



Test report No.: 25B0338R-SAUSV01S-C

SAR Test Report

Product Name	Notebook Computer
Trademark	Lenovo
Model and /or type reference	TP00177A
Applicant's name / address	LC Future Center 7F., No.780 Bei'an Rd., Zhongshan Dist., Taipei City 104, Taiwan
Manufacturer's name	LC Future Center
FCC ID	2AJN7-TP00177AR
Applicable Standard	IEEE 1528-2013 KDB 447498 D01 v06 KDB 865664 D01 v01r04
Test Result	Refer to Section 1.1
Verdict Summary	IN COMPLIANCE
Documented By (Senior Project Specialist / Genie Chang)	<i>Genie Chang</i>
Tested By (Senior Engineer / Luke Cheng)	<i>Luke Cheng</i>
Approved By (Assistant Manager / San Lin)	<i>San Lin</i>
Date of Receipt	2025/11/12
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5. Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Revision History

Report No.	Version	Description	Issued Date
25B0338R-SAUSV01S-C	V1.0	Initial issue of report.	2026/02/23

1. General Information

1.1 EUT Description

Product Name	Notebook Computer
Trademark	Lenovo
Model and /or type reference	TP00177A
FCC ID	2AJN7-TP00177AR
Frequency Range (Licensed)	LTE Band 5: 824-849 MHz LTE Band 12: 699-716 MHz LTE Band 26: 814-849 MHz
Type of Modulation	LTE: QPSK, 16QAM
Antenna Type	PIFA
Device Category	Portable
RF Exposure Environment	Uncontrolled
1. In the tested configuration, the Intel BE211D2W (FCC ID: PD9BE211D2) is integrated into this host. Simultaneous transmission with WWAN has been evaluated in Section 9. 2. The NFC module (FCC ID: MCLT77H747) is integrated into this host. When overlapping transmissions occur between NFC and other radios, they are treated as simultaneous transmission conditions and are subject to evaluation. Overlapping transmissions occurring during short NFC communication sessions with a duration of less than approximately 30 seconds are considered transient and are excluded from simultaneous transmission evaluation based on system design and protocol limitations.	

Summary of test result – Reported 1g Body SAR (W/kg)	
Test configuration	Licensed
Standalone	0.958
Simultaneous	4.138 (SPLSR = 0.02)

1.2 Antenna List

WWAN Antenna Information				
Main Antenna	Manufacturer	AWAN	Peak gain (dBi)	-1.27
	Part number	DC33002BF30	Type	PIFA
	Manufacturer	Luxshare-ICT	Peak gain (dBi)	-1.27
	Part number	DC33002BM30	Type	PIFA

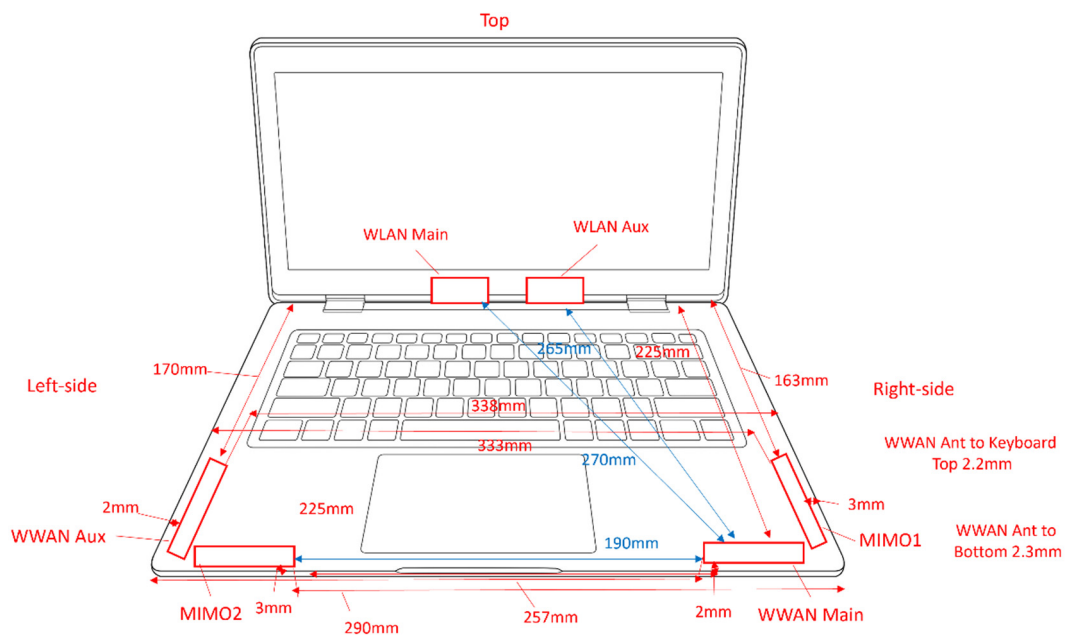
Note:

1. The above EUT information is provided by the host manufacturer.
2. This device has two antenna vendors. In this report, AWAN was selected as the main test, and Luxshare-ICT was spot-checked in the worst-case configuration identified from the AWAN results.

1.3 SAR Test Exclusion Calculation

According to KDB Publication 616217 D04, SAR evaluation is required for the bottom surface of the laptop keyboard.

The laptop does not support flip to PAD mode, the WWAN Main antenna is installed on the keyboard, the distance from the bottom is 2.3 mm, and considering that the antenna distance from the front edge is 2 mm, was tested the bottom and front edge of the keyboard.



