TEST REPORT

APPLICANT	:	Bluebird Inc.
PRODUCT NAME	:	Enterprise Full Touch Handheld Computer
MODEL NAME	:	S50/S70
BRAND NAME	:	Bluebird
FCC ID	:	SS4S50W1
STANDARD(S)	:	FCC 47 CFR Part 2 (2.1093) IEC TR 63170:2018 IEC/IEEE 62209-1528:2020
RECEIPT DATE	:	2025-06-09
TEST DATE	:	2025-06-15 to 2025-07-17
ISSUE DATE	:	2025-07-30

Edited by: ______________________
Pang Siyu (Rapporteur)

Approved by: ______________________
Gan Yueming (Supervisor)

DIRECTORY

Changed History		
Version	**Date**	**Reason for Change**
1.0	2025-07-22	First edition
2.0	2025-07-30	1. Replaced the version 1.0. 2. Update the calibration due date for the equipment.

1. Statement of Compliance

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

<Highest Reported RF Exposure Summary>

Frequency Band		Highest SAR Summary		
		Head (Gap 0 mm)	Body (Gap 10 mm)	Extremity (Gap 0mm)
		1g SAR (W/kg)		10g SAR (W/kg)
WLAN	6GHz WLAN	0.499	0.470	0.224

Frequency Band		APD	Scaled PD
		4cm² (mW/cm²)	4cm² psPD (mW/cm²)
WLAN	6GHz WLAN	0.445	0.464

Note:

1. This device is compliance with Specific Absorption Rate (SAR) for general population or uncontrolled exposure limits (1.6 W/kg for 1g SAR, 1.0 mW/cm² for iPD and APD in 4cm²) specified in FCC 47 CFR Part 1 (1.1310) and IEEE C95.1-1991), and had been tested in accordance with the measurement methods and procedures specified in IEC/IEEE 62209-1528, TCBC workshop notes, IEC TR 63170 and FCC KDB publications.
2. The declarations of EUT presented in the report are provided by applicant and/or manufacturer, and the test laboratory is not responsible for the accuracy of the information.

2. Technical Information

Note: Provide by applicant.

2.1. Applicant and Manufacturer Information

Applicant:	Bluebird Inc.
Applicant Address:	3F, 115, Irwon-ro, Gangnam-gu, Seoul, Republic of Korea
Manufacturer:	Bluebird Inc.
Manufacturer Address:	3F, 115, Irwon-ro, Gangnam-gu, Seoul, Republic of Korea

2.2. Equipment under Test (EUT) Description

Product Name:	Enterprise Full Touch Handheld Computer
EUT No.:	4#
Hardware Version:	REV0.1
Software Version:	R1.17
Frequency Bands:	WLAN 6.2GHz (U-NII-5): 5925 MHz ~ 6425 MHz WLAN 6.5GHz (U-NII-6): 6425 MHz ~ 6525 MHz WLAN 6.7GHz (U-NII-7): 6525 MHz ~ 6875 MHz WLAN 7.0GHz (U-NII-8): 6875 MHz ~ 7125 MHz
Modulation Mode:	802.11a: OFDM 802.11ax-HEW20/40/80/160: OFDMA/OFDM
Antenna Type:	Internal Antenna

Note:

1. According to the certificate holder, they declared that only the external rubber shell is different between model S50 and model S70. The S70 is available in rubber rugged and plastic rugged types. The main measuring model is S50, only the results for S50 were recorded in this report.
2. For more detailed description, please refer to specification or user manual supplied by the applicant and/or manufacturer.

2.3. Environment of Test Site/Conditions

Normal Temperature (NT):	20-25 °C
Relative Humidity:	30-75 %

During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established.

The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the Factory. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset.

The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the handset by at least 35 dB.

3. Specific Absorption Rate (SAR)

3.1. Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an 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 or controlled and general population or uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational or controlled exposure limits are Middle than the limits for general population or uncontrolled.

3.2. SAR Definition

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 a given density. (ρ). The equation description is as below:

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

SAR is expressed in units of Watts per kilogram (W/kg).
SAR measurement can be either related to the temperature elevation in tissue by,

$$\mathbf{SAR} = \mathbf{C}\left(\frac{\boldsymbol{\delta}\mathbf{T}}{\boldsymbol{\delta}\mathbf{t}}\right)$$

Where C is the specific head capacity, δT is the temperature rise and δt the exposure duration, or related to the electrical field in the tissue by

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

Where σ is the conductivity of the tissue, ρ is the mass density of the tissue and $|E|$ is the rmselectrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

4. RF Exposure Limits

4.1. Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

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

Type Exposure	Uncontrolled Environment Limit
Spatial Peak SAR (1g cube tissue for head and trunk)	1.6 W/kg
Spatial Peak SAR (10g cube tissue for limbs)	4.0 W/kg
Spatial Peak SAR (1g cube tissue for whole body)	0.08 W/kg

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

Note:

1. Occupational/Uncontrolled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).
2. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

4.2. Controlled Environment

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). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

5. Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Remark
FCC 47 CFR Part 2 (2.1093)	Radio Frequency Radiation Exposure Evaluation: Portable Devices	/
IEC/IEEE 62209-1528:2020	Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices –Part 1528: Human models, instrumentation, and procedures (Frequency range of 4 MHz to 10 GHz)	/
IEC TR 63170:2018	Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz	/
KDB 447498 D01v06	General RF Exposure Guidance	/
KDB 248227 D01v02r02	SAR Measurement Procedures for 802.11 Transmitters	/
KDB 865664 D01v01r04	SAR Measurement 100 MHz to 6 GHz	/
KDB 865664 D02v01r02	RF Exposure Reporting	/
KDB 648474 D04v01r03	Handset SAR	/
KDB 941225 D06v02r01	SAR Evaluation Procedures for Portable Devices With Wireless Router Capabilities	/
Note: Any additions, deviation, or exclusions from the method shall be noted in the “Remark".		

6. SAR Measurement System

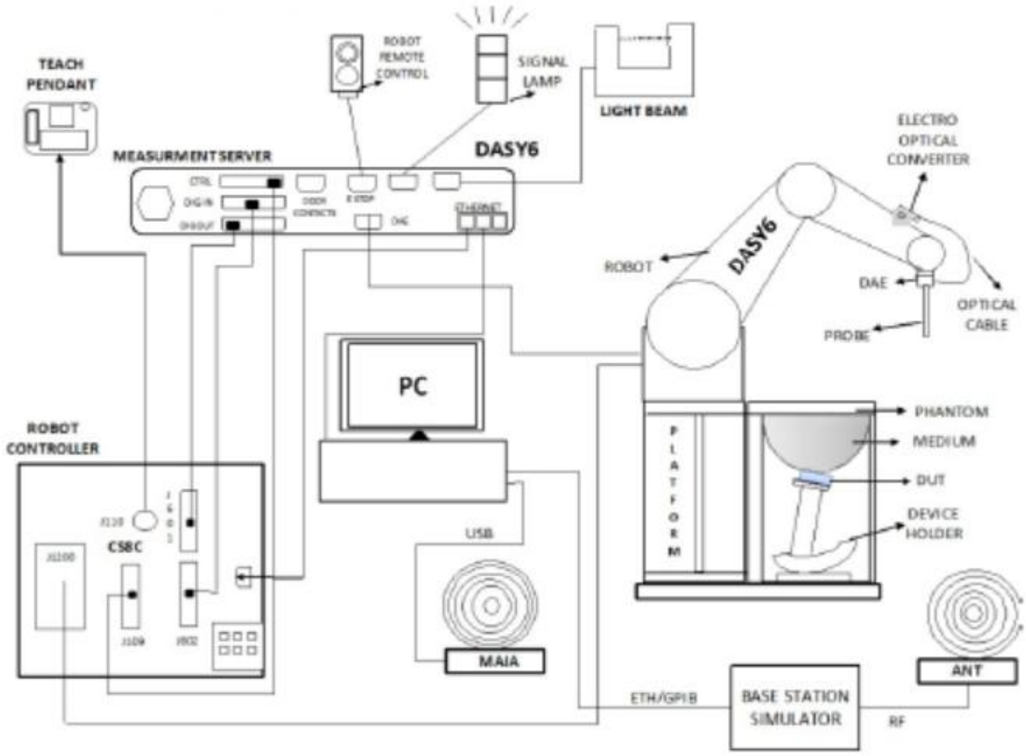


Fig 6.1 SPEAG DASY System Configurations

The DASY system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software.
- A data acquisition electronic (DAE) attached to the robot arm extension.
- A dosimetric probe equipped with an optical surface detector system.
- The electro-optical converter (ECO) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning.
- A computer operating Windows XP.
- DASY software.
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom.
- A device holder.
- Tissue simulating liquid.

- Dipole for evaluating the proper functioning of the system.
- Some of the components are described in details in the following sub-sections.

