SGS

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.

FCC SAR TEST REPORT

Application No.:	SUCR2505000492AT
Applicant:	Shanghai Sunmi Technology Co.,Ltd.
Manufacturer:	Shanghai Sunmi Technology Co.,Ltd.
Product Name:	Smart POS System
Model No.(EUT):	T6F0A, T6F0B ♣
♣	Please refer to section 1.4 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark:	SUNMI
FCC ID:	2AH25T6F0A
Standards:	FCC 47CFR §2.1093
Date of Receipt:	2025-05-28
Date of Test:	2025-06-09
Date of Issue:	2025-07-02
Test conclusion:	**PASS ***

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

Revision Record			
Version	**Description**	**Date**	**Remark**
01	Original	2025/06/21	/

Authorized for issue by:		
Prepared By		Leon Liu **Leon Liu/ Project Manager**
Approved By		Nick Hu **Nick Hu/ Technical Manager**

TEST SUMMARY

Frequency Band	Maximum Reported SAR(W/kg)			
	Head	**Body-worn**	**Hotspot**	**Product specific 10g SAR**
GSM850	<0.10	0.25	0.25	/
GSM1900	0.16	0.30	0.30	/
WCDMA Band II	0.29	0.49	0.49	/
WCDMA Band IV	0.33	**1.08**	**1.08**	/
WCDMA Band V	0.13	0.54	0.54	/
LTE Band 7	<0.10	0.64	0.84	/
LTE Band 12(17)	0.12	0.30	0.30	/
LTE Band 13	0.20	0.39	0.39	/
LTE Band 14	0.18	0.38	0.38	/
LTE Band 25(2)	0.27	0.44	0.44	/
LTE Band 26(5)	<0.10	0.31	0.31	/
LTE Band 30	0.24	0.65	0.65	/
LTE Band 40	<0.10	0.23	0.23	/
LTE Band 41(38)	<0.10	0.92	1.05	/
LTE Band 66(4)	0.30	0.85	0.85	/
LTE Band 71	0.12	0.32	0.32	/
WI-FI (2.4GHz)	**0.47**	0.30	0.59	/
WI-FI (5GHz)	0.41	0.51	0.74	**2.92**
BT	0.13	<0.10	0.18	/
NFC	/	/	/	<0.10
SAR Limited(W/kg)	1.6			4.0
Maximum Simultaneous Transmission SAR (W/kg)				
Scenario	Head	Body-worn	Hotspot	Product specific 10g SAR
Sum SAR	0.80	1.51	1.51	2.92
SPLSR	/	0.01	0.01	/
SPLSR Limited	0.04			0.1

Remark:
This test report (Report No.: SUCR250500049208 issue on 2025/07/02) is based on the original test report (Report No.: SUCR250400033708 issue on 2025/05/16).
Review this report and original report, this report just changing the parts according to the declaration letter from client.
Considering to the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report for fully retest.
Therefore in this report only WCDMA Band IV and WIFI 2.4/5G were performed based on the original report with report number SUCR250400033708 issue on 2025/05/16 and other test data in this report are based on the previous report with report number SUCR250400033708 issue on 2025/05/16.

CONTENTS

1 General Information

1.1 Details of Client

Applicant:	Shanghai Sunmi Technology Co.,Ltd
Address:	Room 505,No.388,Song Hu Road,Yang Pu District,Shanghai,China
Manufacturer:	Shanghai Sunmi Technology Co.,Ltd
Address:	Room 505,No.388,Song Hu Road,Yang Pu District,Shanghai,China

1.2 Test Location

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

1.3 Test Facility

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

• **A2LA (Certificate No. 6336.01)**

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

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

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

CAB identifier: CN0120.

IC#: 27594.

• **FCC –Designation Number: CN1312**

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

Designation Number: CN1312.