1.4 Test Environment

Ambient conditions in the laboratory:

Test Date: 2026/01/16 - 2026/01/17

Items	Required	Actual
Temperature (°C)	18-25	23 ± 2
Humidity (%RH)	30-70	50 ± 20

USA	FCC Designation Number: TW0033 / FCC Registration Number: 647365
Canada	CAB Identifier Number: TW3023 / Company Number: 26930

Site Description	Accredited by TAF
	Accredited Number: 3023

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
	Linkou Laboratory
Address	No. 85, Wenlin St., Linkou Dist., New Taipei City 244017, Taiwan, R.O.C.
Performed Location	No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan, R.O.C.
Phone Number	+886-3-275-7255
Fax Number	+886-3-327-8031

1.5 Measurement procedures

IEEE 1528-2013

47CFR § 2.1093

KDB 447498 D01 v06

KDB 616217 D04 v01r02

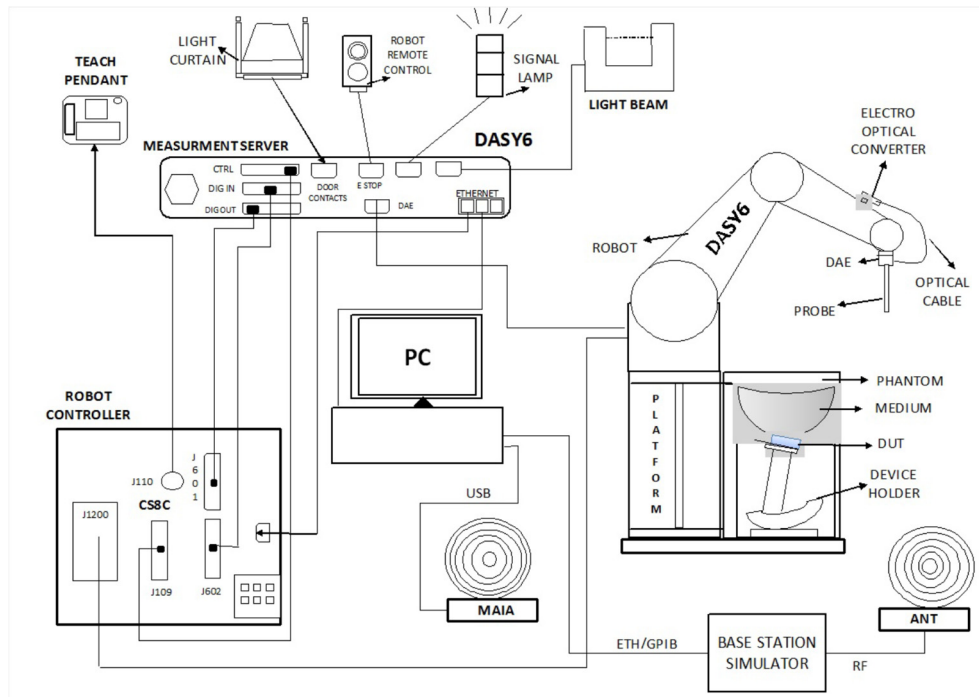
KDB 865664 D01 v01r04

KDB 941225 D05 v02r05

2. SAR Measurement System

2.1 DASY System Description

SAR Configurations is shown below:



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

- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion 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.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win7/8/10 and the DASY software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

2.2 Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for utilize a 10mm² step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.

When an Area Scan has measured all reachable points, it computes the field maxima found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing.

2.2.1 Zoom Scan (Cube Scan Averaging)

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. A density of 1000 kg/m³ is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1 g cube is 10mm, with the side length of the 10 g cube 21,5mm.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications utilize a physical step of 5x5x7 (8mmx8mmx5mm) providing a volume of 32mm in the X & Y axis, and 30mm in the Z axis.

2.2.2 SAR measurement drifts

Before an area scan and after the zoom scan, single point SAR measurements are performed at defined locations to estimate the SAR measurement drift due to device output power variations. If a device is known to drift randomly, additional single point drift reference measurements should be performed at regular intervals throughout the area and zoom scan test durations. The SAR drift shall be kept within $\pm 5\%$, whether there are substantial drifts or not. The field difference will be calculated in dB units in the DASY software.

2.2.3 Uncertainty of Inter-/Extrapolation and Averaging

In order to evaluate the uncertainty of the interpolation, extrapolation and averaged SAR calculation algorithms of the Postprocessor, DASY allows the generation of measurement grids which are artificially predefined by analytically based test functions. Therefore, the grids of area scans and zoom scans can be filled with uncertainty test data, according to the SAR benchmark functions.

2.3 DASY E-Field Probe

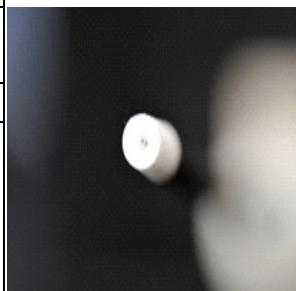
The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

SPEAG conducts the probe calibration in compliance with international and national standards under ISO 17025. The calibration data are in Appendix D.

