

SAR Test Report

Report No.: AGC16740241205FH01

FCC ID	:	WQ8-DV2411
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	PROFESSIONAL SCAN TOOL
BRAND NAME	:	AUTEL
MODEL NAME	:	MaxiDiag MD909 Pro, MaxiDiag MD906 Pro
APPLICANT	:	Autel Intelligent Technology Corp., Ltd.
DATE OF ISSUE	:	Jan. 20, 2025
STANDARD(S)	:	IEEE Std. 1528:2013 FCC 47 CFR Part 2§2.1093 IEEE Std C95.1 ™-2005
REPORT VERSION	:	V1.0







Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jan. 20, 2025	Valid	Initial Release



Test Report				
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Factory Address	7F&6F, East Wing, Building 2, and 6F of Electronical Building, Yanxiang Industrial Zone, Gaoxin Rd, Dongzhou Community of Guangming New District, Shenzhen			
Product Designation	PROFESSIONAL SCAN TOOL			
Brand Name	AUTEL			
Test Model Name	MaxiDiag MD909 Pro			
Series Model Name	MaxiDiag MD906 Pro			
Different Description	All the same, except for the model name and color.			
EUT Voltage	DC 3.8V by battery			
Applicable Standard	IEEE Std. 1528:2013 FCC 47 CFR Part 2§2.1093 IEEE Std C95.1 ™-2005			
Date of receipt of test item	Dec. 23, 2024			
Test Date	Jan. 15, 2025 to Jan. 18, 2025			
Report Template	AGCRT-US-5G/SAR (2021-04-20)			

Note: The results of testing in this report apply to the product/system which was tested only.

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1. SUMMARY OF MAXIMUM SAR VALUE

The maximum results of Specific Absorption Rate (SAR) found during testing for EUT are as follows:

Frequency Band	Highest Reported 1g-SAR(W/kg)	SAR Test Limit
	Body-worn (with 5mm separation)	(W/kg)
2.4GHz WIFI	0.311	
5.2GHz (U-NII-1)	0.216	
5.8GHz U-NII-3	0.468	1.6
Simultaneous Reported SAR	0.653	
SAR Test Result	PASS	

This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6W/kg) specified in IEEE Std. 1528:2013; FCC 47CFR § 2.1093; IEEE/ANSI C95.1:2005 and the following specific FCC Test Procedures:

• KDB 447498 D01 General RF Exposure Guidance v06

• KDB 865664 D01 SAR Measurement 100MHz to 6GHz v01r04

• KDB 248227 D01 802 11 Wi-Fi SAR v02r02

• KDB 616217 D04 SAR evaluation requirements for laptop, notebook, notebook and tablet computers





2. GENERAL INFORMATION

2.1. EUT Description

General Information	
Product Designation	PROFESSIONAL SCAN TOOL
Test Model	MaxiDiag MD909 Pro
Hardware Version	DV2411_MAIN_V1
Software Version	V01.01.00
Sample ID	241223015
Device Category	Portable
RF Exposure Environment	Uncontrolled
Antenna Type	PIFA
Bluetooth	·
Operation Frequency	2402~2480MHz
Antenna Gain	1.7dBi
Bluetooth Version	V5.0
Type of modulation	GFSK, II/4-DQPSK, 8-DPSK
Peak Output Power	6.007dBm
2.4GHz WIFI	
WIFI Specification	⊠802.11b ⊠802.11g ⊠802.11n(20) □802.11n(40)
Operation Frequency	2412~2462MHz
Avg. Burst Power	11b: 14.84dBm,11g: 12.96dBm,11n(20): 12.41dBm
Antenna Gain	1.9dBi
5 GHz WIFI	
WIFI Specification	⊠802.11a ⊠802.11n20 ⊠802.11n40 ⊠802.11ac20 ⊠802.11ac40 ⊠802.11ac80
Operation Frequency	U-NII-1: 5180MHz~5240MHz; U-NII-3: 5745MHz~5825MHz
Max. conducted Power	U-NII-1: 12.24dBm; U-NII-3: 12.59dBm
Antenna Gain	1.6dBi
Battery	Brand name: N/A Model No. : PT2011 Voltage and Capacitance: 3.8V & 5000mAh
Note: 1.The sample used for t 2.Duty-cycle = [on time/	testing is end product. total time] x 100%

3. The test sample has no any deviation to the test method of standard mentioned in page	je ´	1.
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Production unit Identical Prototype	Product	Гуре	
	Ploduci	Production unit	Identical Prototype



3. SAR MEASUREMENT SYSTEM

Image: Service of the servic

3.1. The DASY5 system used for performing compliance tests consists of following items

A standard high precision 6-axis robot with controller, teach pendant and software.

Data acquisition electronics (DAE) which attached to the robot arm extension. The DAE consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock

A dosimetric probe equipped with an optical surface detector system.

The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital Communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.

A Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.

A computer running WinXP and the DASY5 software.

Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.

Phantoms, device holders and other accessories according to the targeted measurement.

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3.2. DASY5 E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE-1528 etc.)Under ISO17025.The calibration data are in Appendix D.

Model	EX3DV4-SN:3953		
Manufacture	SPEAG		
frequency	0.75GHz-6GHz Linearity:±0.9%(k=2)		
Dynamic Range	0.01W/kg-100W/kg Linearity: ±0.9%(k=2)		
Dimensions	Overall length:337mm Tip diameter:2.5mm Typical distance from probe tip to dipole centers:1mm		
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.		

Isotropic E-Field Probe Specification

3.3. Data Acquisition Electronics description

The data acquisition electronics (DAE) consist if a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converte and a command decoder with a control logic unit. Transmission to the measurement sever is accomplished through an optical downlink fir data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

DAE4			
Input Impedance	200MOhm		1000
The Inputs	Symmetrical and floating	COD COL	C D04 BM
Common mode rejection	above 80 dB		PORCA STATE OF CONCEAN PRIMA PORCE

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3.4. Robot

The DASY system uses the high precision robots (DASY5:TX60) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from is used.

The XL robot series have many features that are important for our application:

- □ High precision (repeatability 0.02 mm)
- □ High reliability (industrial design)
- □ Jerk-free straight movements
- □ Low ELF interference (the closed metallic construction shields against motor control fields)
- □ 6-axis controller



3.5. Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.

The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned prob.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position. e, the same position will be reached with another aligned probe within 0





3.6. Device Holder

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 center for both scales is the ear reference point (EPR).