6.1. 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. This probe has a built in optical surface detection system to prevent from collision with phantom.

- **E-Field Probe Specification**

<ES3DV3 Probe>

<table>
<tr><td>Construction</td><td>Symmetrical design with triangular core
Built-in optical fiber for surface detection system. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE)</td><td rowspan="5">
Fig 6.2 Photo of ES3DV3</td></tr>
<tr><td>Frequency</td><td>10 MHz to 3 GHz; Linearity: ± 0.2 dB</td></tr>
<tr><td>Directivity</td><td>± 0.2 dB in HSL (rotation around probe axis)
± 0.4 dB in HSL (rotation normal to probe axis)</td></tr>
<tr><td>Dynamic Range</td><td>5 µW/g to 100 mW/g; Linearity: ± 0.2 dB</td></tr>
<tr><td>Dimensions</td><td>Overall length: 330 mm (Tip: 16 mm)
Tip diameter: 6.8 mm (Body: 12 mm)
Distance from probe tip to dipole centers: 2.7 mm</td></tr>
</table>

<EX3DV4 Probe>

<table>
<tr><td>Construction</td><td>Symmetrical design with triangular core
Built-in shielding against static charges
PEEK enclosure material (resistant to organic solvents, e.g., DGBE)</td><td rowspan="5">
Fig 6.3 Photo of EX3DV4</td></tr>
<tr><td>Frequency</td><td>10 MHz to 10 GHz; Linearity: ± 0.2 dB</td></tr>
<tr><td>Directivity</td><td>± 0.3 dB in HSL (rotation around probe axis)
± 0.5 dB in tissue material (rotation normal to probe axis)</td></tr>
<tr><td>Dynamic Range</td><td>10 µW/g to 100 mW/g; Linearity: ± 0.2 dB</td></tr>
<tr><td>Dimensions</td><td>Overall length: 330 mm (Tip: 20 mm)
Tip diameter: 2.5 mm (Body: 12 mm)
Typical distance from probe tip to dipole centers: 1 mm</td></tr>
</table>

➢ **E-Field Probe Calibration**

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy shall be evaluated and within ± 0.25 dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix C of this report.

6.2. Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast16 bit AD-converter and a command decoder and control logic unit. 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 DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 6.4 Photo of DAE

6.3. Robot

The SPEAG DASY system uses the high precision robots (DASY4: RX90BL; DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY4: CS7MB; DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:
High precision (repeatability ±0.035 mm)
High reliability (industrial design)
Jerk-free straight movements
Low ELF interference (the closed metallic construction shields against motor control fields)

Fig 6.5 Photo of DASY5

6.4. Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY4: 166 MHz, Intel Pentium; DASY5: 400 MHz, Intel Celeron), chip disk (DASY4: 32 MB; DASY5: 128 MB), RAM (DASY4: 64 MB, DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bits AD converter system for optical detection and digital I/O interface are contained on the DASY 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.

Fig 6.6 Photo of Server for DASY5

6.5. Light Beam Unit

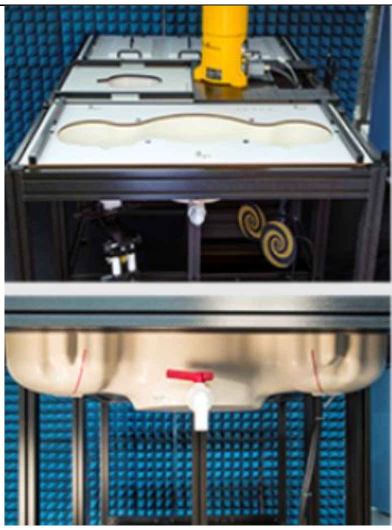
The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are 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 probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.

Fig. 6.7 Photo of Light Beam

6.6. Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%) Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Head, Right Head, Flat Phantom	**Fig. 6.8 Photo of SAM 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.

6.7. Device Holder

<Device Holder for SAM Twin Phantom>

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

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 is constructed 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.

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.

Fig 6.9 Device Holder

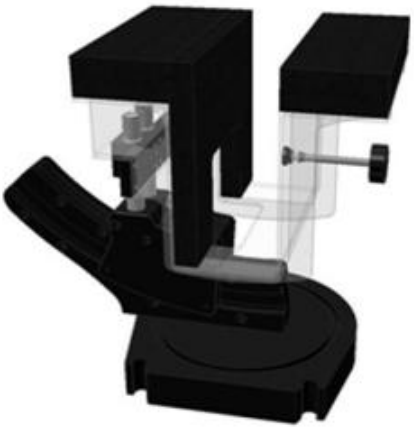


Fig 6.10 Laptop Extension Kit

6.8. Data Storage and Evaluation

➢ **Data Storage**

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing 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 erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

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

➢ **Data Evaluation**

The DASY post-processing software (SEMCAD) 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	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$

	- Diode compression point	dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter 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:

$$V_i = U_i + U_i^2 \times \frac{cf}{dcp_i}$$

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

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

$$\text{E-field Probes:} E_i = \sqrt{\frac{V_i}{Norm_i \times ConvF}}$$

$$\text{H-field Probes:} H_i = \sqrt{V_i} \times \frac{a_{i0} + a_{i1} + a_{i2}f^2}{f}$$

With
V_i = compensated signal of channel i, (i = x, y, z)
$Norm_i$ = sensor sensitivity of channel i, (i = x, y, z), μV/(V/m)^2 forE-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):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

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

$$SAR = E_{tot}^2 \times \frac{\sigma}{\rho \times 1000}$$

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]

ρ = equivalent tissue density in g/cm^3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

6.9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial No./ SW Version	Calibration	
				Last Cal.	Due Date
SPEAG	D6.5GHz System Validation Kit	D6.5GHzV2	1054	2022.11.01	2025.10.31
SPEAG	5G Verification Source	10GHz	1019	2023.12.03	2026.12.02
SPEAG	DOSIMETRIC ASSESSMENT SYSTEM Software	cDASY6 SAR	16.0.0.116	NCR	NCR
SPEAG	DOSIMETRIC ASSESSMENT SYSTEM Software	cDASY6 mmWave	V2.4.2.62	NCR	NCR
SPEAG	Dosimetric E-Field Probe	EX3DV4	7608	2025.03.20	2026.03.19
SPEAG	EUmmWave Probe	EUmmMV4	9602	2025.03.19	2026.03.18
SPEAG	Data Acquisition Electronics	DAE4	1643	2025.03.21	2026.03.20
SPEAG	Dielectric Assessment KIT	DAK-3.5	1279	2025.03.18	2026.03.17
SPEAG	Twin-SAM V8.0 (30deg probe tilt)	N/A	2020	NCR	NCR
SPEAG	mmWave	N/A	N/A	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Agilent	Network Analyzer	E5071B	MY42404762	2025.01.06	2026.01.05
mini-circuits	Amplifier	ZVE-8G+	754401735	NA	NA
Agilent	Signal Generator	N5182B	MY53050509	2024.09.11	2025.09.10
R&S	Power Senor	NRP8S	103215	2025.01.06	2026.01.05
Agilent	Power Meter	E4416A	MY45102093	2024.09.11	2025.09.10
R&S	Power Sensor	NRP8S	103240	2025.01.06	2026.01.05
Anritsu	Power Meter	E4418B	GB43318055	2025.05.15	2026.05.14
Agilent	Dual Directional Coupler	778D	50422	NA	NA
MCL	Attenuation	351-218-010	N/A	NA	NA
R&S	Spectrum Analyzer	N9030A	MY54170556	2024.09.18	2025.09.17
KTJ	Thermo meter	TA298	N/A	2024.11.20	2025.11.19
SPEAG	Tissue Simulating Liquids	HBBL600-10000V6		24H	

Note:

1. The calibration certificate of DASY can be referred to annex F of this report.
2. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
3. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by SPEAG.

4. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1 W input power according to the ratio of 1 W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it.
5. Attenuator insertion loss is calibrated by the network Analyzer, which the calibration is valid, before system check.
6. N.C.R means No Calibration Requirement.

7. Tissue Simulating Liquids

➢ **Description of Tissue Simulation Liquids**

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 7.1, for body SAR testing, the liquid height from the centre of the flat phantom to liquid top surface is larger than 15 cm, which is shown in Fig. 7.2.

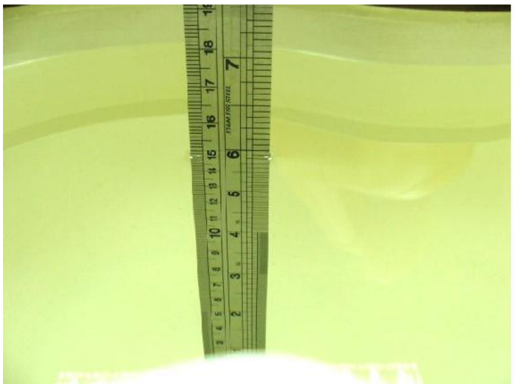


Fig 7.1 Photo of Liquid Height for Head SAR

Fig 7.2 Photo of Liquid Height for Body SAR

➢ **Target Dielectric Properties of the Tissue-equivalent Liquid Material**

The relative permittivity and conductivity of the tissue material should be within ±5% of the values given in the table below recommended by the FCC OET 65 supplement C.