Isotropic E-Field Probe Specification

Model	Ex3DV4	
Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	4 MHz – 10 GHz Linearity: ± 0.2 dB (30 MHz to 10 GHz)	
Directivity	± 0.1 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 µW/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)	
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

E-Field mm-Wave Probe Specification

Model	EUmmWVx	
Construction	Two dipoles optimally arranged to obtain pseudo-vector information Minimum three measurements/point, 120° rotated around probe axis Sensors (0.8 mm length) printed on glass substrate protected by high density foam	
Frequency	750 MHz to 110 GHz	
Dynamic Range	< 20 V/m to 10000 V/m with PRE-10 (min < 20 V/m to 2000 V/m)	
Position Precision	< 0.2 mm	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: encapsulation 8 mm (internal sensor < 1mm) Distance from probe tip to dipole centers: < 2 mm Sensor displacement to probe's calibration point: < 0.3 mm	
Application	E-field measurements of 5G devices and other mm-wave transmitters operating above 10GHz in < 2 mm distance from device (free-space) Power density, H-field, and far-field analysis using total field reconstruction	

2.4 DATA Acquisition Electronics (DAE) and Measurement Server

The data acquisition electronics (DAE) consists 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 and 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.

The input impedance of the DAE4 is 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.



2.5 Robot

The DASY system uses the high precision robots TX90 XL type out of the newer series from Stäubli SA (France). For the 6-axis controller DASY system, the CS8C robot controller version from Stäubli 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

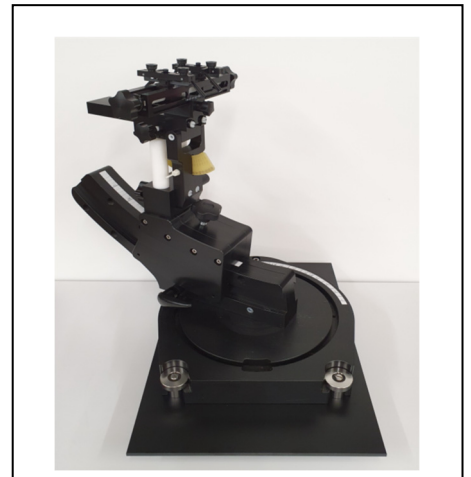


2.6 Device Holder

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 $\epsilon_r = 3$ 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.

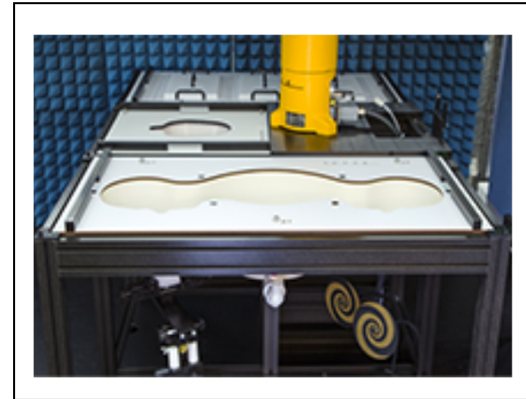


2.7 Phantom

2.7.1 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 device holder positions are adjusted to the standard measurement positions in the three sections. A 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.

2.7.2 mmWave Phantom

The mmWave Phantom approximates free-space conditions, allowing to evaluate not only the antenna side of the device but also the front (screen) side or any opposite-radiating side of wireless devices operating above 10 GHz without distorting the RF field. It consists of a 40 mm thick Rohacell plate used as a test bed, which has a loss tangent ($\tan\delta$) ≤ 0.05 and a relative permittivity (ϵ_r) ≤ 1.2 . High-performance RF absorbers are placed below the foam.



3. Tissue Simulating Liquid

3.1 The composition of the tissue simulating liquid

Description: Aqueous solution with surfactants and inhibitors

Declarable, or hazardous components:

CAS: 107-21-1 EINECS: 203-473-3 Reg.nr.: 01-2119456816-28-0000	Ethanediol STOT RE 2, H373; Acute Tox. 4, H302	< 5.2%
CAS: 68608-26-4 EINECS: 271-781-5 Reg.nr.: 01-2119527859-22-0000	Sodium petroleum sulfonate Eye Irrit. 2, H319	< 2.9%
CAS: 107-41-5 EINECS: 203-489-0 Reg.nr.: 01-2119539582-35-0000	Hexylene Glycol / 2-Methyl-pentane-2,4-diol Skin Irrit. 2, H315; Eye Irrit. 2, H319	< 2.9%
CAS: 68920-66-1 NLP: 500-236-9 Reg.nr.: 01-2119489407-26-0000	Alkoxylated alcohol, > C₁₆ Aquatic Chronic 2, H411; Skin Irrit. 2, H315; Eye Irrit. 2, H319	< 2.0%

3.2 Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using Dielectric Probe Kit and Vector Network Analyzer.

Date	Tissue Type	Frequency (MHz)	Relative Permittivity (ϵ_r)			Conductivity (σ)			Tissue Temp. (°C)
			Measured	Target	Delta (%)	Measured	Target	Delta (%)	
2026/1/16	Head	750	43.12	41.90	2.91	0.88	0.89	-1.12	22.1
2026/1/16	Head	704	43.31	42.15	2.75	0.86	0.89	-3.37	
2026/1/16	Head	707.5	43.29	42.13	2.75	0.86	0.89	-3.37	
2026/1/16	Head	711	43.28	42.11	2.78	0.86	0.89	-3.37	
2026/1/17	Head	835	41.62	41.50	0.29	0.92	0.90	2.22	22.3
2026/1/17	Head	821.5	42.76	41.57	2.86	0.89	0.90	-1.11	
2026/1/17	Head	829	42.13	41.53	1.44	0.91	0.90	1.11	
2026/1/17	Head	831.5	41.92	41.52	0.96	0.91	0.90	1.11	
2026/1/17	Head	836.5	41.51	41.50	0.02	0.92	0.90	2.22	
2026/1/17	Head	841.5	41.08	41.50	-1.01	0.93	0.91	2.20	
2026/1/17	Head	844	40.87	41.50	-1.52	0.94	0.91	3.30	

3.3 Tissue Dielectric Parameters for Phantoms

The head tissue dielectric parameters recommended by the IEC/IEEE 62209-1528 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 tissue parameters that have not been specified are interpolated according to the head parameters specified in IEC/IEEE 62209-1528.