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.



3.7. Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chip-disk (DASY5: 128MB), RAM (DASY5: 128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DAYS I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.





3.8. PHANTOM SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas:

- Left head
- Right head
- □ Flat phantom



The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

ELI4 Phantom

□ Flat phantom a fiberglass shell flat phantom with 2mm+/- 0.2 mm shell thickness. It has only one measurement area for Flat phantom





4. SAR MEASUREMENT PROCEDURE

4.1. Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and occupational/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element(dv) of given mass density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt} \left(\frac{dW}{dm} \right) = \frac{d}{dt} \left(\frac{dW}{\rho dV} \right)$$

SAR is expressed in units of Watts per kilogram (W/kg) SAR can be obtained using either of the following equations:

F

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

$$SAR = c_h \frac{dT}{dt}_{t=0}$$

Where

SAR is the specific absorption rate in watts per kilogram;

- is the r.m.s. value of the electric field strength in the tissue in volts per meter; σ is the conductivity of the tissue in siemens per metre;
- ρ is the density of the tissue in kilograms per cubic metre;
- c_h is the heat capacity of the tissue in joules per kilogram and Kelvin;

 $\frac{dT}{dt}$ | t = 0 is the initial time derivative of temperature in the tissue in kelvins per second



4.2. SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface is 2.7mm This distance cannot be smaller than the distance os sensor calibration points to probe tip as `defined in the probe properties,

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in db) is specified in the standards for compliance testing. For example, a 2db range is required in IEEE Standard 1528, whereby 3db is a requirement when compliance is assessed in accordance with the ARIB standard (Japan) If one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximum are detected, the number of Zoom Scan has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100MHz to 6GHz

	\leq 3 GHz	> 3 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°±1°	$20^{\circ} \pm 1^{\circ}$	
	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm	
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}	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.		

Step 3: Zoom Scan

Zoom Scan are used to assess the peak spatial SAR value within a cubic average volume containing 1g abd 10g of simulated tissue. The Zoom Scan measures points(refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1g and 10g and displays these values next to the job's label.



Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}		$\leq 2 \text{ GHz}$: $\leq 8 \text{ mm}$ 2 - 3 GHz: $\leq 5 \text{ mm}^*$	$3 - 4 \text{ GHz:} \le 5 \text{ mm}^*$ $4 - 6 \text{ GHz:} \le 4 \text{ mm}^*$			
uniform grid: $\Delta z_{Zoom}(n)$		\leq 5 mm	$3 - 4$ GHz: ≤ 4 mm $4 - 5$ GHz: ≤ 3 mm $5 - 6$ GHz: ≤ 2 mm			
Maximum zoom scan spatial resolution, normal to phantom surface	graded	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	\leq 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm		
	grid	∆z _{Zoom} (n>1): between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$			
Minimum zoom scan volume	$ \begin{array}{c} \mbox{Minimum zoom scan} \\ \mbox{volume} \end{array} & x, y, z & \geq 30 \mbox{ mm} & \begin{array}{c} 3-4 \mbox{ GHz}: \geq 28 \mbox{ mm} \\ 4-5 \mbox{ GHz}: \geq 25 \mbox{ mm} \\ 5-6 \mbox{ GHz}: \geq 22 \mbox{ mm} \end{array} \\ \end{array} $					
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.						

Zoom Scan Parameters extracted from KDB865664 d01 SAR Measurement 100MHz to 6GHz

^{*} When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power Drift Measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the same settings. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.



4.3. RF Exposure Conditions

Test Configuration and setting:

The device support 2.4GHz, 5G WIFI and Bluetooth;

For SAR testing, the EUT is configured with the WLAN continuous TX tool through qualcomm software.

Due the BT power is less than exemption limit, SAR is not required.

Antenna Location: (the back view)





SAR Test Exclusion Consideration for Adjacent Edges

Per KDB 447498 D01 cl. 4.3.1:

a) For 100 MHz to 6 GHz and test separation distances \leq 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determine d by the following:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] • [$\sqrt{f}(GHz)$] \leq 3.0 for1-g SAR, and \leq 7.5 for 10-g extremity SAR.

b) For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determine d by the following:

1) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)•(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz

2) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)•10]} mW, for > 1500 MHz an $d \le 6$ GHz

For WIFI Antenna:

1-g SAR test exclusion thresholds							
Test position		Edge 1 (87mm)	Edge 2 (5mm)	Edge 3 (58mm)	Edge 4 (62mm)		
	SAR test exclusion thresholds(mW)	466	9.61	176	216		
2.4G WIFI	SAR Max. Avg. Burst Power(mW)	30.48	30.48	30.48	30.48		
	SAR required (Yes/No)	NO	YES	NO	NO		
	SAR test exclusion thresholds(mW)	435	6.56	145	185		
5.2 WIFI	SAR Max. Avg. Burst Power(mW)	16.75	16.75	16.75	16.75		
	SAR required (Yes/No)	NO	YES	NO	NO		
5.8 WIFI	SAR test exclusion thresholds(mW)	432	6.25	142	182		
	SAR Max. Avg. Burst Power(mW)	18.16	18.16	18.16	18.16		
	SAR required (Yes/No)	NO	YES	NO	NO		

For BT Antenna:

The result for RF exposure evaluation SAR=(4.47mW /5mm) .[√2.402(GHz)]= 1.39<3.0 for 1-g SAR

CONCLUSION

The SAR evaluation of BT is not required.



5. TISSUE SIMULATING LIQUID

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15cm. For head SAR testing the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15cm For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in 6.2

5.1. The composition of the tissue simulating liquid

Ingredient (% Weight) Frequency (MHz)	Water	Nacl	Polysorbate 20	DGBE	1,2- Propanediol	Triton X-100	Diethylen glycol monohex ylether
2450 Head	71.88	0.16	0.0	7.99	0.0	19.97	0.0
5000 Head	65.52	0.0	0.0	0.0	0.0	17.24	17.24

5.2. Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in IEEE 1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in IEEE 1528.