Frequency	Head Tissue Simulating Media	
(MHz)	ε_r (F/m)	σ (S/m)
6000	35.07	5.48
6500	34.46	6.07
7000	33.88	6.65

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

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

The following table shows the measuring results for simulating liquid.

Table 1: Dielectric Performance of Tissue Simulating Liquid

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Conductivity Target (σ)	Delta (σ) (%)	Limit (%)	Date
6500	HSL	22.1	6.09	6.07	0.33	±5	2025/6/15
6500	HSL	22.1	6.14	6.07	1.15	±5	2025/6/30
6500	HSL	22.1	6.11	6.07	0.66	±5	2025/7/17
Frequency (MHz)	**Tissue Type**	**Liquid Temp. (℃)**	**Permittivity (εr)**	**Permittivity Target (εr)**	**Delta (εr) (%)**	**Limit (%)**	**Date**
6500	HSL	22.1	34.12	34.46	-0.99	±5	2025/6/15
6500	HSL	22.1	34.35	34.46	-0.32	±5	2025/6/30
6500	HSL	22.1	34.25	34.46	-0.61	±5	2025/7/17

Note:

According to April 2019 TCB Workshop that FCC has permitted the use of single head-tissue simulating liquid specified in IEC 62209-1 for all SAR tests.

8. SAR System Verification

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

8.1. Purpose of System Performance check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

8.2. System Setup

The output power on dipole port must be calibrated to 250 mW or 100 mW before dipole is connected. In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below.

Fig 8.1 Photo of Dipole Setup

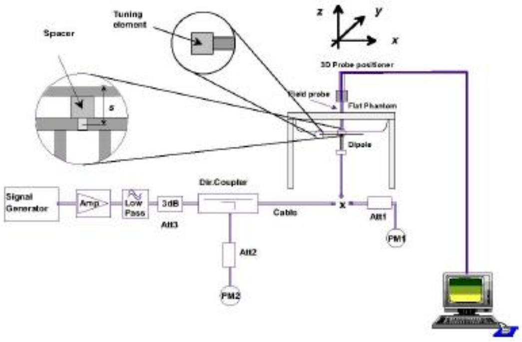


Fig 8.2 System Setup for System Evaluation

8.3. Validation Results

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

<Validation Setup>

Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N
6500	100	D6.5GHzV2-1176-6500	7608	1643

<System Validation>

Frequency (MHz)	Tissue Type	Conductivity (σ)	Permittivity (εr)	CW Signal Validation		
				Sensitivity	Probe Linearity	Probe Isotropy
6500	HSL	6.07	34.46	PASS	PASS	PASS

Frequency (MHz)	Tissue Type	Conductivity (σ)	Permittivity (εr)	Modulation Signal Validation		
				Mod. Type	Duty Factor	PAR
6500	HSL	6.07	34.46	OFDM	N/A	PASS

<Validation Results>

Date	Frequency (MHz)	Tissue Type	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2025/6/15	6500	HSL	31.3	288.0	313	8.68
2025/6/30	6500	HSL	30.9	288.0	309	7.29
2025/7/17	6500	HSL	30.4	288.0	309	7.29

Date	Frequency (MHz)	Tissue Type	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2025/6/15	6500	HSL	5.37	53.1	53.7	1.13
2025/6/30	6500	HSL	5.26	53.1	52.6	-0.94
2025/7/17	6500	HSL	5.23	53.1	52.3	-1.51

Date	Frequency (MHz)	Tissue Type	Measured 4cm^2 APD (W/m^2)	Targeted 4cm^2 APD (W/m^2)	Normalized 4cm^2 APD (W/m^2)	Deviation (%)
2025/6/15	6500	HSL	134.0	1310.0	1340	2.29
2025/6/30	6500	HSL	142.0	1310.0	1420	8.40
2025/7/17	6500	HSL	136.0	1310.0	1360	3.82

Note: System checks the specific test data please see annex C.

8.4. PD System Verification Source

➢ **General description**

The EUT is replaced by a calibrated source, the same spatial resolution, measurement region and test separation used in the calibration was applied to system check. Through visual inspection into the measured power density distribution, both the spatially (shape) and numerically (level) have no noticeable difference. The measurement results should be within ±10% of the calibrated targets.

Frequency [GHz]	Grid step	Grid extent X/Y [mm]	Measurement points
10	$0.25\ (\frac{\lambda}{4})$	120/120	16×16
30	$0.25\ (\frac{\lambda}{4})$	60/60	24×24
60	$0.25\ (\frac{\lambda}{4})$	32.5/32.5	26×26
90	$0.25\ (\frac{\lambda}{4})$	30/30	36×36

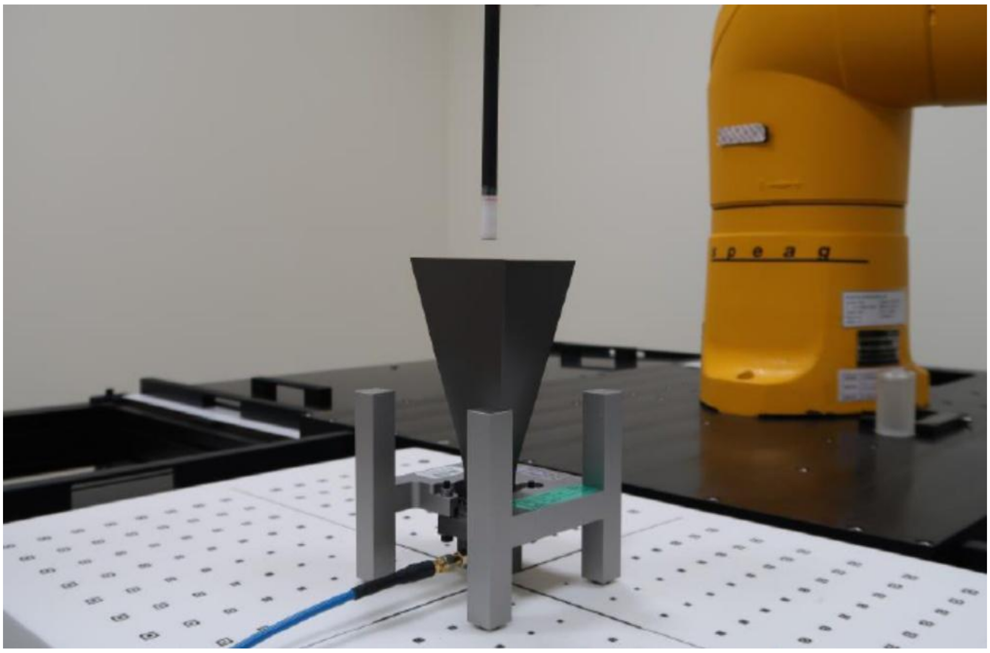


Fig 8.3 Photos of Verification Setup

➢ **Validation Results**

After system check testing, the results of power density will be compared with the reference value derived from the certificate report. The deviation of system check should be within ±10%.

<Validation Setup>

Frequency (GHz)	6.5G Verification Source	Probe S/N	DAE S/N
10	10GHz-SN 1019	9602	1643

<Validation Results>

Date	Frequency (GHz)	Test Distance (mm)	Measured 4cm² pStotavg (W/m²)	Targeted 4cm² pStotavg (W/m²)	Deviation (%)
2025/06/14	10	5.5	42.5	44.8	-5.1
2025/06/28	10	5.5	42.3	44.8	-5.6

Note: System checks the specific test data please see annex C.

9. EUT Testing Position

This EUT was tested in ten different positions. They are right cheek/right tilted/left cheek/left tilted for head, Front/Back/Left/Right/Top/Bottom of the EUT with phantom 10 mm gap, as illustrated below, please refer to annex B for the test setup photos.