Target Frequency (MHz)	Head	
	ϵ_r	σ (S/m)
450	43.5	0.87
750	41.9	0.89
835	41.5	0.90
900	41.5	0.97
1450	40.5	1.20
1640	40.2	1.31
1750	40.1	1.37
1800 – 2000	40.0	1.40
2450	39.2	1.80
3000	38.5	2.40
5000	36.2	4.45
5200	36.0	4.66
5400	35.8	4.86
5600	35.5	5.07
5800	35.3	5.27
6000	35.1	5.48
6500	34.5	6.07
7000	33.9	6.65
7500	33.3	7.24

4. Measurement Procedure

4.1 SAR System Check

4.1.1 Dipoles



The SAR dipoles are optimized symmetrical dipole with $\lambda/4$ balun matched to a Flat phantom section filled with tissue simulating liquids. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC signals. They are available for the variety of frequencies between 300MHz and 10 GHz. The provided tripod is used to hold the dipole below the phantom. As the distance between the dipole center and the TSL is critical, a spacer is placed between the dipole and the phantom. The spacing distance is frequency dependent.

4.1.2 SAR System Check Result

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

Date	Frequency (MHz)	Input Power (mW)	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Delta 1g (%)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Delta 10g (%)	Tissue Temp. (°C)
2026/1/16	750	250	2.05	8.52	8.2	-3.76	1.43	5.56	5.72	2.88	22.1
2026/1/17	835	250	2.51	9.36	10.04	7.26	1.63	6.05	6.52	7.77	22.3

4.2 SAR Measurement Procedure

The Dasy calculates SAR using the following equation,

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

Where :

σ : represents the simulated tissue conductivity

ρ : represents the tissue density

E :RMS electric field strength (V/m)

The SAR / APD measurements for the EUT should be performed on the channel that produces the highest rated output power of each transmitting antenna.

Pre-scans are made on the device to establish the location for the transmitting antenna, using a large area scan in either air or tissue simulation fluid.

The EUT is placed against the Universal Phantom where the maximum area scan dimensions are larger than the physical size of the resonating antenna. When the scan size is not large enough to cover the peak SAR / APD distribution, it is modified by either extending the area scan size in both the X and Y directions, or the device is shifted within the predefined area.

The area scan is then run to establish the peak SAR / APD location (interpolated resolution set at 1mm²) which is then used to orient the center of the zoom scan. The zoom scan is then executed and the 1g and 10g averages are derived from the zoom scan volume (interpolated resolution set at 1mm³).

5. RF Exposure Limits

SAR assessments have been made in line with the requirements of IEEE-1528, RSS-102 Issue 6, and comply with ANSI/IEEE C95.1-1992 “Uncontrolled Environments” limits. These limits apply to a location which is deemed as “Uncontrolled Environment” which can be described as a situation where the general public may be exposed to an RF source with no prior knowledge or control over their exposure.

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

Type Exposure	Uncontrolled Environment Limit
Spatial Peak SAR (1g cube tissue for brain or body)	1.60 W/kg
Spatial Average SAR (whole body)	0.08 W/kg
Spatial Peak SAR (10g for hands, feet, ankles and wrist)	4.00 W/kg

Note: $1 \text{ mW/cm}^2 = 10 \text{ W/m}^2$

6. Test Equipment List

Instrument	Manufacturer	Model No.	Serial No.	Last Calibration	Next Calibration
Reference Dipole 750MHz	Speag	D750V3	1031	2023/05/16	2026/05/15
Reference Dipole 835MHz	Speag	D835V2	4d166	2025/04/14	2028/04/13
Device Holder	Speag	N/A	N/A	N/A	N/A
Data Acquisition Electronic	Speag	DAE4	1207	2025/11/13	2026/11/12
E-Field Probe	Speag	EX3DV4	3698	2025/11/27	2026/11/26
SAR Software	Speag	DASY52	V52.10.4.1535	N/A	N/A
Power Amplifier	Mini-Circuit	ZHL-42	D051404-20	N/A	N/A
Directional Coupler	Agilent	87300C	MY44300353	N/A	N/A ¹
Attenuator	Woken	WATT-218FS-10	N/A	N/A	N/A ¹
Attenuator	Mini-Circuit	BW-S20W2+	N/A	N/A	N/A ¹
Universal Radio Communication	R&S	CMW500	157304	2025/03/13	2026/03/12
Vector Network Analyzer	Agilent	E5071C	MY46108013	2025/03/28	2026/03/27
Signal Generator	Anritsu	MG3694A	041902	2025/08/16	2026/08/15
Power Meter	Anritsu	ML2487A	6K00001447	2025/10/16	2026/10/15
Power Sensor	Anritsu	MA2411B	1339194	2025/10/17	2026/10/16

Note: 1. System Check, the path loss measured by the network analyzer, includes the signal generator, amplifier, cable, attenuator and directional coupler.