Target Frequency	hea	ad	body		
(MHz)	٤٢	σ (S/m)	٤r	σ (S/m)	
300	45.3	0.87	45.3	0.87	
450	43.5	0.87	43.5	0.87	
835	41.5	0.90	41.5	0.90	
900	41.5	0.97	41.5	0.97	
915	41.5	1.01	41.5	1.01	
1450	40.5	1.20	40.5	1.20	
1610	40.3	1.29	40.3	1.29	
1800 – 2000	40.0	1.40	40.0	1.40	
2450	39.2	1.80	39.2	1.80	
3000	38.5	2.40	38.5	2.40	
5200	36.0	4.66	36.0	4.66	
5300	35.9	4.76	35.9	4.76	
5600	35.5	5.07	35.5	5.07	
5800	35.3	5.27	35.3	5.27	

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



5.3. Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using DASY 5 Dielectric Probe Kit and R&S Network Analyzer ZVL6.

Tissue Stimulant Measurement for 2450MHz							
Head	Fr.	Dielectric Par	Tissue	— :			
	(MHz)	εr39.2(37.24-41.16)	δ[s/m]1.80(1.71-1.89)	[°C]	lest time		
	2437	40.32	1.75	20.2	Jan. 15,		
	2450	39.59	1.76	20.3	2025		

Tissue Stimulant Measurement for 5200MHz							
	Fr	Dielectric Par	Tissue				
Head	(MHz)	εr	δ[s/m]	Temp	Test time		
		36.0(32.4-39.6)	4.66(4.194-5.126)	[°C]			
	5200	35.94	4.58	10.9	Jan. 17,		
	5230	35.10	4.60	19.0	2025		

Tissue Stimulant Measurement for 5800MHz							
Head	Fr	Dielectric Par	Tissue				
	(MHz)	٤r	δ[s/m]	Temp	Test time		
		35.3 (33.535-37.065)	5.27 (5.0065-5.5335)	[°C]			
	5755	36.60	5.31	20.4	Jan. 18,		
	5800	36.04	5.34	20.4	2025		



6. SAR SYSTEM CHECK PROCEDURE

6.1. SAR System Check Procedures

SAR system check is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

Each DASY system is equipped with one or more system check kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system check and system validation. System kit includes a dipole, and dipole device holder.

The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system check setup is shown as below.





6.2. SAR System Check 6.2.1. Dipoles



The dipole is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of IEEE. The table below provides details for the mechanical and electrical specifications for the wave guide.

Frequency	L (mm)	h (mm)	d (mm)
2450MHz	51.5	30.4	3.6
5000MHz	20.6	40.3	3.6



6.2.2. System Check Result

System Performance Check at 2450MHz & 5000MHz for Head								
Validation Kit: D2450V2-SN:968& SN 17/22 DIP 5G000-671								
Frequency	Target		Reference Result		Tested		Tissue	
[MHz]	Value((VV/kg)	(± 10%)		Value(W/kg)		Temp.	Test time
	1g	10g	1g	10g	1g	10g	[°C]	
2450	53.5	25.0	48.15-58.85	22.50-27.50	52.30	23.61	20.3	Jan. 15, 2025
5200	73.43	21.83	66.087-80.773	19.647-24.013	73.00	22.70	19.8	Jan. 17, 2025
5800	75.69	22.44	68.121-83.259	20.196-24.684	82.70	24.30	20.4	Jan. 18, 2025

Note:

(1) We use a CW signal of 18dBm or 10dBm for system check, and then all SAR values are normalized to 1W forward power. The result must be within $\pm 10\%$ of target value.



7. EUT TEST POSITION

This EUT was tested in Body back, Body front and Edge2.

7.1. Body Worn Position

- (1) To position the EUT parallel to the phantom surface.
- (2) To adjust the EUT parallel to the flat phantom.
- (3) To adjust the distance between the EUT surface and the flat phantom to 5mm.



8. SAR EXPOSURE LIMITS

Limits for General Population/Uncontrolled Exposure (W/kg)

Type Exposure	Uncontrolled Environment Limit (W/kg)
Spatial Peak SAR (1g cube tissue for brain or body)	1.60
Spatial Average SAR (Whole body)	0.08
Spatial Peak SAR (Limbs)	4.0



9. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA



10. TEST EQUIPMENT LIST

Equipment description	Manufacturer/ Model	Identification No.	Software version	Current calibration date	Next calibration date
Stäubli Robot	Stäubli-TX60	F13/5Q2UD1/A/01	N/A	N/A	N/A
Robot Controller	Stäubli-CS8	139522	N/A	N/A	N/A
E-Field Probe	Speag- EX3DV4	SN:3953	N/A	Sep. 05, 2024	Sep. 04, 2025
SAM Twin Phantom	Speag-SAM	1790	N/A	N/A	N/A
Device Holder	Speag-SD 000 H01 KA	SD 000 H01 KA	N/A	N/A	N/A
DAE4	Speag-SD 000 D04 BM	1398	N/A	May 20, 2024	May 19, 2025
SAR Software	Speag-DASY5 PRO	N/A	52.10.4.1535	N/A	N/A
Liquid	SATIMO	N/A	N/A	N/A	N/A
Dipole	D2450V2	SN968	N/A	May 18, 2023	May 17, 2026
Dipole	SID5000	SN 17/22 DIP 5G000-671	N/A	Apr. 28, 2022	Apr. 27, 2025
Signal Generator	Agilent-E4438C	US41461365	V5.03	May 24, 2024	May 23, 2025
Vector Analyzer	Agilent / E4440A	MY44303916	N/A	May 28, 2024	May 27, 2025
Network Analyzer	Rhode & Schwarz ZVL6	SN101443	3.2	Jul. 24, 2024	Jul. 23, 2025
Attenuator	Warison /WATT-6SR1211	S/N:WRJ34AYM2F1	N/A	June 06, 2024	June 05, 2025
Attenuator	Mini-circuits / VAT-10+	31405	N/A	June 06, 2024	June 05, 2025
Amplifier	AS0104-55_55	1004793	N/A	N/A	N/A
Directional Couple	Werlatone/ C5571-10	SN99463	N/A	Feb. 01, 2024	Jan. 31, 2026
Directional Couple	Werlatone/ C6026-10	SN99482	N/A	Feb. 01, 2024	Jan. 31, 2026
Power Sensor	NRP-Z21	104604	N/A	May 24, 2024	May 23, 2025
Power Sensor	NRP-Z23	100323		Jun. 05, 2024	Jun. 04, 2025
Power Viewer	R&S	V2.3.1.0		N/A	N/A
Calibration standard parts for network sub - port	R&S/ ZV-Z132	N/A	V2.3.1.0	Nov. 08, 2024	Nov. 07, 2025
Thermometer	DigiMate/TP677	3811930452	N/A	June 06, 2024	June 05, 2025

