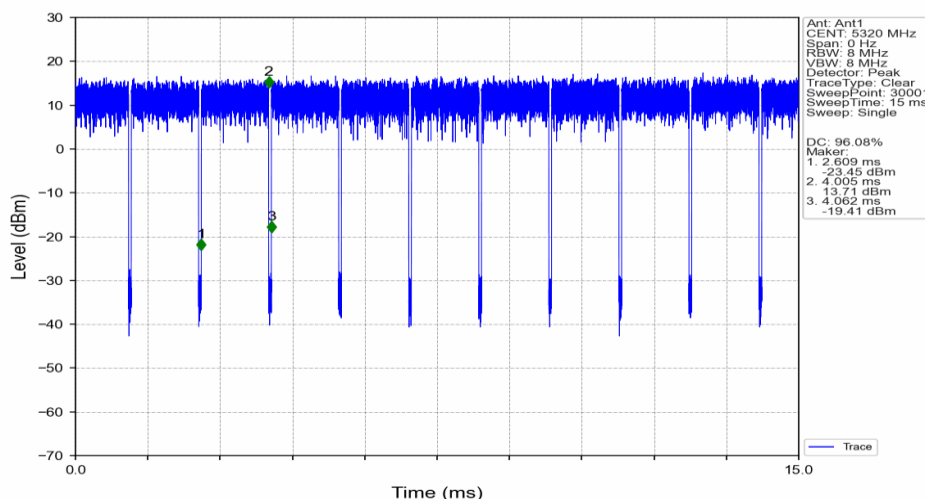
7 Test Configuration

7.1.1 WIFI Test Configuration

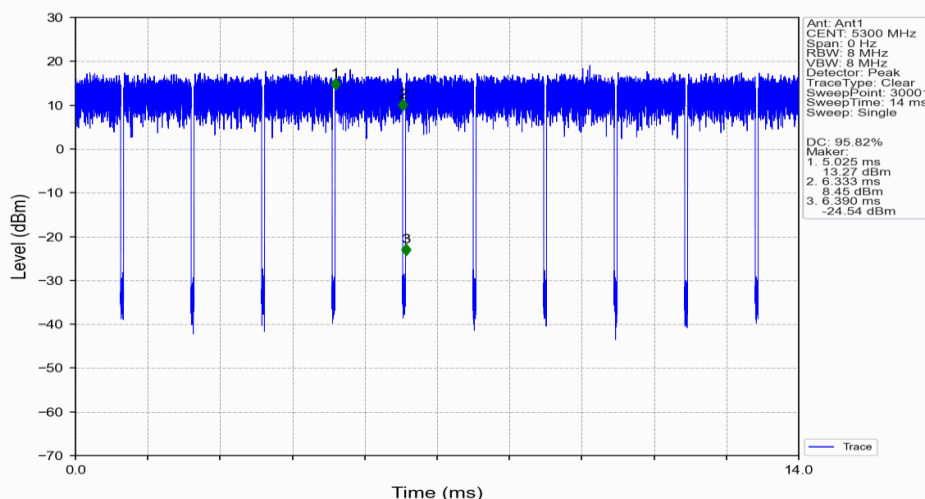
A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

7.1.1.1 Duty cycle

1) Wi-Fi 5GHz 802.11a:Duty cycle=96.08%



2) Wi-Fi 5GHz 802.11n20: Duty cycle=95.82%



7.1.1.2 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.

7.1.1.3 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"

7.1.1.4 5 GHz WiFi SAR Procedures

• U-NII-1 and U-NII-2A Bands

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following:

- 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. If 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 (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR.
- 2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.
- 3) The two U-NII bands may be aggregated to support a 160 MHz channel on channel number 50. Without additional testing, the maximum output power for this is limited to the lower of the maximum output power certified for the two bands. When SAR measurement is required for at least one of the bands and the highest reported SAR adjusted by the ratio of specified maximum output power of aggregated to standalone band is > 1.2 W/kg, SAR is required for the 160 MHz channel. This procedure does not apply to an aggregated band with maximum output higher than the standalone band(s); the aggregated band must be tested independently for SAR. SAR is not required when the 160 MHz channel is operating at a reduced maximum power and also qualifies for SAR test exclusion.