Note:

Per requirements for dipole calibration, the following are recommended procedures for SAR dipole calibration.

1. After a dipole is damaged and properly repaired to meet required specifications.
2. When the measured SAR deviates from the calibrated SAR value by more than 10% due to changes in physical, mechanical, electrical or other relevant dipole conditions.
3. When the most recent return-loss, measured at least annually, deviates by more than 20% from the previous measurement (i.e. 0.2 of the dB value) or not meeting the required -20 dB return-loss specification.

	Frequency	Tissue	Return loss	Limit	Verified Date
Calibration	750 MHz	Head	-27.0	Within 20%	2023/5/16
Measurement	750 MHz	Head	-27.06		2024/5/12
Measurement	750 MHz	Head	-27.04		2025/5/11

4. When the most recent measurement of the real or imaginary parts of the impedance, measured at least annually, deviates by more than 5 Ω from the previous measurement.

	Frequency	Tissue	Impedance	Limit	Verified Date
Calibration	750 MHz	Head	54.5	Within 5 Ω	2023/5/16
Measurement	750 MHz	Head	54.46		2024/5/12
Measurement	750 MHz	Head	54.46		2025/5/11

7. Measurement Uncertainty

Measurement uncertainty for 300 MHz to 3 GHz							
Error Description	Uncert. value	Prob. Dist.	Div.	(ci) 1g	(ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)
Measurement System Errors							
Probe Calibration	±13.3%	N	2	1	1	±6.7%	±6.7%
Probe Calibration Drift	±1.7%	R	1.732	1	1	±1.0%	±1.0%
Probe Linearity	±4.7%	R	1.732	1	1	±2.7%	±2.7%
Broadband Signal	±2.8%	R	1.732	1	1	±1.6%	±1.6%
Probe Isotropy	±7.6%	R	1.732	1	1	±4.4%	±4.4%
Other Probe+Electronic	±0.8%	N	1	1	1	±0.8%	±0.8%
RF Ambient	±1.8%	N	1	1	1	±1.8%	±1.8%
Probe Positioning	±0.006 mm	N	1	0.14	0.14	±0.1%	±0.1%
Data Processing	±1.2%	N	1	1	1	±1.2%	±1.2%
Phantom and Device Errors							
Conductivity (meas.)	±2.5%	N	1	0.78	0.71	±2.0%	±1.8%
Conductivity (temp.)	±3.3%	R	1.732	0.78	0.71	±1.5%	±1.4%
Phantom Permittivity	±14.0%	R	1.732	0	0	±0.0%	±0.0%
Distance DUT - TSL	±2.0%	N	1	2	2	±4.0%	±4.0%
Device Positioning	±1.0%	N	1	1	1	±1.0%	±1.0%
Device Holder	±3.6%	N	1	1	1	±3.6%	±3.6%
DUT Modulation	±2.4%	R	1.732	1	1	±1.4%	±1.4%
Time-average SAR	±1.7%	R	1.732	1	1	±1.0%	±1.0%
DUT drift	±2.5%	N	1	1	1	±2.5%	±2.5%
Val Antenna Unc.	±0.0%	N	1	1	1	±0.0%	±0.0%
Unc. Input Power	±0.0%	N	1	1	1	±0.0%	±0.0%
Correction to the SAR results							
Deviation to Target	±1.9%	N	1	1	0.84	±1.9%	±1.6%
SAR scaling	±0.0%	R	1.732	1	1	±0.0%	±0.0%
Combined Uncertainty						±11.3%	±11.2%
Expanded Uncertainty						±22.7%	±22.5%

Measurement uncertainty for 3 GHz to 6 GHz

Error Description	Uncert. value	Prob. Dist.	Div.	(ci) 1g	(ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)
Measurement System Errors							
Probe Calibration	±13.1%	N	2	1	1	±6.6%	±6.6%
Probe Calibration Drift	±1.7%	R	1.732	1	1	±1.0%	±1.0%
Probe Linearity	±4.7%	R	1.732	1	1	±2.7%	±2.7%
Broadband Signal	±2.6%	R	1.732	1	1	±1.5%	±1.5%
Probe Isotropy	±7.6%	R	1.732	1	1	±4.4%	±4.4%
Other Probe+Electronic	±1.2%	N	1	1	1	±1.2%	±1.2%
RF Ambient	±1.8%	N	1	1	1	±1.8%	±1.8%
Probe Positioning	±0.005 mm	N	1	0.29	0.29	±0.2%	±0.2%
Data Processing	±2.3%	N	1	1	1	±2.3%	±2.3%
Phantom and Device Errors							
Conductivity (meas.)	±2.5%	N	1	0.78	0.71	±2.0%	±1.8%
Conductivity (temp.)	±3.4%	R	1.732	0.78	0.71	±1.5%	±1.4%
Phantom Permittivity	±14.0%	R	1.732	0.25	0.25	±2.0%	±2.0%
Distance DUT - TSL	±2.0%	N	1	2	2	±4.0%	±4.0%
Device Positioning	±1.0%	N	1	1	1	±1.0%	±1.0%
Device Holder	±3.6%	N	1	1	1	±3.6%	±3.6%
DUT Modulation	±2.4%	R	1.732	1	1	±1.4%	±1.4%
Time-average SAR	±1.7%	R	1.732	1	1	±1.0%	±1.0%
DUT drift	±2.5%	N	1	1	1	±2.5%	±2.5%
Val Antenna Unc.	±0.0%	N	1	1	1	±0.0%	±0.0%
Unc. Input Power	±0.0%	N	1	1	1	±0.0%	±0.0%
Correction to the SAR results							
Deviation to Target	±1.9%	N	1	1	0.84	±1.9%	±1.6%
SAR scaling	±0.0%	R	1.732	1	1	±0.0%	±0.0%
Combined Uncertainty						±11.7%	±11.6%
Expanded Uncertainty						±23.3%	±23.1%