Note: Per KDB 865664 Dipole SAR Validation, AGC Lab has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole;

2. System validation with specific dipole is within 10% of calibrated value;

3. Return-loss is within 20% of calibrated measurement;

4. Impedance is within 5Ω of calibrated measurement.



11. MEASUREMENT UNCERTAINTY

DASY Uncertainty- EX3DV4 Measurement uncertainty for Dipole averaged over 1 gram / 10 gram.										
а	b	с	d	e f(d,k)	f	g	h c×f/e	i c×g/e	k	
Uncertainty Component	Sec.	Tol (± %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (±%)	10g Ui (±%)	vi	
Measurement System										
Probe calibration	E.2.1	6.95	N	1	1	1	6.95	6.95	∞	
Axial Isotropy	E.2.2	0.6	R	√3	√0.5	√0.5	0.24	0.24	∞	
Hemispherical Isotropy	E.2.2	1.6	R	$\sqrt{3}$	√0.5	√0.5	0.65	0.65	∞	
Boundary effect	E.2.3	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞	
Linearity	E.2.4	0.45	R	$\sqrt{3}$	1	1	0.26	0.26	ø	
System detection limits	E.2.4	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞	
Modulation response	E2.5	3.3	R	$\sqrt{3}$	1	1	1.91	1.91	ø	
Readout Electronics	E.2.6	0.15	N	1	1	1	0.15	0.15	ø	
Response Time	E.2.7	0	R	$\sqrt{3}$	1	1	0.00	0.00	∞	
Integration Time	E.2.8	1.7	R	√3	1	1	0.98	0.98	∞	
RF ambient conditions-Noise	E.6.1	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞	
RF ambient conditions-reflections	E.6.1	3	R	$\sqrt{3}$	1	1	1.73	1.73	~	
Probe positioner mechanical tolerance	E.6.2	0.4	R	√3	1	1	0.23	0.23	∞	
Probe positioning with respect to phantom shell	E.6.3	6.7	R	√3	1	1	3.87	3.87	8	
Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation	E.5	4	R	√3	1	1	2.31	2.31	∞	
Test sample Related					-	-				
Test sample positioning	E.4.2	2.9	N	1	1	1	2.90	2.90	∞	
Device holder uncertainty	E.4.1	3.6	Ν	1	1	1	3.60	3.60	∞	
Output power variation—SAR drift measurement	E.2.9	5	R	√3	1	1	2.89	2.89	8	
SAR scaling	E.6.5	5	R	√3	1	1	2.89	2.89	∞	
Phantom and tissue parameters							-			
Phantom shell uncertainty—shape, thickness, and permittivity	E.3.1	6.6	R	√3	1	1	3.81	3.81	∞	
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	1.9	N	1	1	0.84	1.90	1.60	∞	
Liquid conductivity measurement	E.3.3	4	N	1	0.78	0.71	3.12	2.84	М	
Liquid permittivity measurement	E.3.3	5	N	1	0.23	0.26	1.15	1.30	М	
Liquid conductivity—temperature uncertainty	E.3.4	2.5	R	√3	0.78	0.71	1.13	1.02	∞	
Liquid permittivity—temperature uncertainty	E.3.4	2.5	R	√3	0.23	0.26	0.33	0.38	∞	
Combined Standard Uncertainty			RSS				11.97	11.80		
Expanded Uncertainty (95% Confidence interval)			K=2				23.93	23.61		





Systen	DASY Uncertainty- EX3DV4 System Check uncertainty for Dipole averaged over 1 gram / 10 gram.								
a	b	С	d	e f(d,k)	f	g	h c×f/e	i c×g/e	k
Uncertainty Component	Sec.	Tol (± %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (±%)	10g Ui (±%)	vi
Measurement System	•			•	•	•	,	,	
Probe calibration drift	E.2.1	0.5	N	1	1	1	0.5	0.5	∞
Axial Isotropy	E.2.2	0.6	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Hemispherical Isotropy	E.2.2	1.6	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Boundary effect	E.2.3	1	R	√3	0	0	0.00	0.00	∞
Linearity	E.2.4	0.45	R	$\sqrt{3}$	0	0	0.00	0.00	∞
System detection limits	E.2.4	1	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Modulation response	E2.5	3.3	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Readout Electronics	E.2.6	0.15	Ν	1	0	0	0.00	0.00	8
Response Time	E.2.7	0	R	$\sqrt{3}$	0	0	0.00	0.00	8
Integration Time	E.2.8	1.7	R	$\sqrt{3}$	0	0	0.00	0.00	∞
RF ambient conditions-Noise	E.6.1	3	R	$\sqrt{3}$	0	0	0.00	0.00	∞
RF ambient conditions-reflections	E.6.1	3	R	$\sqrt{3}$	0	0	0.00	0.00	∞
Probe positioner mechanical tolerance	E.6.2	0.4	R	√3	1	1	0.37	0.37	8
Probe positioning with respect to phantom shell	E.6.3	6.7	R	√3	1	1	3.87	3.87	8
Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation	E.5	4	R	√3	0	0	0.00	0.00	80
System check source (dipole)									
Deviation of experimental dipoles	E.6.4	2.0	Ν	1	1	1	2.00	2.00	8
Input power and SAR drift measurement	8,6.6.4	5.0	R	√3	1	1	2.89	2.89	8
Dipole axis to liquid distance	8,E.6.6	2.0	R	√3	1	1	1.15	1.15	8
Phantom and tissue parameters									
Phantom shell uncertainty—shape, thickness, and permittivity	E.3.1	6.6	R	√3	1	1	3.81	3.81	8
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	1.9	N	1	1	0.84	1.90	1.60	8
Liquid conductivity measurement	E.3.3	4	Ν	1	0.78	0.71	3.12	2.84	М
Liquid permittivity measurement	E.3.3	5	Ν	1	0.23	0.26	1.15	1.30	М
Liquid conductivity—temperature uncertainty	E.3.4	2.5	R	√3	0.78	0.71	1.13	1.02	8
Liquid permittivity—temperature uncertainty	E.3.4	2.5	R	√3	0.23	0.26	0.33	0.38	∞
Combined Standard Uncertainty			RSS				7.34	7.07	
Expanded Uncertainty (95% Confidence interval)			K=2				14.67	14.14	