9.1. Handset Reference Points

The vertical centre line passes through two points on the front side of the handset – the midpoint of the width wt of the handset at the level of the acoustic output, and the midpoint of the width wb of the bottom of the handset.
The horizontal line is perpendicular to the vertical centre line and passes the center of the acoustic output. The horizontal line is also tangential to the handset at point A.
The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centre line is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

Fig. 9.1 Illustration for Cheek Position

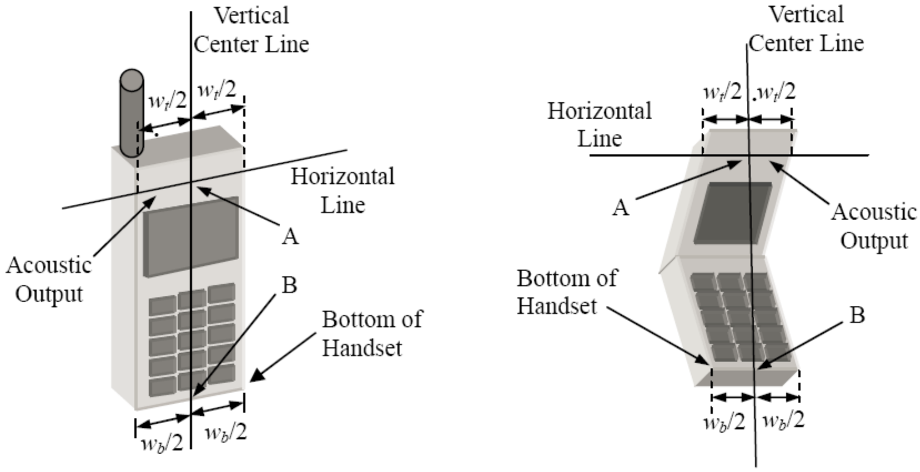


Fig. 9.2 Illustration for Handset Vertical and Horizontal Reference Lines

9.2. Positioning for Cheek / Touch

To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see below figure)

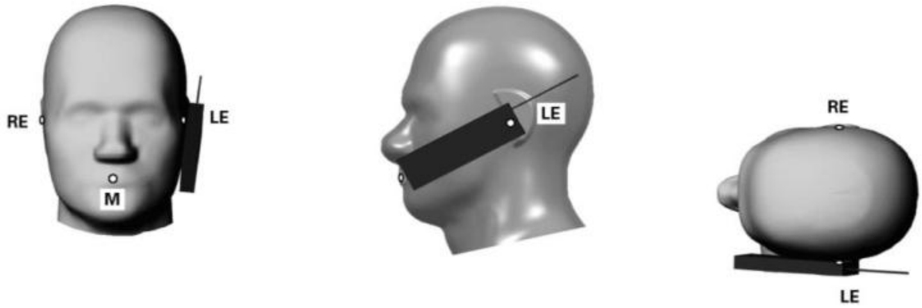


Fig 9.3 Illustration for Cheek Position

9.3. Positioning for Ear / 15º Tilt

To position the device in the “cheek” position described above.
While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see figure below).

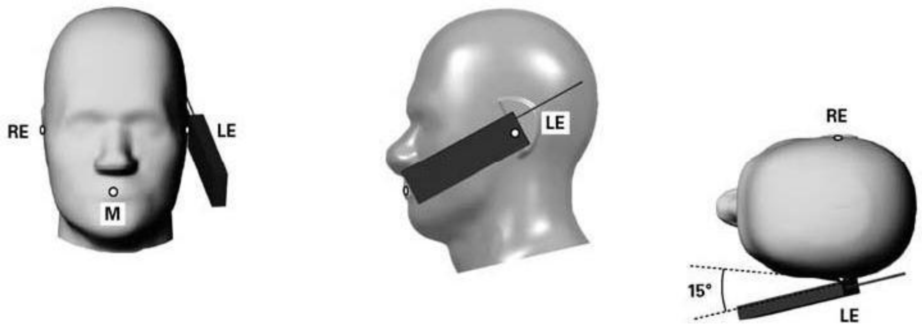


Fig 9.4 Illustration for Tilted Position

9.4. SAR Evaluation near the Mouth/Jaw Regions of the Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR locations identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

9.5. Body-worn Configurations

The body-worn configurations shall be tested with the supplied accessories (belt-clips, holsters, etc.) attached to the device in normal use configuration.

For body-worn and other configurations a flat phantom shall be used which is comprised of material with electrical properties similar to the corresponding tissues.

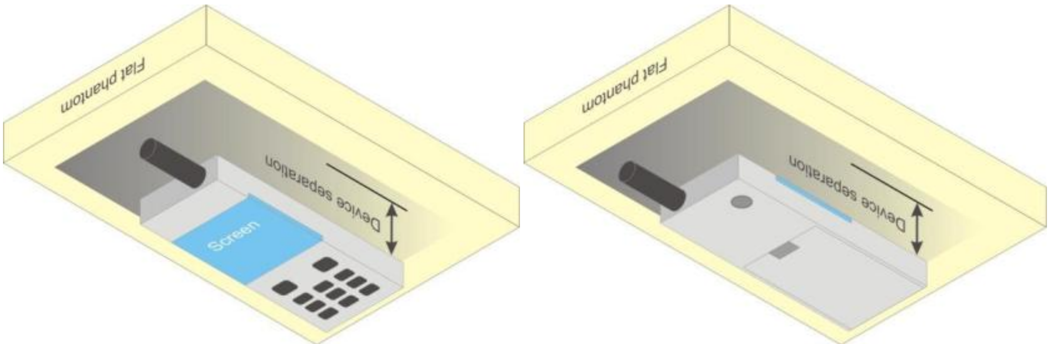


Fig 9.5 Illustration for Body Worn Position

10. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.

(b) Read the WWAN RF power level from the base station simulator.

(c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band.

(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power.

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.

(b) Place the EUT in the positions as Appendix D demonstrates.

(c) Set scan area, grid size and other setting on the DASY software.

(d) Measure SAR results for the highest power channel on each testing position.

(e) Find out the largest SAR result on these testing positions of each band.

(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg.

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

(a) Power reference measurement.

(b) Area scan.

(c) Zoom scan.

(d) Power drift measurement.

10.1. Spatial Peak SAR Evaluation

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

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

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

(a) Extraction of the measured data (grid and values) from the Zoom Scan.
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters).
(c) Generation of a high-resolution mesh within the measured volume.
(d) Interpolation of all measured values from the measurement grid to the high-resolution grid.
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface.
(f)Calculation of the averaged SAR within masses of 1g and 10g.

10.2. Power Reference Measurement

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

10.3. SAR Averaged Methods

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

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

10.4. Power Drift Monitoring

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

11. Power Density Measurement Procedure

➢ **Computation of the Electric Field Polarization Ellipse**

For the numerical description of an arbitrarily oriented ellipse in three-dimensional space, five parameters are needed: the semi-major axis (a), the semi-minor axis (b), two angles describing the orientation of the normal vector of the ellipse (φ,θ), and one angle describing the tilt of the semi-major axis (Ψ). For the two extreme cases, i.e. circular and linear polarizations, three parameters only (a, φ and θ) are sufficient for the description of the incident field.

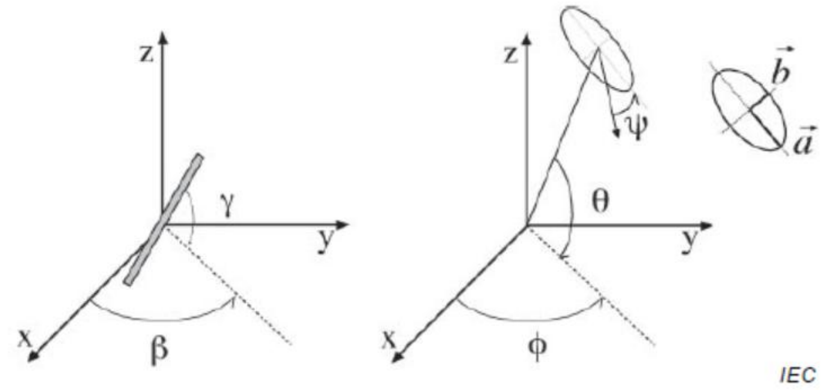


Fig 11.1 Illustration of the angles used for the numerical description of the sensor and the orientation of an ellipse in 3-D space

For the construction of the ellipse parameters from measured data, the problem can be reformulated as a nonlinear search problem. The semi-major and semi-minor axes of an elliptical field can be express as functions of the three angles (φ, θ and Ψ). The parameters can be uniquely determined towards minimizing the error based on least-squares for the given set of angles and the measured data. In this way, the numbers of three parameters is reduced from five to three, which means that least three sensors readings are necessary to gain sufficient information for the reconstruction of ellipse parameters. However, to suppress the noise and increase the reconstruction accuracy, it is desirable to have an over determined system of equations. The solution to use a probe consisting of two sensors angled by γ1 and γ2 toward the probe axis and to perform measurements at three angular positions of the probe, i.e. at
β1, β2 and β3, results in over determination of two. If there is a need for more information or increased accuracy, more rotation angles can be added.

The reconstruction of ellipse parameters can be separated into linear and non-linear parts that are best solved by the givens algorithm combined with a downhill simplex algorithm. To minimize the mutual coupling, sensor angles are set with a 90° shift (γ1=γ2+90°), and, to simplify, the first rotation angle of the probe (β1) can be set to 0°.