8. Conducted Power Measurement (Including tolerance allowed for production unit)

Mode		Maximum Output Power (dBm) (Including tolerance)
LTE Band 5	QPSK	21
LTE Band 12	QPSK	22.5
LTE Band 26	QPSK	22

Channel	Modulation	LTE Band 5					
		RB	RB	Maximum Conducted Output Power			
		No.	Offset	1.4M	3M	5M	10M
Low	QPSK	1	#0	20.28	20.30	20.53	20.90
		1	#Mid	20.06	20.13	20.43	20.79
		1	#Max	20.01	20.09	20.35	20.66
		50%	#0	19.92	19.98	20.28	20.79
		50%	#Mid	19.91	19.98	20.22	20.62
		50%	#Max	19.49	19.69	19.89	20.29
		100%	--	20.07	20.17	20.41	20.75
	16QAM	1	#0	20.03	20.18	20.40	20.73
		1	#Mid	20.00	20.15	20.28	20.60
		1	#Max	19.92	20.12	20.24	20.52
		50%	#0	19.86	20.12	20.21	20.67
		50%	#Mid	19.86	20.12	20.19	20.60
		50%	#Max	19.83	20.07	20.14	20.58
		100%	--	19.81	20.12	20.29	20.56
Mid	QPSK	1	#0	20.24	20.43	20.60	20.93
		1	#Mid	20.23	20.35	20.51	20.81
		1	#Max	20.15	20.31	20.50	20.78
		50%	#0	20.09	20.25	20.49	20.87
		50%	#Mid	20.04	20.16	20.37	20.85
		50%	#Max	19.90	20.11	20.26	20.69
		100%	--	20.01	20.26	20.41	20.79
	16QAM	1	#0	20.03	20.11	20.35	20.67
		1	#Mid	19.91	20.09	20.28	20.65
		1	#Max	19.89	20.08	20.27	20.59
		50%	#0	19.82	19.92	20.17	20.44
		50%	#Mid	19.66	19.89	20.03	20.37
		50%	#Max	19.50	19.70	20.02	20.29
		100%	--	19.72	19.86	20.00	20.42
High	QPSK	1	#0	20.15	20.35	20.61	20.92
		1	#Mid	20.13	20.34	20.54	20.86
		1	#Max	20.13	20.27	20.45	20.76
		50%	#0	20.09	20.15	20.38	20.83
		50%	#Mid	20.09	20.10	20.34	20.75
		50%	#Max	19.96	20.08	20.28	20.68
		100%	--	20.10	20.27	20.34	20.79
	16QAM	1	#0	19.87	20.05	20.29	20.58
		1	#Mid	19.73	20.05	20.11	20.44
		1	#Max	19.69	20.01	20.10	20.38
		50%	#0	19.66	19.92	20.03	20.47
		50%	#Mid	19.62	19.79	20.02	20.31
		50%	#Max	19.55	19.75	19.78	20.24
		100%	--	19.65	19.83	20.01	20.29

Channel	Modulation	LTE Band 12					
		RB	RB	Maximum Conducted Output Power			
		No.	Offset	1.4M	3M	5M	10M
Low	QPSK	1	#0	21.84	22.10	22.19	22.48
		1	#Mid	21.77	21.99	22.14	22.37
		1	#Max	21.69	21.88	22.09	22.20
		50%	#0	21.68	21.79	21.94	22.45
		50%	#Mid	21.60	21.73	21.80	22.30
		50%	#Max	21.31	21.59	21.63	22.01
		100%	--	21.80	21.82	22.04	22.30
	16QAM	1	#0	21.71	21.80	22.00	22.37
		1	#Mid	21.64	21.69	21.94	22.22
		1	#Max	21.36	21.57	21.68	22.01
		50%	#0	21.12	21.32	21.39	21.71
		50%	#Mid	21.06	21.11	21.34	21.67
		50%	#Max	20.64	20.74	21.04	21.32
		100%	--	20.75	21.06	21.06	21.47
Mid	QPSK	1	#0	21.90	21.94	22.16	22.49
		1	#Mid	21.85	21.92	22.06	22.39
		1	#Max	21.58	21.76	21.86	22.23
		50%	#0	21.54	21.71	21.86	22.46
		50%	#Mid	21.50	21.65	21.84	22.09
		50%	#Max	21.44	21.59	21.72	21.97
		100%	--	21.44	21.62	21.83	22.33
	16QAM	1	#0	21.54	21.82	21.88	22.20
		1	#Mid	21.54	21.65	21.87	22.12
		1	#Max	21.49	21.65	21.80	22.08
		50%	#0	20.74	20.78	21.11	21.34
		50%	#Mid	20.64	20.63	20.88	21.18
		50%	#Max	20.52	20.56	20.69	21.07
		100%	--	20.56	20.81	20.83	21.24
High	QPSK	1	#0	21.69	21.93	22.03	22.43
		1	#Mid	21.63	21.77	21.96	22.28
		1	#Max	21.53	21.68	21.88	22.12
		50%	#0	21.38	21.57	21.75	22.42
		50%	#Mid	21.38	21.52	21.75	22.38
		50%	#Max	21.14	21.30	21.48	21.84
		100%	--	21.41	21.61	21.71	22.01
	16QAM	1	#0	21.69	21.72	22.02	22.29
		1	#Mid	21.66	21.67	21.85	22.24
		1	#Max	20.98	21.00	21.33	21.57
		50%	#0	20.62	20.69	20.87	21.15
		50%	#Mid	20.55	20.58	20.77	20.99
		50%	#Max	20.51	20.57	20.69	20.95
		100%	--	20.50	20.54	20.71	21.10