• U-NII-2C and U-NII-3 Bands

The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. when Terminal Doppler Weather Radar (TDWR) restriction applies, all channels that operate at 5.60 – 5.65 GHz must be included to apply the SAR test reduction and measurement procedures.

When the same transmitter and antenna(s) are used for U-NII-2C band and U-NII-3 band or 5.8 GHz band of §15.247, the bands may be aggregated to enable additional channels with 20, 40 or 80 MHz bandwidth to span across the band gap, as illustrated in Appendix B. The maximum output power for the additional band gap channels is limited to the lower of those certified for the bands. Unless band gap channels are permanently disabled, they must be considered for SAR testing. The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or §15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels. When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.



OFDM Transmission Mode SAR Test Configuration and Channel Selection Requirements

The initial test configuration for 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.

- 1) The largest channel bandwidth configuration is selected among the multiple configurations with the same specified maximum output power.
- 2) If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
- 3) If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected.
- 4) When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n. After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following. These channel selection procedures apply to both the initial test configuration and subsequent test configuration(s), with respect to the default power measurement procedures or additional power measurements required for further SAR test reduction. The same procedures also apply to subsequent highest output power channel(s) selection.
 - a) The channel closest to mid-band frequency is selected for SAR measurement.
 - b) For channels with equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

• SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 a/n/ac OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies. When band gap channels between U-NII-2C band and 5.8 GHz U-NII-3 or §15.247 band are supported, the highest maximum output power transmission mode configuration and maximum output power channel across the bands must be used to determine SAR test reduction, according to the initial test configuration and subsequent test configuration requirements. 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.

8 Test Result

8.1 Measurement of RF Conducted Power

8.1.1 Conducted Power of WIFI

WIFI 5G Ant 1						
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11a	U-NII-1	36	5180	6	11.57	12.00
		40	5200		11.15	12.00
		48	5240		11.11	12.00
	U-NII-2A	52	5260		11.56	12.50
		60	5300		10.77	12.50
		64	5320		12.20	12.50
	U-NII-2C	100	5500		10.88	12.50
		116	5580		11.93	12.50
		140	5700		10.92	12.50
	U-NII-3	149	5745		10.87	12.50
		157	5785		11.40	12.50
		165	5825		11.31	12.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11n-HT20	U-NII-1	36	5180	MCS0	11.44	12.00
		40	5200		11.63	12.00
		48	5240		11.47	12.00
	U-NII-2A	52	5260		11.48	12.50
		60	5300		11.46	12.50
		64	5320		11.43	12.50
	U-NII-2C	100	5500		11.36	12.50
		116	5580		10.77	12.50
		140	5700		10.77	12.50
	U-NII-3	149	5745		10.38	12.00
		157	5785		10.44	12.00
		165	5825		10.73	12.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11n-HT40	U-NII-1	38	5190	MCS0	9.89	10.00
		46	5230		9.29	10.00
	U-NII-2A	54	5270		9.40	10.00
		62	5310		9.34	10.00
	U-NII-2C	102	5510		8.69	10.00
		110	5550		8.91	10.00



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		134	5670		8.49	10.00
	U-NII-3	151	5755		7.91	9.50
		159	5795		8.04	9.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT20	U-NII-1	36	5180	MCS0	10.56	11.00
		40	5200		10.37	11.00
		48	5240		10.61	11.00
	U-NII-2A	52	5260		10.58	11.00
		60	5300		10.49	11.00
		64	5320		10.56	11.00
	U-NII-2C	100	5500		9.99	11.00
		116	5580		9.32	11.00
		140	5700		9.10	11.00
	U-NII-3	149	5745		8.58	10.50
		157	5785		9.01	10.50
		165	5825		8.88	10.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT40	U-NII-1	38	5190	MCS0	9.37	10.00
		46	5230		9.40	10.00
	U-NII-2A	54	5270		8.81	10.00
		62	5310		9.01	10.00
	U-NII-2C	102	5510		8.70	10.00
		110	5550		9.25	10.00
		134	5670		8.81	10.00
	U-NII-3	151	5755		8.74	10.50
		159	5795		9.08	10.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT80	U-NII-1	42	5210	MCS0	8.40	9.00
	U-NII-2A	58	5290		8.16	9.00
	U-NII-2C	106	5530		8.13	9.00
		122	5610		8.16	9.00
	U-NII-3	155	5775		7.45	9.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT160	U-NII-1 & U-NII-2A	50	5250	MCS0	8.94	9.50
	U-NII-2C	114	5570		8.47	9.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up