DASY Uncertainty- EX3DV4 System Validation uncertainty for Dipole averaged over 1 gram / 10 gram										
System	valluation	uncertainty		e		II / TO grain	h. h	i	Ι.	
a	b	C	d	f(d,k)	t	g	c×f/e	c×g/e	ĸ	
Uncertainty Component	Sec.	Tol (±%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (±%)	10g Ui (±%)	vi	
Measurement System										
Probe calibration	E.2.1	6.95	Ν	1	1	1	6.95	6.95	∞	
Axial Isotropy	E.2.2	0.6	R	$\sqrt{3}$	1	1	0.35	0.35	8	
Hemispherical Isotropy	E.2.2	1.6	R	$\sqrt{3}$	0	0	0.00	0.00	8	
Boundary effect	E.2.3	1	R	$\sqrt{3}$	1	1	0.58	0.58	8	
Linearity	E.2.4	0.45	R	$\sqrt{3}$	1	1	0.26	0.26	8	
System detection limits	E.2.4	1	R	$\sqrt{3}$	1	1	0.58	0.58	8	
Modulation response	E2.5	3.3	R	$\sqrt{3}$	0	0	0.00	0.00	8	
Readout Electronics	E.2.6	0.15	Ν	1	1	1	0.15	0.15	∞	
Response Time	E.2.7	0	R	$\sqrt{3}$	0	0	0.00	0.00	∞	
Integration Time	E.2.8	1.7	R	$\sqrt{3}$	0	0	0.00	0.00	8	
RF ambient conditions-Noise	E.6.1	3	R	$\sqrt{3}$	1	1	1.73	1.73	8	
RF ambient conditions-reflections	E.6.1	3	R	$\sqrt{3}$	1	1	1.73	1.73	8	
Probe positioner mechanical tolerance	E.6.2	0.4	R	√3	1	1	0.23	0.23	8	
Probe positioning with respect to phantom shell	E.6.3	6.7	R	√3	1	1	3.87	3.87	8	
Extrapolation, interpolation, and integrations algorithms for max. SAR evaluation	E.5	4	R	√3	1	1	2.31	2.31	∞	
System check source (dipole)										
Deviation of experimental dipole from numerical dipole	E.6.4	5.0	N	1	1	1	5.00	5.00	∞	
Input power and SAR drift measurement	8,6.6.4	5.0	R	√3	1	1	2.89	2.89	8	
Dipole axis to liquid distance	8,E.6.6	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞	
Phantom and tissue parameters										
Phantom shell uncertainty—shape, thickness, and permittivity	E.3.1	6.6	R	√3	1	1	3.81	3.81	8	
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	1.9	N	1	1	0.84	1.90	1.60	∞	
Liquid conductivity measurement	E.3.3	4	N	1	0.78	0.71	3.12	2.84	М	
Liquid permittivity measurement	E.3.3	5	N	1	0.23	0.26	1.15	1.30	М	
Liquid conductivity—temperature uncertainty	E.3.4	2.5	R	$\sqrt{3}$	0.78	0.71	1.13	1.02	∞	
Liquid permittivity—temperature uncertainty	E.3.4	2.5	R	√3	0.23	0.26	0.33	0.38	∞	
Combined Standard Uncertainty			RSS				11.62	11.46		
Expanded Uncertainty (95% Confidence interval)			K=2				23.25	22.91		



12. CONDUCTED POWER MEASUREMENT

Bluetooth_BR/EDR

Modulation	Channel	Frequency(MHz)	Peak Power (dBm)
	0	2402	5.977
GFSK	39	2441	4.978
	78	2480	4.168
	0	2402	6.001
π /4-DQPSK	39	2441	4.991
	78	2480	4.173
	0	2402	6.007
8-DPSK	39	2441	4.988
	78	2480	4.176

WIFI 2.4G

Mode	Data Rate (Mbps)	Channel	Frequency(MHz)	Avg. Burst Power(dBm)
		01	2412	14.66
802.11b	1	06	2437	14.84
		11	2462	14.79
802.11g		01	2412	12.75
	6	06	2437	12.90
		11	2462	12.96
802.11n(20)		01	2412	12.27
	6.5	06	2437	12.41
		11	2462	12.31



5GHz WIFI

			Average Power(dBm)							
Mode	channel	Frequency				Data Ra	ate(bps)			
			6M	9M	12M	18M	24M	36M	48M	54M
	36	5180	10.82	10.79	10.68	10.58	10.51	10.40	10.22	10.11
	40	5200	11.03	10.92	10.77	10.72	10.54	10.37	10.25	10.20
000 44 -	48	5240	11.67	11.56	11.48	11.35	11.24	11.13	11.02	10.92
802.11a	149	5745	12.08	11.91	11.88	11.82	11.68	11.66	11.53	11.43
	157	5785	11.40	11.26	11.23	11.14	11.08	10.92	10.89	10.85
	165	5825	10.56	10.55	10.39	10.33	10.15	10.07	10.02	9.83
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	36	5180	10.51	10.48	10.33	10.22	10.11	10.02	10.02	9.83
	40	5200	10.81	10.77	10.75	10.69	10.55	10.40	10.28	10.13
802.11n	48	5240	11.41	11.39	11.36	11.21	11.12	11.00	10.94	10.84
(20)	149	5745	11.61	11.61	11.61	11.41	11.35	11.25	11.06	10.96
	157	5785	11.00	10.97	10.85	10.69	10.55	10.50	10.30	10.10
	165	5825	10.11	9.96	9.82	9.76	9.75	9.70	9.68	9.68
		I	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	38	5190	11.51	11.45	11.41	11.22	11.21	11.10	10.99	10.96
802.11n	46	5230	12.21	12.06	12.04	11.89	11.85	11.80	11.79	11.75
(40)	151	5755	12.59	12.49	12.39	12.31	12.16	12.00	11.87	11.69
	159	5795	11.80	11.63	11.44	11.25	11.25	11.07	11.03	10.86
		I	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	36	5180	10.36	10.22	10.07	10.06	9.89	9.75	9.56	9.39
	40	5200	10.68	10.68	10.60	10.60	10.50	10.39	10.28	10.19
802.11ac	48	5240	11.31	11.14	10.98	10.80	10.72	10.70	10.52	10.42
(20)	149	5745	11.60	11.54	11.47	11.34	11.32	11.20	11.09	10.94
	157	5785	10.99	10.86	10.69	10.62	10.47	10.37	10.32	10.30
	165	5825	10.10	10.07	9.87	9.74	9.62	9.49	9.46	9.43
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	38	5190	11.39	11.33	11.13	11.13	11.04	10.87	10.87	10.85
802.11ac	46	5230	12.24	12.22	12.10	12.00	11.84	11.76	11.69	11.67
(40)	151	5755	12.52	12.48	12.31	12.27	12.20	12.10	12.00	11.82
	159	5795	11.73	11.65	11.54	11.51	11.49	11.42	11.24	11.07
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11ac	42	5210	11.69	11.50	11.36	11.17	11.10	11.03	11.01	11.01
(80)	155	5775	11.78	11.74	11.69	11.66	11.59	11.40	11.25	11.13