- **Total Field and Power Flux Density Reconstruction**

Computation of the power density in general requires knowledge of the electric and magnetic field amplitudes and phases in the plane of incidence. Reconstruction of these quantities from pseudo-vector E-field measurements is feasible, as they are constrained by Maxi well,s equations. The SPEAG have developed a reconstruction approach based on the Gerchberg-Saxton algorithm, which benefits from the availability of the E-Field polarization ellipse information obtained with the EUmmWV2 probe. This reconstruction algorithm, together with the ability of the probe to measure extremely close to the source without perturbing the field, permits reconstruction of the E-field and H-field, as well as of the power density, on measurement planes located as near as λ/5 away.

- **Power Flux Density Averaging**

The average of the reconstructed power density is evaluated over a circular area in each measurement plane. The area of the circle is defined by the user; the default is 1cm2. The computed peak average value is displayed in the box at the top right. Note that the average is evaluated only for grid points where the averaging circle is completely filed with values; for points at the edge where the averaging circle is only partly filled with values, the average power density is set to zero. Two average power density values are computed.

12. SAR Measurement Procedure

12.1. Test Procedure

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 IEC/IEEE 62209-1528:2020.

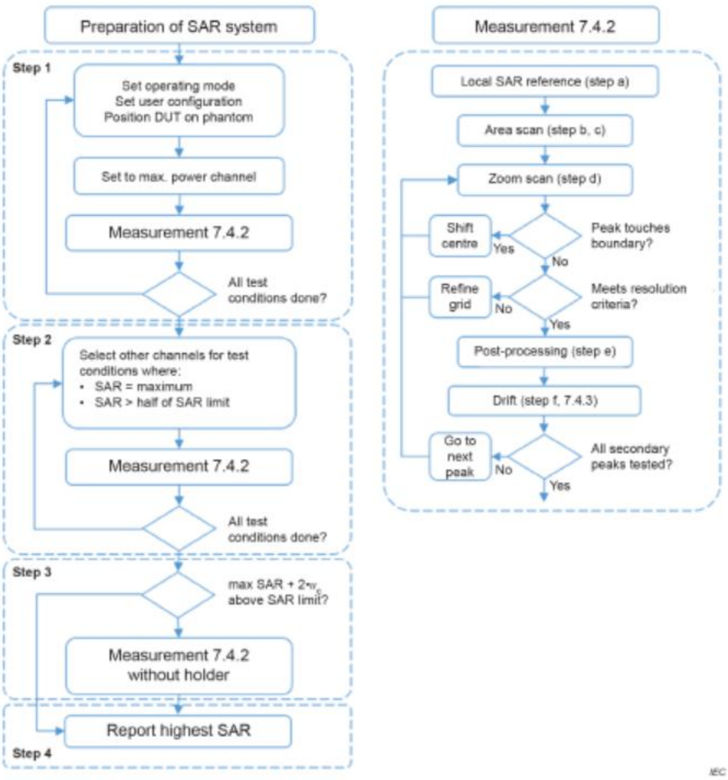


Fig 12.1 Block diagram of the tests to be performed

The SAR test procedure shall be performed for each test configuration should follows the requirements specified in IEC/IEEE 62209-1528. The Following steps are used for each test position shown in fig 12.1：

1. Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface.
2. Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.

12.2. Scanning Requirements

➢ **Area Scan Parameters**

Measure the two-dimensional SAR distribution within the phantom (i.e. the area scan). Table 1 provides the measurement parameters required for the area scan.

Table 1 Area scan parameters

Parameter	DUT transmit frequency being tested	
	$f \leq 3$ GHz	3 GHz < $f \leq 10$ GHz
Maximum distance between the measured points (geometric centre of the sensors) and the inner phantom surface (z_{M1} in Figure 20 in mm)	5 ± 1	δ ln(2)/2 ± 0,5 [a]
Maximum spacing between adjacent measured points in mm (see O.8.3.1)[b]	20, or half of the corresponding zoom scan length, whichever is smaller	60 / f, or half of the corresponding zoom scan length, whichever is smaller
Maximum angle between the probe axis and the phantom surface normal (α in Figure 20)[c]	5° (flat phantom only) 30° (other phantoms)	5° (flat phantom only) 20° (other phantoms)
Tolerance in the probe angle	1°	1°

[a] δ is the penetration depth for a plane-wave incident normally on a planar half-space.

[b] See Clause O.8 on how Δx and Δy may be selected for individual area scan requirements.

[c] The probe angle relative to the phantom surface normal is restricted due to the degradation in the measurement accuracy in fields with steep spatial gradients. The measurement accuracy decreases with increasing probe angle and increasing frequency. This is the reason for the tighter probe angle restriction at frequencies above 3 GHz.

1. The area over which the SAR measurement is performed shall cover at least an area larger than the projection of the DUT, including its antenna. For some DUTs, the area projected onto the phantom can be relatively large, such that the probe might not reach all points. In this case, rotated phantoms may be used, and the area may be assessed by multiple overlapping area scans. The measurement resolution and spatial resolution for interpolation shall be selected to allow identification of the local peak locations to within one-half of the linear dimension of the corresponding side of the zoom-scan volume.
2. For the flat phantom, the boundary of the measurement area shall not be closer than 20 mm from the phantom side walls.

➢ **Zoom Scan Parameters**

Measure the three-dimensional SAR distribution at each of the local maxima locations identified in step c) (i.e. the zoom scan).

Table 2 Zoom scan parameters

Parameter	DUT transmit frequency being tested	
	$f \leq 3$ GHz	3 GHz < $f \leq 10$ GHz
Maximum distance between the closest measured points and the phantom surface (z_{M1} in Figure 20 and Table 3, in mm)	5	δ ln(2)/2 [a]
Maximum angle between the probe axis and the phantom surface normal (α in Figure 20)	5° (flat phantom only) 30° (other phantoms)	5° (flat phantom only) 20° (other phantoms)
Maximum spacing between measured points in the x- and y-directions (Δx and Δy, in mm)	8	$24/f$ [b]
For uniform grids: Maximum spacing between measured points in the direction normal to the phantom shell (Δz_1 in Figure 20, in mm)	5	$10/(f-1)$
For graded grids: Maximum spacing between the two closest measured points in the direction normal to the phantom shell (Δz_1 in Figure 20, in mm)	4	$12/f$
For graded grids: Maximum incremental increase in the spacing between measured points in the direction normal to the phantom shell ($R_z = \Delta z_2/\Delta z_1$ in Figure 20)	1,5	1,5
Minimum edge length of the zoom scan volume in the x- and y-directions (L_z in O.8.3.2, in mm)	30	22
Minimum edge length of the zoom scan volume in the direction normal to the phantom shell (L_h in O.8.3.2 in mm)	30	22
Tolerance in the probe angle	1°	1°
[a] δ is the penetration depth for a plane-wave incident normally on a planar half-space. [b] This is the maximum spacing allowed, which might not work for all circumstances.		

1. For frequencies at or below 3 GHz, the following procedure shall be applied (see Table 2).
   1) The minimum size of the zoom scan volume shall be 30 mm by 30 mm by 30 mm.
   2) The horizontal grid step shall be 8 mm or less.
   3) The grid step in the vertical direction shall be 5 mm, or less if uniform spacing is used.
   4) If variable spacing is used in the vertical direction, the maximum spacing between the two closest measured points to the phantom shell (M1 and M2, see Figure 20 of IEC/IEEE 62209-1528 section 7.4.2) shall be 4 mm or less, and the spacing between the farther points shall increase by a factor of 1.5 or less.
   5) For other parameters, see Table 4.
2. For frequencies above 3 GHz, the following procedure shall be applied.

1) The minimum size of the zoom scan volume may be reduced to 22 mm by 22 mm by 22 mm.
2) The horizontal grid step shall be (24 / f [GHz]) mm or less.
3) If uniform spacing in the vertical direction is used, the grid step in the vertical direction shall be (10 / (f [GHz] − 1)) mm or less.
4) If variable spacing is used in the vertical direction, the maximum spacing between the two measured points closest to the phantom shell shall be (12 / f [GHz]) mm or less, and the spacing between farther points shall increase by a factor of 1.5 or less.

3. If the highest SAR 1 g or 10 g cube is touching the boundary of a zoom-scan volume, the entire zoom scan shall be repeated with the new centre located at the maximum psSAR location indicated by the preceding zoom scan measurement. It is also acceptable to expand the zoom scan during measurement until the 1 g or 10 g cube is no longer touching the boundary of the zoom-scan volume.
4. If the zoom scan measured as specified in the preceding paragraphs complies with both i) and ii), or if the psSAR is below 0.1 W/kg, no additional measurements are needed.
   1) The smallest horizontal distance from the local SAR peaks to all points 3 dB below the SAR peak shall be larger than the horizontal grid steps in both x- and y-directions (Δx, Δy). This shall be checked for the measured zoom scan plane conformal to the phantom at the distance zM1. The minimum distance shall be recorded in the SAR test report.
   2) ii) The ratio of the SAR at the second measured point (M2) to the SAR at the closest measured point (M1) at the x-y location of the measured maximum SAR value shall be at least 30 % (Figure 20). This ratio (in %) shall be recorded in the SAR test report.