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802.11ax HEW20	U-NII-1	36	5180	MCS0	11.21	12.00
		40	5200		11.24	12.00
		48	5240		11.17	12.00
	U-NII-2A	52	5260		10.80	12.00
		60	5300		10.98	12.00
		64	5320		11.16	12.00
	U-NII-2C	100	5500		10.77	12.00
		116	5580		10.84	12.00
		140	5700		10.77	12.00
	U-NII-3	149	5745		10.63	12.00
		157	5785		11.09	12.00
		165	5825		10.89	12.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ax HEW40	U-NII-1	38	5190	MCS0	9.22	10.00
		46	5230		9.24	10.00
	U-NII-2A	54	5270		9.13	10.00
		62	5310		9.36	10.00
	U-NII-2C	102	5510		9.02	10.00
		110	5550		9.61	10.00
		134	5670		8.93	10.00
	U-NII-3	151	5755		8.51	10.00
		159	5795		8.73	10.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ax HEW80	U-NII-1	42	5210	MCS0	9.49	10.50
	U-NII-2A	58	5290		9.57	10.50
	U-NII-2C	106	5530		9.46	10.50
		122	5610		9.17	10.50
	U-NII-3	155	5775		8.50	10.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ax HEW160	U-NII-1 & U-NII-2A	50	5250	MCS0	9.48	10.00
	U-NII-2C	114	5570		9.29	10.00



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Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11a	U-NII-1	36	5180	6	10.60	11.00
		40	5200		9.13	11.00
		48	5240		10.33	11.00
	U-NII-2A	52	5260		11.31	12.50
		60	5300		10.87	12.50
		64	5320		10.87	12.50
	U-NII-2C	100	5500		11.04	12.50
		116	5580		12.39	12.50
		140	5700		12.04	12.50
	U-NII-3	149	5745		11.96	13.00
		157	5785		12.54	13.00
		165	5825		12.31	13.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11n-HT20	U-NII-1	36	5180	MCS0	10.38	12.00
		40	5200		10.80	12.00
		48	5240		10.72	12.00
	U-NII-2A	52	5260		11.09	12.50
		60	5300		11.26	12.50
		64	5320		11.20	12.50
	U-NII-2C	100	5500		10.95	12.50
		116	5580		11.31	12.50
		140	5700		11.61	12.50
	U-NII-3	149	5745		11.60	12.00
		157	5785		11.81	12.00
		165	5825		11.77	12.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11n-HT40	U-NII-1	38	5190	MCS0	9.05	10.00
		46	5230		8.33	10.00
	U-NII-2A	54	5270		8.89	10.00
		62	5310		8.80	10.00
	U-NII-2C	102	5510		8.82	10.00
		110	5550		9.07	10.00
		134	5670		9.58	10.00
	U-NII-3	151	5755		9.64	10.50
		159	5795		9.90	10.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT20	U-NII-1	36	5180	MCS0	9.43	11.00
		40	5200		9.42	11.00
		48	5240		9.73	11.00