13. TEST RESULTS

13.1. SAR Test Results Summary 13.1.1. Test position and configuration

Body SAR was performed with the device 5mm from the phantom

13.1.2. Operation Mode

- 1. Per KDB 447498 D01 v06 ,for each exposure position, if the highest 1-g SAR is \leq 0.8 W/kg, testing for low and high channel is optional.
- Per KDB 865664 D01 v01r04, for each frequency band, if the measured SAR is ≥0.8W/kg, testing for repeated SAR measurement is required, that the highest measured SAR is only to be tested. When the SAR results are near the limit, the following procedures are required for each device to verify these types of SAR measurement related variation concerns by repeating the highest measured SAR configuration in each frequency band.
 - (1) When the original highest measured SAR is ≥ 0.8 W/kg, repeat that measurement once.
 - (2) 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 \ge 1.45 W/kg.
 - (3) Perform a third repeated measurement only if the original, first and second repeated measurement is \geq 1.5 W/kg and ratio of largest to smallest SAR for the original, first and second measurement is \geq 1.20.
- Maximum Scaling SAR in order to calculate the Maximum SAR values to test under the standard Peak Power, Calculation method is as follows: Maximum Scaling SAR =tested SAR (Max.) ×[maximum turn-up power (mw)/ maximum measurement output power(mw)]
- 4. Per KDB 248227 D01 v02r02 Chapter 5.3.4, 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, the procedures in 5.3.2 are applied to determine the test configuration. 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 D01 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.
- 5. Per KDB 248227 D01 v02r02 Chapter 5.2.2, when SAR measurement is required for 2.4GHz 802.11g/n OFDM configurations, the measurement and test reducing procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.



and/or along the edges of the devices; therefore, SAR evaluation is required for these configurations. Exposures from antennas through the front (top) surface of the display section of a full-size tablet, away from the edges, are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary, except for tablets that are designed to require continuous operations with the hand(s) next to the antenna(s).

13.1.3. Test Result

Depth of Liquid (cm)::	Rela	Relative Humidity (%): 52.1							
Product: PROFESSIONAL SCAN TOOL									
Test Mode: 802.11b									
Position	Mode	Ch.	Fr. (MHz)	Power Drift (<±0.2d B)	SAR (1g) (W/kg)	Max. Tune-up Power (dBm)	Meas. output Power (dBm)	Scaled SAR (W/Kg)	Limit W/kg
Body back	DTS	06	2437	0.08	0.258	15.00	14.84	0.268	1.6
Body front	DTS	06	2437	0.13	0.300	15.00	14.84	0.311	1.6
Edge 2 (Right)	DTS	06	2437	0.17	0.277	15.00	14.84	0.287	1.6
N I <i>J</i>									

Note:

• When the 1-g SAR is ≤ 0.8W/kg, testing for low and high channel is optional.

• The test separation of all above table is 5mm.

• According to KDB248227, SAR is not required for 802.11n HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channelS.

• Plots are only shown for the bold markered worst case SAR results.

SAR MEASUREMENT

Depth of Liquid (cm):>15	Relative Humidity (%): 53.8
Product: PROFESSIONAL SCAN TOOL	

Test Mode: 5 2GHz W/IEI-802 11ac(40)

Test Mode. 5.2GHz WIFI-602. Trac(40)									
Position	Ch.	Fr. (MHz)	Power Drift (<±0.2dB)	SAR (1g) (W/kg)	Max. Tune-up Power (dBm)	Meas. output Power (dBm)	Scaled SAR (W/kg)	Limit (W/kg)	
Body back	46	5230	0.12	0.152	12.30	12.24	0.154	1.6	
Body front	46	5230	0.02	0.200	12.30	12.24	0.203	1.6	
Edge 2 (Right)	46	5230	0.09	0.213	12.30	12.24	0.216	1.6	

Note:

• When the 1-g SAR is ≤ 0.8W/kg, testing for low and high channel is optional.

• The test separation of all above table is 5mm.

• Plots are only shown for the bold markered worst case SAR results.

SAR MEASUREMENT								
Depth of Liquid (cm):>15 Relative Humidity (%): 51.9								
Product: PROFESSIONAL SCAN TOOL								
Test Mode: 5.8GHz WIFI-802.11n(40)								
Position	Ch.	Fr. (MHz)	Power Drift (<±0.2dB)	SAR (1g) (W/kg)	Max. Tune-up Power (dBm)	Meas. output Power (dBm)	Scaled SAR (W/kg)	Limit (W/kg)
Body back	151	5755	-0.05	0.167	13.22	12.59	0.193	1.6
Body front	151	5755	0.04	0.167	13.22	12.59	0.193	1.6
Edge 2 (Right)	151	5755	0.12	0.405	13.22	12.59	0.468	1.6

Note:

• When the 1-g SAR is ≤ 0.8W/kg, testing for low and high channel is optional.

• The test separation of all above table is 5mm.

• Plots are only shown for the bold markered worst case SAR results.