Channel	Modulation	LTE Band 26						
		RB	RB	Maximum Conducted Output Power				
		No.	Offset	1.4M	3M	5M	10M	15M
Low	QPSK	1	#0	21.07	21.03	21.20	21.55	21.83
		1	#Mid	21.01	21.01	21.13	21.43	21.68
		1	#Max	20.84	20.95	21.11	21.39	21.58
		50%	#0	20.51	20.79	21.03	21.11	21.76
		50%	#Mid	20.39	20.46	20.84	20.99	21.26
		50%	#Max	20.26	20.39	20.50	20.53	20.78
		100%	--	20.41	20.64	20.92	21.05	21.34
	16QAM	1	#0	20.99	21.02	21.32	21.53	21.67
		1	#Mid	20.91	20.92	21.14	21.50	21.57
		1	#Max	20.80	20.86	20.95	21.32	21.44
		50%	#0	20.65	20.85	20.90	21.20	21.55
		50%	#Mid	20.48	20.53	20.86	21.18	21.27
		50%	#Max	20.33	20.49	20.62	21.08	21.22
		100%	--	20.46	20.58	20.89	21.15	21.35
Mid	QPSK	1	#0	20.96	21.20	21.36	21.58	21.89
		1	#Mid	20.67	20.89	21.08	21.31	21.37
		1	#Max	20.53	20.88	20.82	21.23	21.35
		50%	#0	20.42	20.72	20.81	21.09	21.82
		50%	#Mid	20.40	20.61	20.79	21.09	21.32
		50%	#Max	20.39	20.54	20.76	20.91	21.12
		100%	--	20.36	20.68	20.76	21.03	21.75
	16QAM	1	#0	20.83	21.12	21.04	21.24	21.57
		1	#Mid	20.80	20.78	21.03	21.21	21.42
		1	#Max	20.76	20.70	20.95	21.16	21.34
		50%	#0	20.67	20.63	20.94	21.11	21.33
		50%	#Mid	20.60	20.56	20.93	21.03	21.30
		50%	#Max	20.22	20.44	20.77	20.92	21.18
		100%	--	20.52	20.56	20.86	21.06	21.21
High	QPSK	1	#0	20.89	21.20	21.11	21.57	21.84
		1	#Mid	20.84	21.01	21.09	21.37	21.69
		1	#Max	20.77	20.95	21.07	21.37	21.57
		50%	#0	20.73	20.81	20.97	21.24	21.78
		50%	#Mid	20.44	20.79	20.83	20.99	21.25
		50%	#Max	20.16	20.26	20.32	20.66	20.72
		100%	--	20.47	20.64	20.85	21.08	21.36
	16QAM	1	#0	21.00	21.22	21.41	21.67	21.69
		1	#Mid	20.97	21.03	21.28	21.33	21.51
		1	#Max	20.89	20.76	21.06	21.27	21.46
		50%	#0	20.85	20.71	21.03	21.26	21.56
		50%	#Mid	20.68	20.60	20.94	21.18	21.31
		50%	#Max	20.29	20.55	20.89	20.88	21.17
		100%	--	20.64	20.62	20.78	21.17	21.42

9. Test Results

9.1 Test Results Summary

SAR MEASUREMENT										
Ambient Temperature (°C): 22.9±2							Relative Humidity (%): 58%			
Liquid Temperature (°C): 22.3±2							Depth of Liquid (cm): >15			
Test Position	Dist. (mm)	RB	RB offset	Frequency		Conducted Power (dBm)		SAR (W/kg)		Plot No.
				Ch.	MHz	Meas.	Tune-Up Limit	Meas-1g	Scaled-1g	
Test Mode: LTE Band 5_10M_QPSK_ANT Main_AWAN										
Front edge	0	1	0	20450	829	20.90	21	0.864	0.884	
Front edge	0	1	0	20525	836.5	20.93	21	0.871	0.885	401
Front edge	0	1	0	20600	844	20.92	21	0.842	0.858	
Front edge	0	25	0	20450	829	20.79	21	0.832	0.873	
Front edge	0	25	0	20525	836.5	20.87	21	0.852	0.878	
Front edge	0	25	0	20600	844	20.83	21	0.815	0.848	
Front edge	0	50	0	20525	836.5	20.79	21	0.833	0.874	
Bottom	0	1	0	20525	836.5	20.93	21	0.589	0.599	
Test Mode: LTE Band 5_10M_QPSK_ANT Main_ICT										
Front edge	0	1	0	20525	836.5	20.93	21	0.633	0.643	

Note:

1. When the reported SAR of the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channels.

SAR MEASUREMENT										
Ambient Temperature (°C): 22.7±2							Relative Humidity (%): 57%			
Liquid Temperature (°C): 22.1±2							Depth of Liquid (cm): >15			
Test Position	Dist. (mm)	RB	RB offset	Frequency		Conducted Power (dBm)		SAR (W/kg)		Plot No.
				Ch.	MHz	Meas.	Tune-Up Limit	Meas-1g	Scaled-1g	
Test Mode: LTE Band 12_10M_QPSK_ANT Main_AWAN										
Front edge	0	1	0	23095	707.5	22.49	22.5	0.436	0.437	
Bottom	0	1	0	23060	704	22.48	22.5	0.942	0.946	
Bottom	0	1	0	23095	707.5	22.49	22.5	0.956	0.958	404
Bottom	0	1	0	23130	711	22.43	22.5	0.931	0.946	
Bottom	0	25	0	23060	704	22.45	22.5	0.908	0.919	
Bottom	0	25	0	23095	707.5	22.46	22.5	0.924	0.933	
Bottom	0	25	0	23130	711	22.42	22.5	0.912	0.929	
Bottom	0	50	0	23095	707.5	22.33	22.5	0.909	0.945	
Test Mode: LTE Band 12_10M_QPSK_ANT Main_ICT										
Bottom	0	1	0	23095	707.5	22.49	22.5	0.946	0.948	

Note:

1. When the reported SAR of the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channels.

SAR MEASUREMENT										
Ambient Temperature (°C): 22.9±2							Relative Humidity (%): 58%			
Liquid Temperature (°C): 22.3±2							Depth of Liquid (cm): >15			
Test Position	Dist. (mm)	RB	RB offset	Frequency		Conducted Power (dBm)		SAR (W/kg)		Plot No.
				Ch.	MHz	Meas.	Tune-Up Limit	Meas-1g	Scaled-1g	
Test Mode: LTE Band 26_15M_QPSK_ANT Main_AWAN										
Front edge	0	1	0	26765	821.5	21.83	22	0.902	0.938	
Front edge	0	1	0	26865	831.5	21.89	22	0.919	0.943	407
Front edge	0	1	0	26965	841.5	21.84	22	0.905	0.939	
Front edge	0	36	0	26765	821.5	21.76	22	0.868	0.917	
Front edge	0	36	0	26865	831.5	21.82	22	0.899	0.937	
Front edge	0	36	0	26965	841.5	21.78	22	0.881	0.927	
Front edge	0	75	0	26865	831.5	21.75	22	0.879	0.931	
Bottom	0	1	0	26765	821.5	21.83	22	0.896	0.932	
Bottom	0	1	0	26865	831.5	21.89	22	0.909	0.932	
Bottom	0	1	0	26965	841.5	21.84	22	0.885	0.918	
Bottom	0	36	0	26765	821.5	21.76	22	0.881	0.931	
Bottom	0	36	0	26865	831.5	21.82	22	0.900	0.938	
Bottom	0	36	0	26965	841.5	21.78	22	0.885	0.931	
Bottom	0	75	0	26865	831.5	21.75	22	0.879	0.931	
Test Mode: LTE Band 26_15M_QPSK_ANT Main_ICT										
Front edge	0	1	0	26865	831.5	21.89	22	0.897	0.920	

Note:

1. When the reported SAR of the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in other channels.

9.2 Simultaneous Transmission

Simultaneous Transmission Configurations	
1	WWAN + WLAN ANT Main + WLAN ANT Aux/BT

Worst Case SAR_Body Exposure Conditions

WWAN Band	Front edge	Bottom
LTE Band 5	0.885	0.599
LTE Band 12	0.437	0.958
LTE Band 26	0.943	0.938

9.2.1 Simultaneous transmission test exclusion considerations

Test Position	Worst Case WWAN Band	1	2	3	1 + 2 + 3
		WWAN (W/kg)	WLAN ANT Main (W/kg)	WLAN ANT Aux/BT (W/kg)	Σ 1-g SAR
Front edge at 0 mm	LTE Band 26 Ant Main	0.943	-	-	0.943
Bottom at 0 mm	LTE Band 12 Ant Main	0.958	1.590	1.590	4.138

When the sum of SAR is larger than the limit, The ratio is determined by $(SAR1 + SAR2)^{1.5/R_i}$, 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. The estimation result as below:

Test Position	LTE Band 12 ANT Main SAR (W/kg)	WLAN ANT Main SAR (W/kg)	Simultaneous Transmission (W/kg)	Antenna pair in mm	Peak location separation ratio
Bottom	0.958	1.590	2.548	270	0.02
Test Position	LTE Band 12 ANT Main SAR (W/kg)	WLAN ANT Aux/BT SAR (W/kg)	Simultaneous Transmission (W/kg)	Antenna pair in mm	Peak location separation ratio
Bottom	0.958	1.590	2.548	265	0.02

SPLSR ≤ 0.04 ; simultaneous transmission testing not required.

10. SAR measurement variability

- 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 .

Frequency		SAR 1g (W/kg)		
Channel	MHz	Original	First Repeated	
			Value	Ratio
23095	707.5	0.956	0.944	1.013
26865	831.5	0.919	0.910	1.010

Appendix

Appendix A. System Check Data

Appendix B. Highest measurement Data

Appendix C. Test Setup Photographs

Appendix D. Probe Calibration Data

Appendix E. Dipole Calibration Data

Appendix F. Product Photos-Please refer to the file: 25B0338R-Product Photos