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	U-NII-2A	52	5260		10.13	11.00
		60	5300		10.02	11.00
		64	5320		10.08	11.00
	U-NII-2C	100	5500		10.11	11.00
		116	5580		10.49	11.00
		140	5700		10.71	11.00
	U-NII-3	149	5745		10.75	11.50
		157	5785		11.27	11.50
		165	5825		11.03	11.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT40	U-NII-1	38	5190	MCS0	8.82	10.00
		46	5230		8.75	10.00
	U-NII-2A	54	5270		8.63	10.00
		62	5310		8.82	10.00
	U-NII-2C	102	5510		8.55	10.00
		110	5550		8.84	10.00
		134	5670		9.44	10.00
	U-NII-3	151	5755		9.71	10.50
		159	5795		10.17	10.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT80	U-NII-1	42	5210	MCS0	7.96	9.00
	U-NII-2A	58	5290		8.14	9.00
	U-NII-2C	106	5530		7.97	9.00
		122	5610		8.06	9.00
	U-NII-3	155	5775		8.50	9.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT160	U-NII-1 & U-NII-2A	50	5250	MCS0	8.53	9.50
	U-NII-2C	114	5570		8.24	9.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ax HEW20	U-NII-1	36	5180	MCS0	10.99	12.00
		40	5200		10.93	12.00
		48	5240		10.74	12.00
	U-NII-2A	52	5260		10.82	12.00
		60	5300		11.02	12.00
		64	5320		11.26	12.00
	U-NII-2C	100	5500		10.92	12.00
		116	5580		11.23	12.00
		140	5700		11.73	12.00
	U-NII-3	149	5745		11.58	12.00
		157	5785		11.91	12.00



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		165	5825		11.76	12.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ax HEW40	U-NII-1	38	5190	MCS0	8.81	10.00
		46	5230		8.73	10.00
	U-NII-2A	54	5270		9.11	10.00
		62	5310		9.51	10.00
	U-NII-2C	102	5510		9.08	10.00
		110	5550		9.31	10.00
		134	5670		9.57	10.00
	U-NII-3	151	5755		9.53	10.00
		159	5795		9.84	10.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ax HEW80	U-NII-1	42	5210	MCS0	9.13	10.50
	U-NII-2A	58	5290		9.71	10.50
	U-NII-2C	106	5530		9.40	10.50
		122	5610		9.10	10.50
	U-NII-3	155	5775		9.58	10.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ax HEW160	U-NII-1 & U-NII-2A	50	5250	MCS0	9.10	10.00
	U-NII-2C	114	5570		9.13	10.00



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WIFI 5G MIMO						
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11n-HT20	U-NII-1	36	5180	MCS0	13.95	15.00
		40	5200		14.25	15.00
		48	5240		14.12	15.00
	U-NII-2A	52	5260		14.30	15.50
		60	5300		14.37	15.50
		64	5320		14.33	15.50
	U-NII-2C	100	5500		14.17	15.50
		116	5580		14.06	15.50
		140	5700		14.22	15.50
	U-NII-3	149	5745		14.04	15.00
		157	5785		14.19	15.00
		165	5825		14.29	15.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11n-HT40	U-NII-1	38	5190	MCS0	12.50	13.00
		46	5230		11.85	13.00
	U-NII-2A	54	5270		12.16	13.00
		62	5310		12.09	13.00
	U-NII-2C	102	5510		11.77	13.00
		110	5550		12.00	13.00
		134	5670		12.08	13.00
	U-NII-3	151	5755		11.87	13.00
		159	5795		12.08	13.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT20	U-NII-1	36	5180	MCS0	13.04	14.00
		40	5200		12.93	14.00
		48	5240		13.20	14.00
	U-NII-2A	52	5260		13.37	14.00
		60	5300		13.27	14.00
		64	5320		13.34	14.00
	U-NII-2C	100	5500		13.06	14.00
		116	5580		12.95	14.00
		140	5700		12.99	14.00
	U-NII-3	149	5745		12.81	14.00
		157	5785		13.30	14.00
		165	5825		13.10	14.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac	U-NII-1	38	5190	MCS0	12.11	13.00