12.3. Description of Interpolation/Extrapolation Scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.

12.4. Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

13. Conducted Power List

Remark: The output power of WLAN 6E was recorded in annex E of this report.

14. EUT Antenna Location

➢ **EUT Antenna Location**

The location of antenna was recorded in annex B
ANT 8: WIFI 6GHz ANT 9: WIFI 6GHz

➢ **EUT Antenna Distance**

Antenna Location	Front	Back	Left	Right	Top	Bottom
ANT 8	＜5mm	＜5mm	＞25mm	＜5mm	＜25mm	＞25mm
ANT 9	＜5mm	＜5mm	＜5mm	＞25mm	＜5mm	＞25mm

➢ **Body Evaluation**

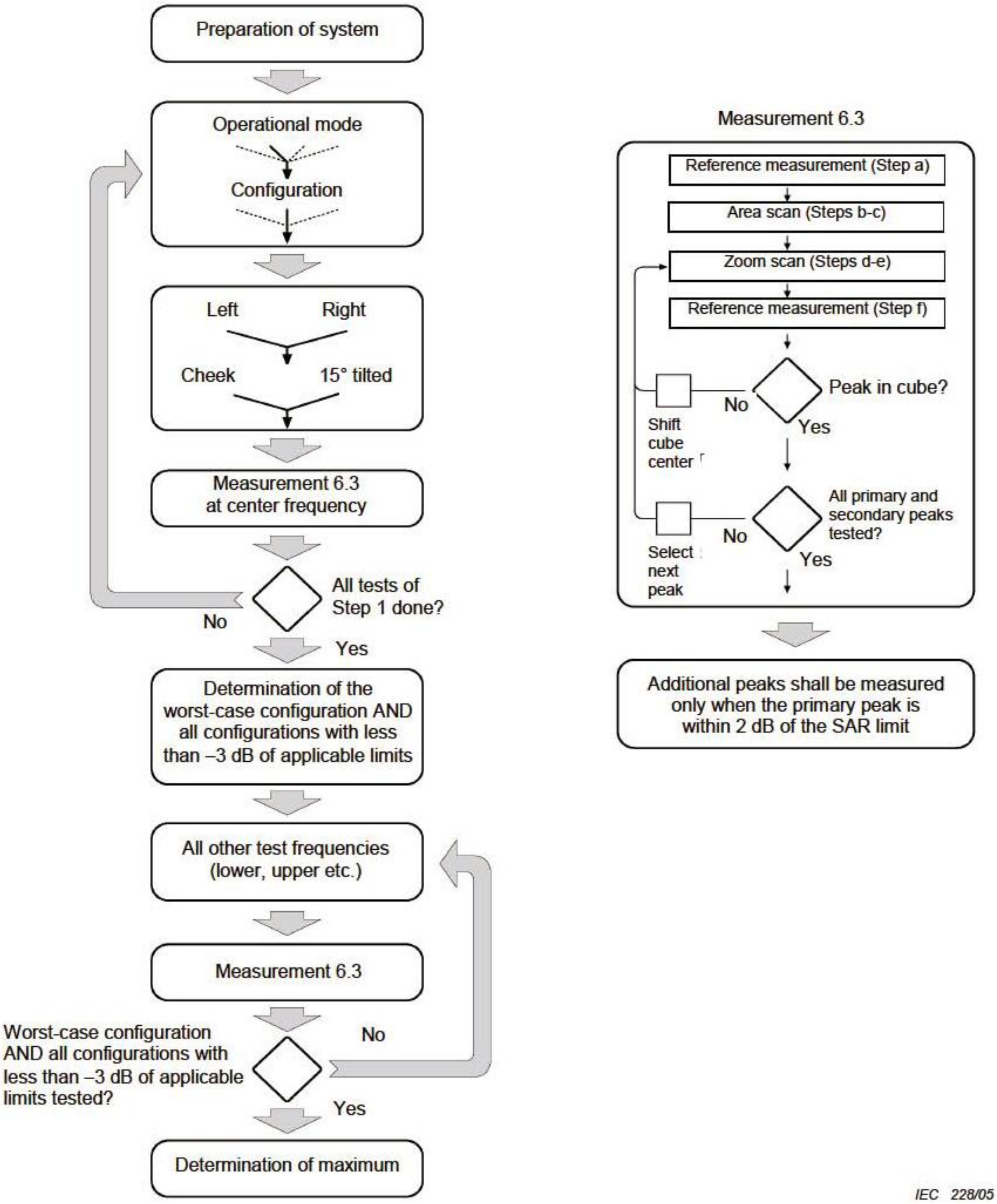
Assessment	Body Side for SAR Test Distance: 10mm					
Antennas	Front	Back	Left	Right	Top	Bottom
ANT 8	Yes	Yes	No	Yes	Yes	No
ANT 9	Yes	Yes	Yes	No	Yes	No

Note :

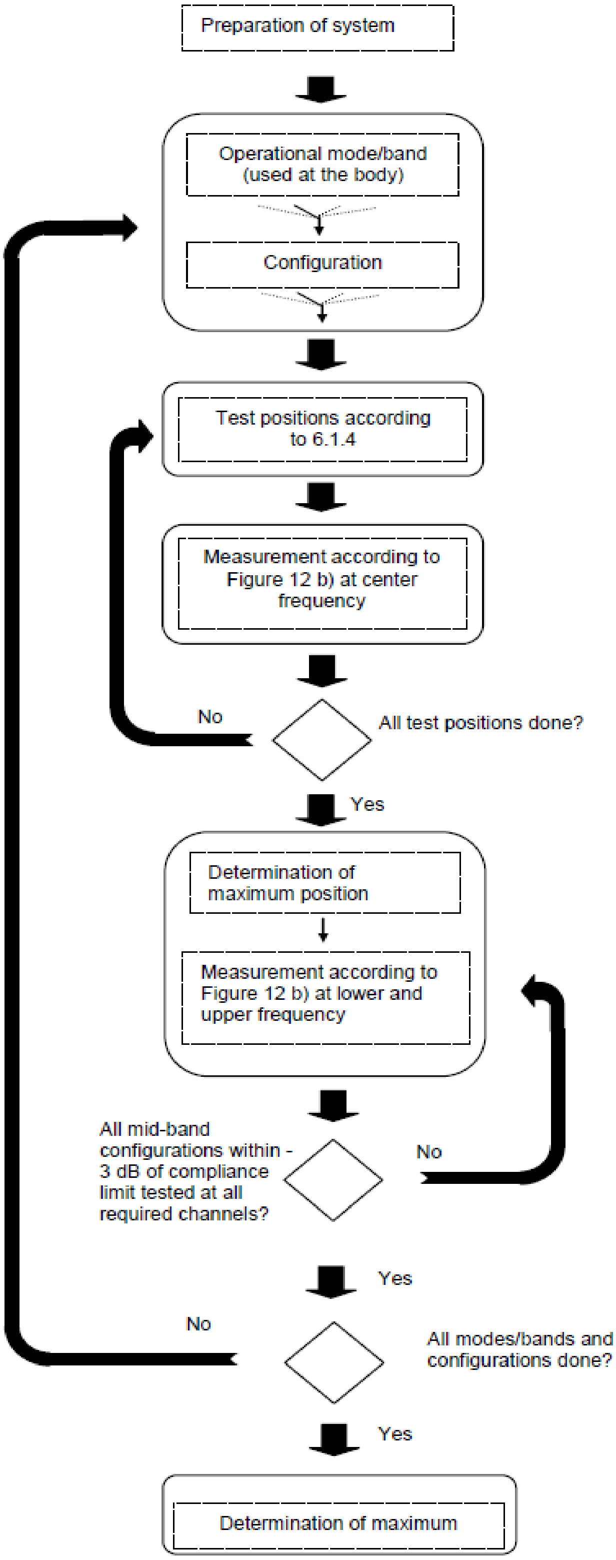
1. Head/Body mode SAR assessments are required.
2. Referring to KDB 941225 D06, when the overall device length and width are ≥ 9 cm * 5 cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25 mm from that surface or edge.