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Simultaneous Multi-band Transmission Evaluation:

Application Simultaneous Transmission information:

NO	Simultanoous stato	Portable Handset		
	Simulaneous state	Body-worn		
1	WLAN 2.4GHz (data) + Bluetooth(data)	Yes		
2	WLAN 5.2GHz (data) + Bluetooth(data)	Yes		
3	WLAN 5.8GHz (data) + Bluetooth(data)	Yes		

NOTE:

- 1. WLAN and BT with different antenna.
- 2. For simultaneous transmission at body exposure position, 2 transmitters simultaneous transmission was the worst state.
- 3. Based upon KDB 447498 D01, BT SAR is excluded as below table.
- 4. Based upon KDB 447498 D01, for handsets the test separation distance is determined by the smallest distance between the outer surface of the device and the user; which is 5mm for body-worn SAR.
- 5. According to KDB 447498 D01 4.3.1, Standalone SAR test exclusion is as follow: For 100 MHz to 6 GHz and test separation distances \leq 50 mm, the 1-g and 10-g SAR test exclusion

thresholds are determined by the following: [(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] • [\checkmark

- f(GHz)] $\,\leqslant\,$ 3.0 for 1-g SAR, and $\,\leqslant\,$ 7.5 for 10-g extremity SAR $^{30}\!,$ where
- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation³¹
- The result is rounded to one decimal place for comparison
- The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

The test exclusions are applicable only when the minimum test separation distance is \leq 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

- 6. If the test separation distance is <5mm, 5mm is used for excluded SAR calculation.
- 7. According to KDB 447498 D01 4.3.2, simultaneous transmission SAR test exclusion is as follow:
 - (1) Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.
 - (2) Any transmitters and antennas should be considered when calculating simultaneous mode.
 - (3) For mobile phone and PC, it's the sum of all transmitters and antennas at the same mode with same position in each applicable exposure condition
 - (4) When the standalone SAR test exclusion of section 4.3.2 is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the following to det

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[$\sqrt{f}(GHz)/x$] W/kg for test separation distances ≤ 50 mm; where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

8. When the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR to peak location separation ratio. The simultaneous transmitting antennas in each operating mode and exposure condition combination must be considered one pair at a time to determine the SAR to peak location separation ratio to qualify for test exclusion. The ratio is determined by (SAR1 + SAR2)1.5/Ri, rounded to two decimal digits, and must be ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion.



Estimated SAR		Max Power including Tune-up Tolerance		Separation	Estimated SAR
		dBm	mW	Distance (mm)	(00/kg)
BT	Body	6.50	4.467	5	0.185



RF Exposure	Test	Simultaneous Trar	nsmission Scenario	Σ1-g SAR	SPLSR (Yes/No)
Conditions	Position	2.4GHz WI-Fi	Bluetooth	(Ŵ/kg)	
Body-worn	Rear	0.268	0.185	0.453	No
	Front	0.311	0.185	0.496	No
	Edge 2	0.287	0.185	0.472	No
RF Exposure	Test	Simultaneous Transmission Scenario		Σ1-g SAR	SPLSR
Conditions	Position	5.2GHz WI-Fi	Bluetooth	(W/kg)	(Yes/No)
Body-worn	Rear	0.154	0.185	0.339	No
	Front	0.203	0.185	0.388	No
	Edge 2	0.216	0.185	0.401	No
RF Exposure	Test	Simultaneous Transmission Scenario		Σ1-g SAR	SPLSR
Conditions	Position	5.8GHz WI-Fi	Bluetooth	(W/kg)	(Yes/No)
	Rear	0.193	0.185	0.378	No
Body-worn	Front	0.193	0.185	0.378	No
	Edge 2	0.468	0.185	0.653	No

Sum of the SAR for Wi-Fi & BT:

Note:

•According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/kg, SPLSR assessment is not required.

·SPLSR mean is "The SAR to Peak Location Separation Ratio "



APPENDIX A. SAR SYSTEM CHECK DATA

Date: Jan. 15, 2025

Test Laboratory: AGC Lab System Check Head 2450 MHz DUT: Dipole 2450 MHz Type: D2450V2

Communication System CW; Communication System Band: D2450 (2450.0 MHz); Duty Cycle: 1:1; Frequency: 2450 MHz; Medium parameters used: f = 2450 MHz; σ =1.76 mho/m; ϵ r =39.59; ρ = 1000 kg/m³; Phantom section: Flat Section; Input Power=18dBm Ambient temperature (°C): 20.4, Liquid temperature (°C): 20.3

DASY Configuration:

• Probe: EX3DV4 - SN:3953; ConvF(7.87, 7.87, 7.87); Calibrated: Sep. 05, 2024;

- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 SN1398; Calibrated: May 20, 2024
- Phantom: SAM (20deg probe tilt) with CRP v5.0; Type: QD000P40CD;
- DASY5 PRO 52.10.4.1535; SEMCAD X 14.6.14.7501

System Check Head 2450 MHz/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 3.66 W/kg

System Check Head 2450 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 46.11 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 7.32 W/kg

SAR(1 g) = 3.3 W/kg; SAR(10 g) = 1.49 W/kg Smallest distance from peaks to all points 3 dB below = 9.8 mm Ratio of SAR at M2 to SAR at M1 = 44.5% Maximum value of SAR (measured) = 5.16 W/kg





Date: Jan. 17, 2025

Test Laboratory: AGC Lab System Check Head 5200 MHz DUT: Dipole 5000MHz Type: SWG5500

Communication System: CW; Communication System Band: D5000 (5000.0 MHz); Duty Cycle: 1:1; Frequency: 5200 MHz; Medium parameters used: f = 5250 MHz; σ =4.58mho/m; ϵ r = 35.94; ρ = 1000 kg/m³; Phantom section: Flat Section; Input Power=10dBm Ambient temperature (°C): 19.9, Liquid temperature (°C): 19.8

DASY Configuration:

• Probe: EX3DV4 – SN:3953; ConvF(5.50, 5.50, 5.50); Calibrated: Sep. 05, 2024;

- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 SN1398; Calibrated: May 20, 2024
- Phantom: SAM (20deg probe tilt) with CRP v5.0; Type: QD000P40CD;
- DASY5 PRO 52.10.4.1535; SEMCAD X 14.6.14.7501

System Check Head 5200MHz/Area Scan (7x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.18 W/kg System Check Head 5200MHz/Zoom Scan (8x8x16)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm Reference Value = 15.14 V/m; Power Drift = 0.17 dB Peak SAR (extrapolated) = 2.90 W/kg SAR(1 g) = 0.730 W/kg; SAR(10 g) = 0.227 W/kg Smallest distance from peaks to all points 3 dB below = 7.9 mm Ratio of SAR at M2 to SAR at M1 = 53.6% Maximum value of SAR (measured) = 1.50 W/kg





Date: Jan. 18, 2025

Test Laboratory: AGC Lab System Check Head 5800 MHz DUT: Dipole 5000MHz Type: SWG5500