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VHT40	U-NII-2A	46	5230		12.10	13.00
		54	5270		11.73	13.00
		62	5310		11.93	13.00
	U-NII-2C	102	5510		11.64	13.00
		110	5550		12.06	13.00
		134	5670		12.15	13.00
	U-NII-3	151	5755		12.26	13.50
		159	5795		12.67	13.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT80	U-NII-1	42	5210	MCS0	11.20	12.00
	U-NII-2A	58	5290		11.16	12.00
	U-NII-2C	106	5530		11.06	12.00
		122	5610		11.12	12.00
	U-NII-3	155	5775		11.02	12.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT160	U-NII-1 & U-NII-2A	50	5250	MCS0	11.75	12.50
	U-NII-2C	114	5570		11.37	12.50
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ax HEW20	U-NII-1	36	5180	MCS0	14.11	15.00
		40	5200		14.10	15.00
		48	5240		13.97	15.00
	U-NII-2A	52	5260		13.82	15.00
		60	5300		14.01	15.00
		64	5320		14.22	15.00
	U-NII-2C	100	5500		13.86	15.00
		116	5580		14.05	15.00
		140	5700		14.29	15.00
	U-NII-3	149	5745		14.14	15.00
		157	5785		14.53	15.00
		165	5825		14.36	15.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ax HEW40	U-NII-1	38	5190	MCS0	12.03	13.00
		46	5230		12.00	13.00
	U-NII-2A	54	5270		12.13	13.00
		62	5310		12.45	13.00
	U-NII-2C	102	5510		12.06	13.00
		110	5550		12.47	13.00
		134	5670		12.27	13.00



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	U-NII-3	151	5755		12.06	13.00
		159	5795		12.33	13.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ax HEW80	U-NII-1	42	5210	MCS0	12.32	13.50
	U-NII-2A	58	5290		12.65	13.50
	U-NII-2C	106	5530		12.44	13.50
		122	5610		12.15	13.50
	U-NII-3	155	5775		12.08	13.00
Mode	5GHz	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ax HEW160	U-NII-1 & U-NII-2A	50	5250	MCS0	12.30	13.00
	U-NII-2C	114	5570		12.22	13.00



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8.2 Measurement of SAR Data

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.
- 2) Per KDB447498 D04, 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:
 - $\leq 0.8\text{W/kg}$ for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is $\leq 100\text{MHz}$.
 - $\leq 0.6\text{ W/kg}$ or 1.5 W/kg , for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.
 - $\leq 0.4\text{ W/kg}$ or 1.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\geq 200\text{ MHz}$.

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 $\leq 1.2\text{ W/kg}$, SAR is not required for U-NII-1 band for that configuration.

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 $\leq 1.2\text{ W/kg}$, SAR test for the other 802.11 modes are not required.