15. Block Diagram of the Tests to be Performed

15.1. Head



15.2. Body



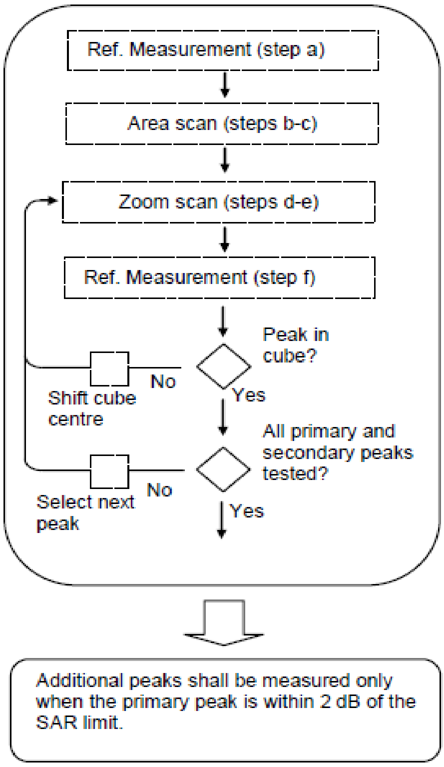


Figure 12b – General procedure

16. Test Results List

16.1. Test Guidance

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1 / (duty cycle)".
   c. For WLAN/Bluetooth: Reported SAR (W/kg) = Measured SAR (W/kg) * Duty Cycle scaling factor * Tune-up scaling factor.
2. Per KDB 447498 D01v06, for each exposure position, 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:
   a. ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   b. ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   c. ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg, however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for tablet modes to compare with the 1.2 W/kg SAR test reduction threshold.
6. Per KDB248227 D01v02r02, 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. The test frequencies established using test mode must correspond to the actual channel frequencies required for operations in the U.S. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. In addition, a periodic transmission duty factor is required for current generation SAR systems to measure SAR

correctly. Unless it is permitted by specific KDB procedures or continuous transmission is specifically restricted by the device, the reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. When a device is not capable of sustaining continuous transmission or the output can become nonlinear, and it is limited by hardware design and unable to transmit at higher than 85% duty factor, a periodic duty factor within 15% of the maximum duty factor the device is capable of transmitting should be used. The reported SAR must be scaled to the maximum transmission duty factor to determine compliance. Descriptions of the procedures applied to establish the specific duty factor used for SAR testing are required in SAR reports to support the test results.

7. Evaluate SAR / APD with DASY6 Module SAR V16.0 or higher. The configurations to be tested are defined in the relevant Knowledge Database (KDB). The 4cm^2 psSAR and absorbed psPD are reported.

16.2. Head SAR Data

- **WLAN 6GHz Head SAR**

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)	Meas. 4cm^{2}APD (W/m^2)
ANT 8+9									
	U-NII-5/802.11ax40	Right Cheek	7	15.39	16	1.151	0.288	0.331	1.930
	U-NII-5/802.11ax40	Right Tilt	7	15.39	16	1.151	0.125	0.144	0.890
1#	U-NII-5/802.11ax40	Left Cheek	7	15.39	16	1.151	0.350	0.403	2.560
	U-NII-5/802.11ax40	Left Tilt	7	15.39	16	1.151	0.159	0.183	1.230
ANT 8+9									
	U-NII-6/802.11ax160	Right Cheek	111	15.36	16	1.159	0.173	0.200	1.260
	U-NII-6/802.11ax160	Right Tilt	111	15.36	16	1.159	0.085	0.098	0.420
2#	U-NII-6/802.11ax160	Left Cheek	111	15.36	16	1.159	0.208	0.241	1.510
	U-NII-6/802.11ax160	Left Tilt	111	15.36	16	1.159	0.103	0.119	0.590
ANT 8+9									
	U-NII-7/802.11ax40	Right Cheek	179	15.33	16	1.167	0.271	0.316	1.820
	U-NII-7/802.11ax40	Right Tilt	179	15.33	16	1.167	0.153	0.179	1.090
3#	U-NII-7/802.11ax40	Left Cheek	179	15.33	16	1.167	0.320	0.373	2.240
	U-NII-7/802.11ax40	Left Tilt	179	15.33	16	1.167	0.205	0.239	1.520
ANT 8+9									
	U-NII-8/802.11ax40	Right Cheek	187	15.21	16	1.199	0.305	0.366	2.020
	U-NII-8/802.11ax40	Right Tilt	187	15.21	16	1.199	0.138	0.166	0.914
4#	U-NII-8/802.11ax40	Left Cheek	187	15.21	16	1.199	0.416	0.499	2.900
	U-NII-8/802.11ax40	Left Tilt	187	15.21	16	1.199	0.184	0.221	1.270

Note:

1. Per KDB 447498 D01v06, for each exposure position, if the highest output power channel Reported SAR ≤ 0.8 W/kg, other channels SAR testing is not necessary.

2. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8 W/kg.
3. Per KDB 248227 D01v02r02, for 802.11b DSSS , when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in that exposure configuration.
4. Per KDB 248227 D01v02r02, OFDM SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
5. According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.

16.3. Body SAR Data

➢ **WLAN 6GHz Body SAR**

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)	Meas. $4cm^2$APD (W/m^2)
ANT 8+9									
	U-NII-5/802.11ax40	Front Side	7	15.39	16	1.151	0.115	0.132	0.959
5#	U-NII-5/802.11ax40	Back Side	7	15.39	16	1.151	0.123	0.142	1.040
	U-NII-5/802.11ax40	Left Side	7	15.39	16	1.151	0.073	0.084	0.421
6#	U-NII-5/802.11ax40	Right Side	7	15.39	16	1.151	0.408	0.470	3.180
	U-NII-5/802.11ax40	Top Side	7	15.39	16	1.151	0.062	0.071	0.353
ANT 8+9									
	U-NII-6/802.11ax160	Front Side	111	15.36	16	1.159	0.041	0.048	0.297
7#	U-NII-6/802.11ax160	Back Side	111	15.36	16	1.159	0.052	0.060	0.392
	U-NII-6/802.11ax160	Left Side	111	15.36	16	1.159	0.029	0.034	0.203
8#	U-NII-6/802.11ax160	Right Side	111	15.36	16	1.159	0.138	0.160	1.050
	U-NII-6/802.11ax160	Top Side	111	15.36	16	1.159	0.106	0.123	0.716
ANT 8+9									
	U-NII-7/802.11ax40	Front Side	179	15.33	16	1.167	0.143	0.167	1.190
9#	U-NII-7/802.11ax40	Back Side	179	15.33	16	1.167	0.144	0.168	1.230
10#	U-NII-7/802.11ax40	Left Side	179	15.33	16	1.167	0.215	0.251	1.700
	U-NII-7/802.11ax40	Right Side	179	15.33	16	1.167	0.155	0.181	1.240
	U-NII-7/802.11ax40	Top Side	179	15.33	16	1.167	0.089	0.104	0.436
ANT 8+9									
	U-NII-8/802.11ax40	Front Side	187	15.21	16	1.199	0.072	0.086	0.614
11#	U-NII-8/802.11ax40	Back Side	187	15.21	16	1.199	0.078	0.094	0.700
	U-NII-8/802.11ax40	Left Side	187	15.21	16	1.199	0.158	0.190	1.420
12#	U-NII-8/802.11ax40	Right Side	187	15.21	16	1.199	0.168	0.202	1.370
	U-NII-8/802.11ax40	Top Side	187	15.21	16	1.199	0.163	0.196	0.766

16.4. Extremity SAR Data

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR_{10g} (W/kg)	Reported SAR_{10g} (W/kg)	Meas. $4cm^2$APD (W/m^2)
ANT 8+9									
	U-NII-5/802.11ax40	Front Side	7	15.39	16	1.151	0.106	0.122	2.130
13#	U-NII-5/802.11ax40	Back Side	7	15.39	16	1.151	0.195	0.224	4.450
	U-NII-5/802.11ax40	Back Side	43	15.13	15.5	1.089	0.074	0.081	1.680
	U-NII-5/802.11ax40	Back Side	91	15.22	16	1.197	0.089	0.107	2.020
ANT 8+9									
14#	U-NII-6/802.11ax160	Front Side	111	15.36	16	1.159	0.102	0.118	2.340
	U-NII-6/802.11ax160	Back Side	111	15.36	16	1.159	0.096	0.111	2.180
ANT 8+9									
	U-NII-7/802.11ax40	Front Side	179	15.33	16	1.167	0.090	0.105	2.070
	U-NII-7/802.11ax40	Back Side	179	15.33	16	1.167	0.094	0.110	2.110
15#	U-NII-7/802.11ax40	Back Side	123	14.57	15	1.104	0.182	0.201	4.110
	U-NII-7/802.11ax40	Back Side	155	14.57	15	1.104	0.076	0.084	1.370
ANT 8+9									
16#	U-NII-8/802.11ax40	Front Side	187	15.21	16	1.199	0.167	0.200	3.830
	U-NII-8/802.11ax40	Back Side	187	15.21	16	1.199	0.134	0.161	3.050