Communication System: CW; Communication System Band: D5000 (5000.0 MHz); Duty Cycle: 1:1; Frequency: 5800 MHz; Medium parameters used: f = 5750 MHz; σ =5.34 mho/m; ϵ r =36.04; ρ = 1000 kg/m³; Phantom section: Flat Section; Input Power=10dBm Ambient temperature (°C): 20.6, Liquid temperature (°C): 20.4

DASY Configuration:

- Probe: EX3DV4 SN:3953; ConvF(4.98, 4.98, 4.98); Calibrated: Sep. 05, 2024;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 SN1398; Calibrated: May 20, 2024
- Phantom: SAM (20deg probe tilt) with CRP v5.0; Type: QD000P40CD;
- DASY5 PRO 52.10.4.1535; SEMCAD X 14.6.14.7501

System Check Head 5800MHz/Area Scan (7x12x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.48 W/kg **System Check Head 5800MHz/Zoom Scan (8x8x22)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 16.06 V/m; Power Drift = 0.13 dBPeak SAR (extrapolated) = 3.47 W/kgSAR(1 g) = 0.827 W/kg; SAR(10 g) = 0.243 W/kg

Smallest distance from peaks to all points 3 dB below = 8.2 mmRatio of SAR at M2 to SAR at M1 = 62.4%

Maximum value of SAR (measured) = 2.14 W/kg





APPENDIX B. SAR MEASUREMENT DATA

Test Laboratory: AGC Lab 802.11b Mid- Body- Front DUT: PROFESSIONAL SCAN TOOL; Type: MaxiDiag MD909 Pro Date: Jan. 15, 2025

Communication System: Wi-Fi; Communication System Band: 802.11b; Duty Cycle: 1:1; Frequency: 2437 MHz; Medium parameters used: f = 2450 MHz; $\sigma = 1.75 \text{ mho/m}$; $\epsilon r = 40.32$; $\rho = 1000 \text{ kg/m}^3$; Phantom section: Flat Section

Ambient temperature (°C): 20.4, Liquid temperature (°C):20.3

DASY Configuration:

- Probe: EX3DV4 SN:3953; ConvF(7.87, 7.87, 7.87); Calibrated: Sep. 05, 2024;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 SN1398; Calibrated: May 20, 2024
- Phantom: SAM (20deg probe tilt) with CRP v5.0; Type: QD000P40CD;
- DASY5 PRO 52.10.4.1535; SEMCAD X 14.6.14.7501

BODY/FRONT/Area Scan (9x15x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.397 W/kg **BODY/FRONT/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 5.569 V/m; Power Drift = 0.13 dB Peak SAR (extrapolated) = 0.649 W/kg **SAR(1 g) = 0.300 W/kg; SAR(10 g) = 0.153 W/kg** Smallest distance from peaks to all points 3 dB below = 13.6 mm Ratio of SAR at M2 to SAR at M1 = 45.7% Maximum value of SAR (measured) = 0.457 W/kg









Test Laboratory: AGC Lab 5.2GHz -802.11ac(40) CH46- Body- Edge 2 (Right) DUT: PROFESSIONAL SCAN TOOL; Type: MaxiDiag MD909 Pro

Date: Jan. 17, 2025

Communication System: Wi-Fi; Communication System Band: 802.11ac(40); Duty Cycle: 1:1 Frequency: 5230 MHz; Medium parameters used: f = 5230MHz; $\sigma = 4.60$ mho/m; $\epsilon r = 35.10$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 19.9, Liquid temperature (°C): 19.8

DASY Configuration:

- Probe: EX3DV4 SN:3953; ConvF(5.50, 5.50, 5.50); Calibrated: Sep. 05, 2024;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 SN1398; Calibrated: May 20, 2024
- Phantom: SAM (20deg probe tilt) with CRP v5.0; Type: QD000P40CD;
- DASY5 PRO 52.10.4.1535; SEMCAD X 14.6.14.7501

BODY/EDGE2/Area Scan (9x18x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (measured) = 0.385 W/kg BODY/EDGE2/Zoom Scan (8x8x16)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm Reference Value = 3.568 V/m; Power Drift = 0.09 dB Peak SAR (extrapolated) = 0.776 W/kg SAR(1 g) = 0.213 W/kg; SAR(10 g) = 0.104 W/kg Smallest distance from peaks to all points 3 dB below = 11.1 mm Ratio of SAR at M2 to SAR at M1 = 58% Maximum value of SAR (measured) = 0.391 W/kg









Test Laboratory: AGC Lab 5.8GHz -802.11ac(40)- CH151- Edge 2 (Right) DUT: PROFESSIONAL SCAN TOOL; Type: MaxiDiag MD909 Pro

Date: Jan. 18, 2025

Communication System: Wi-Fi; Communication System Band: 802.11ac(40); Duty Cycle: 1:1 Frequency: 5755 MHz; Medium parameters used: f = 5755 MHz; $\sigma = 5.31$ mho/m; $\epsilon r = 36.60$; $\rho = 1000$ kg/m³; Phantom section: Flat Section

Ambient temperature (°C): 20.6, Liquid temperature (°C): 20.4

DASY Configuration:

- Probe: EX3DV4 SN:3953; ConvF(4.98, 4.98, 4.98); Calibrated: Sep. 05, 2024;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 SN1398; Calibrated: May 20, 2024
- Phantom: SAM (20deg probe tilt) with CRP v5.0; Type: QD000P40CD;
- DASY5 PRO 52.10.4.1535; SEMCAD X 14.6.14.7501

BODY/EDGE2/Area Scan (9x18x1): Measurement grid: dx=10mm, dy=10mm Maximum value of SAR (measured) = 0.743 W/kg BODY/EDGE2/Zoom Scan (8x8x16)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm Reference Value = 2.568 V/m; Power Drift = 0.12 dB Peak SAR (extrapolated) = 1.64 W/kg SAR(1 g) = 0.405 W/kg; SAR(10 g) = 0.175 W/kg Smallest distance from peaks to all points 3 dB below = 11.1 mm Ratio of SAR at M2 to SAR at M1 = 52.4% Maximum value of SAR (measured) = 0.739 W/kg









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APPENDIX C. TEST SETUP PHOTOGRAPHS

Body Back 5mm



Body Front 5mm



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Edge 2(Right) 5mm





DEPTH OF THE LIQUID IN THE PHANTOM—ZOOM IN

Note : The position used in the measurement were according to IEEE 1528-2013





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APPENDIX D. CALIBRATION DATA

Refer to Attached files.



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