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8.2.1 SAR Result of WIFI 5G

Wi-Fi 5G SAR Test Record												
Test Record Ant 1												
Test position	Test mode	Test ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	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.(°C)
Limbs Test data of U-NII-2A (Separate 0mm)												
Side 1	802.11a	64/5320	96.08%	1.041	0.075	0.017	-0.08	12.20	12.50	1.072	0.019	22.1
Side 2	802.11a	64/5320	96.08%	1.041	0.066	0.018	0.18	12.20	12.50	1.072	0.020	22.1
Side 3	802.11a	64/5320	96.08%	1.041	3.030	0.869	0.09	12.20	12.50	1.072	0.969	22.1
Side 4	802.11a	64/5320	96.08%	1.041	0.041	0.012	0.03	12.20	12.50	1.072	0.013	22.1
Side 5	802.11a	64/5320	96.08%	1.041	0.028	0.010	0.07	12.20	12.50	1.072	0.011	22.1
Side 3	802.11a	36/5180	96.08%	1.041	1.970	0.528	-0.04	11.57	12.00	1.104	0.607	22.1
Side 3	802.11a	52/5260	96.08%	1.041	3.490	0.924	0.04	11.56	12.50	1.242	1.194	22.1
Side 3	802.11a	60/5300	96.08%	1.041	3.620	0.973	0.09	10.77	12.50	1.489	1.508	22.1
Limbs Test data of U-NII-2C (Separate 0mm)												
Side 1	802.11a	116/5580	96.08%	1.041	0.016	0.003	-0.13	11.93	12.50	1.140	0.004	22.1
Side 2	802.11a	116/5580	96.08%	1.041	0.061	0.016	0.12	11.93	12.50	1.140	0.019	22.1
Side 3	802.11a	116/5580	96.08%	1.041	4.280	1.140	0.02	11.93	12.50	1.140	1.353	22.1
Side 4	802.11a	116/5580	96.08%	1.041	0.037	0.011	0.08	11.93	12.50	1.140	0.013	22.1
Side 5	802.11a	116/5580	96.08%	1.041	0.021	0.008	0.01	11.93	12.50	1.140	0.009	22.1
Side 3	802.11a	100/5500	96.08%	1.041	4.070	1.130	0.05	10.88	12.50	1.452	1.708	22.1
Side 3	802.11a	140/5700	96.08%	1.041	1.640	0.705	0.19	10.92	12.50	1.439	1.056	22.1
Limbs Test data of U-NII-3 (Separate 0mm)												
Side 1	802.11a	157/5785	96.08%	1.041	0.075	0.019	-0.01	11.40	12.50	1.288	0.025	22.1
Side 2	802.11a	157/5785	96.08%	1.041	0.095	0.028	0.02	11.40	12.50	1.288	0.038	22.1
Side 3	802.11a	157/5785	96.08%	1.041	1.930	0.670	0.05	11.40	12.50	1.288	0.898	22.1
Side 4	802.11a	157/5785	96.08%	1.041	0.086	0.024	0.02	11.40	12.50	1.288	0.032	22.1
Side 5	802.11a	157/5785	96.08%	1.041	0.079	0.022	0.08	11.40	12.50	1.288	0.029	22.1
Side 3	802.11a	149/5745	96.08%	1.041	1.560	0.652	0.12	10.87	12.50	1.455	0.988	22.1
Side 3	802.11a	165/5825	96.08%	1.041	1.700	0.555	0.13	11.31	12.50	1.315	0.760	22.1
Test Record Ant 2												
Test position	Test mode	Test ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	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.(°C)
Limbs Test data of U-NII-2A (Separate 0mm)												
Side 1	802.11a	52/5260	96.08%	1.041	0.067	0.014	0.01	11.31	12.50	1.315	0.019	22.1
Side 2	802.11a	52/5260	96.08%	1.041	4.550	1.240	0.15	11.31	12.50	1.315	1.697	22.1
Side 3	802.11a	52/5260	96.08%	1.041	0.120	0.076	-0.18	11.31	12.50	1.315	0.104	22.1
Side 4	802.11a	52/5260	96.08%	1.041	0.089	0.046	-0.12	11.31	12.50	1.315	0.063	22.1
Side 5	802.11a	52/5260	96.08%	1.041	0.103	0.070	-0.10	11.31	12.50	1.315	0.096	22.1
Side 2	802.11a	36/5180	96.08%	1.041	5.160	1.390	-0.16	10.60	11.00	1.096	1.586	22.1