16.5. PD Test Results

➢ **General Note**

1. The reported PD is the measured Total PD value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For PD testing of WLAN signal with non-100% duty cycle, the measured PD is scaled-up by the duty cycle scaling factor which is equal to "1 / (duty cycle)".
   c. For WLAN: Reported PD (W/m^2) = Measured Total PD (W/m^2) * Duty Cycle scaling factor * Tune-up scaling factor.
2. According to the equipment user manual that the most conservative test distance of 2 mm was applied to PD measurement and the REC (field reconstruction) component of the uncertainty budget for a given E-field is valid only for d ≥ λ /5 mm.
3. According to TCBC workshop in April 2021 that in addition to tune-up tolerance scaling, adjust measured results per amount that measurement uncertainty exceeds 30% (e.g. per methods of IEC 62479:2010). Total expanded uncertainty of 2.68dB which was converted to 85% was used to determining the psPD measurement scaling factor.
4. The duty cycle scaling factor of 1.000 should be calculated the final power density.
5. According to TCBC workshop in October 2018 that $4cm^2$ averaging area may now be considered.
6. RF exposure compliance with PD is demonstrated for various radio configurations using below equation:

   Final PD = Mea. $psPD_{tot+}$ ** tune-up factor * duty cycle factor * Uncertainty Factor*

   Where Uncertainty factor = 1 + (| 1- $10^{1.51/10}$ * 100% | – 30%)
7. The final psPD should be scaled to the uncertainty factor of 1.12.
8. The measurement procedure consists of measuring the PDinc at two different distances: d=2mm (compliance distance) and d= λ /5. The same grid extents and grid steps should be used for both measurements. The grid extents should be large enough to fully capture the transmitted energy. The grid step should be fine enough to demonstrate that the integrated Power Density iPDn varies by less than 1 dB between the d = 2 mm and d = λ /5 measurements. We recommend using as first approximation a grid step Lgrid that is a function of the distance to the transmitting structure and not larger than:

$$l_{grid} = \begin{cases} 1.25d & for\, d < \lambda/5 \\ \lambda/4 & for\, d \geq \lambda/5 \end{cases}$$

➢ PD Test Results

Band/Mode	Exposure Position	Gap (mm)	Ant.	Ch.	Grip Step (λ)	iPDn (W/m²)	iPDn Ratio (<1dB)	Total psPDtot+ (W/m²)
U-NII-5/802.11ax40	Right Side	2	Ant 8+9 MIMO	7	0.0625	1.19	0.799	3.6
U-NII-5/802.11ax40	Right Side	10	Ant 8+9 MIMO	7	0.0625	0.99		2.32

Plot No.	Band/Mode	Exposure Position	Ch.	Ave. Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	psPDtot+ over 4cm² (W/m²)	
							Mea.	Scaled
ANT 8+9								
	U-NII-5/802.11ax40	Front Side	7	15.39	16	1.151	1.780	2.294
	U-NII-5/802.11ax40	Back Side	7	15.39	16	1.151	1.200	1.547
	U-NII-5/802.11ax40	Left Side	7	15.39	16	1.151	2.410	3.106
17#	U-NII-5/802.11ax40	Right Side	7	15.39	16	1.151	3.600	4.640
	U-NII-5/802.11ax40	Top Side	7	15.39	16	1.151	0.496	0.639
	U-NII-5/802.11ax40	Bottom Side	7	15.39	16	1.151	0.152	0.196
	U-NII-5/802.11ax40	Right Side	43	15.13	15.5	1.089	1.390	1.695
	U-NII-5/802.11ax40	Right Side	91	15.22	16	1.197	2.100	2.815
ANT 8+9								
	U-NII-6/802.11ax160	Front Side	111	15.36	16	1.159	0.812	1.054
	U-NII-6/802.11ax160	Back Side	111	15.36	16	1.159	1.060	1.376
	U-NII-6/802.11ax160	Left Side	111	15.36	16	1.159	0.446	0.579
18#	U-NII-6/802.11ax160	Right Side	111	15.36	16	1.159	1.700	2.206
	U-NII-6/802.11ax160	Top Side	111	15.36	16	1.159	0.355	0.461
	U-NII-6/802.11ax160	Bottom Side	111	15.36	16	1.159	0.112	0.145
ANT 8+9								
	U-NII-7/802.11ax40	Front Side	179	15.33	16	1.167	1.510	1.973
	U-NII-7/802.11ax40	Back Side	179	15.33	16	1.167	1.370	1.790
	U-NII-7/802.11ax40	Left Side	179	15.33	16	1.167	2.100	2.744
19#	U-NII-7/802.11ax40	Right Side	179	15.33	16	1.167	2.610	3.411
	U-NII-7/802.11ax40	Top Side	179	15.33	16	1.167	0.798	1.043
	U-NII-7/802.11ax40	Bottom Side	179	15.33	16	1.167	0.128	0.167
ANT 8+9								
	U-NII-8/802.11ax40	Front Side	187	15.21	16	1.199	1.490	2.002
	U-NII-8/802.11ax40	Back Side	187	15.21	16	1.199	1.280	1.72
	U-NII-8/802.11ax40	Left Side	187	15.21	16	1.199	2.490	3.345
20#	U-NII-8/802.11ax40	Right Side	187	15.21	16	1.199	2.740	3.681
	U-NII-8/802.11ax40	Top Side	187	15.21	16	1.199	0.162	0.218
	U-NII-8/802.11ax40	Bottom Side	187	15.21	16	1.199	0.101	0.136

17. Simultaneous Transmission Evaluation

Remark: This product only support WIFI 6GHz mode, so the simultaneous transmission is not required.

18. Uncertainty Assessment

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A Type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in below Table.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor	1/k(b)	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

DASY6/8 Uncertainty Budget for psSAR / psAPD Assessment (Frequency Range: 6GHz ~ 10GHz)								
Symbol	**Error Description**	**Uncert. Value (±%)**	**Prob. Dist.**	**Div.**	**Ci (1g)**	**Ci (10g)**	**Standard Uncertainty (1g) (±%)**	**Standard Uncertainty (10g) (±%)**
psSAR	Module SAR V16.0 (Table 6.3.3)	14.2/13.9	N	1	1	1	14.2	13.9
PDC	Power Density Conversion	13.5	R	$\sqrt{3}$	1	1	7.8	7.8
u(▲SAR)	**Combined Standard Uncertainty**						16.2	15.9
U	**Expanded Standard Uncertainty in dB**						32.4 ±1.2dB	31.9 ±1.2dB

Error Description	**Uncertainty (±dB)**	**Probability Distribution**	**Divisor**	***ci***	**Standard Uncertainty (±dB)**	***v_i* or *v_{eff}***
Uncertainty terms dependent on the measurement system						
Probe calibration	0.49	N	1	1	0.49	∞
Probe correction	0	R	1.732	1	0	∞
Frequency response	0.20	R	1.732	1	0.12	∞
Sensor cross coupling	0	R	1.732	1	0	∞
Isotropy	0.50	R	1.732	1	0.29	∞
Linearity	0.20	R	1.732	1	0.12	∞
Probe scattering	0	R	1.732	1	0	∞
Probe positioning offset	0.30	R	1.732	1	0.17	∞
Probe positioning repeatability	0.04	R	1.732	1	0.02	∞
Sensor mechanical offset	0	R	1.732	1	0	∞
Probe spatial resolution	0	R	1.732	1	0	∞
Field impedance dependance	0	R	1.732	1	0	∞
Amplitude and phase drift	0	R	1.732	1	0	∞
Amplitude and phase noise	0.04	R	1.732	1	0.02	∞
Measurement area truncation	0	R	1.732	1	0	∞
Data acquisition	0.03	R	1.732	1	0.03	∞
Sampling	0	R	1.732	1	0	∞
Field reconstruction	2.0	R	1.732	1	1.15	∞
Forward transformation	0	R	1.732	1	0	∞
Power density scaling	-	R	1.732	1	-	∞
Spatial averaging	0.10	R	1.732	1	0.06	∞
System Detection Limits	0.04	R	1.732	1	0.02	∞
Uncertainty terms dependent on the DUT and environmental factors						
Probe coupling with DUT	0	R	1.732	1	0	∞
Modulation response	0.40	R	1.732	1	0.23	∞
Integration time	0	R	1.732	1	0	∞
Response time	0	R	1.732	1	0	∞

Device holder influence	0.10	R	1.732	1	0.06	∞
DUT alignment	0	R	1.732	1	0	∞
RF ambient	0.04	R	1.732	1	0.02	∞
Ambient reflections	0.04	R	1.732	1	0.02	∞
Immunity / secondary reception	0	R	1.732	1	0	∞
Drift of the DUT	-	R	1.732	1	-	∞
Combined standard uncertainty					0.75 dB	∞
Coverage Factor for 95%					K=2	N/A
Expanded standard uncertainty					1.51 dB	

PD Uncertainty Budget for Frequency Range 6 – 10GHz

Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

The FCC designation number is CN1192, the test firm registration number is 226174.

Note：

The main report is end here and the other annex (B,C,D,E,F) will be submitted separately.

****** END OF MAIN REPORT ******