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Side 2	802.11a	60/5300	96.08%	1.041	4.320	1.180	-0.07	10.87	12.50	1.455	1.788	22.1
Side 2	802.11a	64/5320	96.08%	1.041	4.280	1.130	0.09	10.87	12.50	1.455	1.712	22.1
Limbs Test data of U-NII-2C (Separate 0mm)												
Side 1	802.11a	116/5580	96.08%	1.041	0.072	0.017	-0.13	12.39	12.50	1.026	0.018	22.1
Side 2	802.11a	116/5580	96.08%	1.041	3.020	0.899	0.12	12.39	12.50	1.026	0.960	22.1
Side 3	802.11a	116/5580	96.08%	1.041	0.143	0.055	0.02	12.39	12.50	1.026	0.059	22.1
Side 4	802.11a	116/5580	96.08%	1.041	0.105	0.041	0.08	12.39	12.50	1.026	0.044	22.1
Side 5	802.11a	116/5580	96.08%	1.041	0.138	0.052	0.01	12.39	12.50	1.026	0.056	22.1
Side 2	802.11a	100/5500	96.08%	1.041	3.840	1.072	0.05	11.04	12.50	1.400	1.562	22.1
Side 2	802.11a	140/5700	96.08%	1.041	3.550	0.899	0.19	12.04	12.50	1.112	1.040	22.1
Limbs Test data of U-NII-3 (Separate 0mm)												
Side 1	802.11a	157/5785	96.08%	1.041	0.070	0.017	-0.01	12.54	13.00	1.112	0.020	22.1
Side 2	802.11a	157/5785	96.08%	1.041	3.070	0.746	0.02	12.54	13.00	1.112	0.863	22.1
Side 3	802.11a	157/5785	96.08%	1.041	0.071	0.017	0.05	12.54	13.00	1.112	0.020	22.1
Side 4	802.11a	157/5785	96.08%	1.041	0.062	0.014	0.06	12.54	13.00	1.112	0.016	22.1
Side 5	802.11a	157/5785	96.08%	1.041	0.076	0.019	0.01	12.54	13.00	1.112	0.022	22.1
Side 2	802.11a	149/5745	96.08%	1.041	3.420	0.833	0.12	11.96	13.00	1.271	1.102	22.1
Side 2	802.11a	165/5825	96.08%	1.041	3.210	0.823	0.13	12.31	13.00	1.172	1.004	22.1
MIMO Test Record												
Test position	Test mode	Test ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	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.(°C)
Limbs Test data of U-NII-2A (Separate 0mm)												
Side 1	802.11n HT20	60/5300	95.82%	1.044	0.067	0.015	-0.15	14.37	15.50	1.297	0.020	22.1
Side 2	802.11n HT20	60/5300	95.82%	1.044	3.600	1.020	0.04	14.37	15.50	1.297	1.380	22.1
Side 3	802.11n HT20	60/5300	95.82%	1.044	0.322	0.118	-0.09	14.37	15.50	1.297	0.160	22.1
Side 4	802.11n HT20	60/5300	95.82%	1.044	0.219	0.076	0.03	14.37	15.50	1.297	0.103	22.1
Side 5	802.11n HT20	60/5300	95.82%	1.044	0.306	0.111	-0.02	14.37	15.50	1.297	0.150	22.1
Side 2	802.11n HT20	36/5180	95.82%	1.044	4.810	0.993	0.09	13.95	15.00	1.273	1.319	22.1
Side 2	802.11n HT20	52/5260	95.82%	1.044	5.020	1.350	0.10	14.30	15.50	1.318	1.857	22.1
Side 2	802.11n HT20	64/5320	95.82%	1.044	3.350	1.030	0.11	14.33	15.50	1.310	1.408	22.1
Limbs Test data of U-NII-2C (Separate 0mm)												
Side 1	802.11n HT20	140/5700	95.82%	1.044	0.072	0.016	0.01	14.22	15.50	1.343	0.022	22.1
Side 2	802.11n HT20	140/5700	95.82%	1.044	2.740	0.841	-0.02	14.22	15.50	1.343	1.178	22.1
Side 3	802.11n HT20	140/5700	95.82%	1.044	0.134	0.050	0.19	14.22	15.50	1.343	0.070	22.1
Side 4	802.11n HT20	140/5700	95.82%	1.044	0.107	0.036	-0.02	14.22	15.50	1.343	0.050	22.1
Side 5	802.11n HT20	140/5700	95.82%	1.044	0.128	0.047	0.10	14.22	15.50	1.343	0.066	22.1



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Side 2	802.11n HT20	100/5500	95.82%	1.044	3.970	1.080	-0.05	14.17	15.50	1.358	1.531	22.1
Side 2	802.11n HT20	116/5580	95.82%	1.044	2.800	0.793	0.18	14.06	15.50	1.394	1.153	22.1
Limbs Test data of U-NII-3 (Separate 0mm)												
Side 1	802.11n HT20	165/5825	95.82%	1.044	0.067	0.013	0.01	14.29	15.00	1.177	0.016	22.1
Side 2	802.11n HT20	165/5825	95.82%	1.044	2.500	0.655	0.11	14.29	15.00	1.177	0.805	22.1
Side 3	802.11n HT20	165/5825	95.82%	1.044	0.112	0.042	-0.06	14.29	15.00	1.177	0.052	22.1
Side 4	802.11n HT20	165/5825	95.82%	1.044	0.081	0.032	-0.03	14.29	15.00	1.177	0.039	22.1
Side 5	802.11n HT20	165/5825	95.82%	1.044	0.109	0.040	-0.09	14.29	15.00	1.177	0.049	22.1
Side 2	802.11n HT20	149/5745	95.82%	1.044	2.770	0.716	0.16	14.04	15.00	1.247	0.931	22.1
Side 2	802.11n HT20	157/5785	95.82%	1.044	2.530	0.636	-0.15	14.19	15.00	1.205	0.800	22.1



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9 Equipment list

Test Platform		SPEAG DASY Professional				
Description		SAR Test System				
Software Reference		DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)				
Hardware Reference						
Equipment		Manufacturer	Model	Inventory No.	Calibration Date	Due date of calibration
<input checked="" type="checkbox"/>	Test Phantom	SPEAG	SAM Twin	SZ-WSR-A-031	NCR	NCR
<input checked="" type="checkbox"/>	DAE	SPEAG	DAE4	SZ-WSR-M-100	2024/12/31	2025/12/30
<input checked="" type="checkbox"/>	E-Field Probe	SPEAG	EX3DV4	SZ-WSR-M-027	2024/07/17	2025/07/16
<input checked="" type="checkbox"/>	Validation Kits	SPEAG	D5GHzV2	SZ-WSR-M-046	2022/11/01	2025/10/31
<input checked="" type="checkbox"/>	Dielectric parameter probes	SPEAG	DAKS-3.5	SZ-WSR-M-053	2024/06/26	2025/06/25
<input checked="" type="checkbox"/>	RF Bi-Directional Coupler	Agilent	86205-60001	SZ-WSR-A-004	NCR	NCR
<input checked="" type="checkbox"/>	Signal Generator	Agilent	N5171B	SZ-WSR-M-006	2025/01/07	2026/01/06
<input checked="" type="checkbox"/>	Preamplifier	Mini-Circuits	ZHL-42W	SZ-WSR-A-001	NCR	NCR
<input checked="" type="checkbox"/>	Preamplifier	Compliance Directions Systems Inc.	AMP28-3W	SZ-WSR-A-002	NCR	NCR
<input checked="" type="checkbox"/>	Power Meter	Agilent	E4416A	SZ-WSR-M-007	2025/01/07	2026/01/06
<input checked="" type="checkbox"/>	Power Sensor	Agilent	8481H	SZ-WSR-M-008	2025/01/07	2026/01/06
<input checked="" type="checkbox"/>	Power Sensor	R&S	NRP-Z92	SZ-WSR-M-009	2025/01/08	2026/01/07
<input checked="" type="checkbox"/>	Attenuator	SHX	TS2-3dB	SZ-WSR-A-012	NCR	NCR
<input checked="" type="checkbox"/>	Speed reading thermometer	Zhengzhou Boyang Instrument	TP3001	SZ-WSR-M-014	2024/05/30	2025/05/29
<input checked="" type="checkbox"/>	Temperature	MingGao	T809	SZ-WSR-M-015	2024/05/30	2025/05/29
<input checked="" type="checkbox"/>	Temperature	MingGao	T809	SZ-WSR-M-016	2024/05/30	2025/05/29
<input checked="" type="checkbox"/>	Humidity and Temperature Indicator	CHIGAO	HTC-1	SZ-WSR-M-011	2024/05/28	2025/05/27

Note: All the equipment are within the valid period when the tests are performed.



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10 Calibration certificate

Please see the Appendix C

11 Photographs

Please see the Appendix D

Appendix A: Detailed System Check Results

Appendix B: Detailed Test Results

Appendix C: Calibration certificate

Appendix D: Photographs

--- End of report ---