Test Firm Registration Number: 0031225543

1.4 General Description of EUT

Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
Product Name:	Smart POS System		
Model No.(EUT):	T6F0A,T6F0B		
Trade Mark:	SUNMI		
Product Phase:	Production Unit		
Hardware Version:	V2.1		
Software Version:	P3_AIR-MGL_user_4.1.1_10_20250416		
Device Operating Configurations :			
Modulation Mode:	**GSM:** GMSK, 8PSK; **WCDMA:** QPSK; **LTE:** QPSK,16QAM **WIFI:** DSSS, OFDM; **BT:** GFSK, π/4DQPSK,8DPSK **NFC**: ASK		
Device Class:	B		
GPRS Multi-slots Class:	12	EGPRS Multi-slots Class:	12
HSDPA UE Category:	24	HSUPA UE Category	7
Power Class	4,tested with power level 5(GSM850)		
	1,tested with power level 0(GSM1900)		
	3, tested with power control “all 1”(WCDMA Band)		
	3, tested with power control Max Power(LTE Band)		
Frequency Bands:	Band	Tx (MHz)	
	GSM850	824 - 849	
	GSM1900	1850 - 1910	
	WCDMA Band II	1850 - 1910	
	WCDMA Band IV	1710 - 1755	
	WCDMA Band V	824 - 849	
	LTE Band 2	1850 - 1910	
	LTE Band 4	1710 - 1755	
	LTE Band 5	824 - 849	
	LTE Band 7	2500 - 2570	
	LTE Band 12	699 - 716	
	LTE Band 13	777 - 787	
	LTE Band 14	788 - 798	
	LTE Band 17	704 - 716	
	LTE Band 25	1850 - 1915	
	LTE Band 26	814 - 849	
	LTE Band 30	2305 - 2315	
	LTE Band 38	2570 - 2620	
	LTE Band 40	2300 - 2400	
	LTE Band 41	2496 - 2690	
	LTE Band 66	1710 - 1780	
	LTE Band 71	663-698	
	Bluetooth	2400 - 2483.5	
	Wi-Fi 2.4G	2402 - 2462	
	Wi-Fi 5G	5150 - 5250	
		5250 - 5350	
		5470 - 5725	
		5725 - 5850	

	NFC	13.56
RF Cable:	☒ Provided by the applicant ☐ Provided by the laboratory	
Battery Information:	Model:	HPPC 1ICP9/59/57
	Normal Voltage:	3.87V
	Rated capacity:	5000mAh
	Manufacturer:	Guangdong Highpower New Energy Technology Co., Ltd

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

1) According to TCB workshop October,2014 RF Exposure Procedures Update (Overlapping Bands): SAR for LTE Band 2 (Frequency range:1850 - 1910 MHz)/LTE Band 4 (Frequency range:1710 - 1755 MHz)/LTE Band 5 (Frequency range:824 - 849 MHz)/LTE Band 17 (Frequency range:704-716 MHz)/LTE Band 38 (Frequency range:2570 - 2620 MHz) is respectively covered by LTE Band25 (Frequency range:1850 - 1915 MHz)/LTE Band66 (Frequency range:1710 - 1780 MHz)/LTE Band26 (Frequency range:814 - 849 MHz)/LTE Band12 (Frequency range:699 - 716 MHz)/ LTE Band41 (Frequency range:2496 - 2690 MHz) due to similar frequency range, same maximum tune up limit and same channel bandwidth.

2) For LTE band 4/5/12/13/17/26/30/38/71 that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. When a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Remark:

1. As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.
2. Declaration of EUT Family Grouping:
   There are series models mentioned in this report, only model T6F0A have been tested.
   The antenna layout (including size, location, and types of antennas) for 2G/3G/4G and WLAN remains unchanged. However, this specific configuration features only a single NFC antenna module designed for payment applications, lacking the secondary non-metallic NFC antenna typically located on the back.
   Except for the above differences, the rest are consistent.

1.4.1 DUT Antenna Locations (Back View)

The DUT Antenna Locations can be referred to Appendix D

Ant	Band:
Ant1	WIFI5G
Ant2	WIFI2.4G BT
Ant4	GSM: G850/1900 WCDMA: B2/4/5 LTE: B2/4/5/7/12/13/14/17/25/26/30/38/40/41/66/71

Note: According to the distance between LTE/WCDMA/GSM&WIFI&BT antennas and the sides of the EUT we can draw the conclusion that:

EUT Sides for SAR Testing							
Mode	Exposure Condition	Front	Back	Left	Right	Top	Bottom
Ant 1	Hotspot/Product specific 10g SAR	Yes	Yes	No	Yes	Yes	No
Ant 2	Hotspot/Product specific 10g SAR	Yes	Yes	No	Yes	Yes	No
Ant 4	Hotspot/Product specific 10g SAR	Yes	Yes	Yes	Yes	No	Yes

Note:
1) When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.

1.5 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
ANSI/IEEE C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
IEC/IEEE 62209-1528:2020	Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices –Part 1528: Human models, instrumentation, and procedures(Frequency range of 4 MHz to 10 GHz)
KDB 941225 D01	3G SAR Measurement Procedures v03r01
KDB 941225 D05	SAR for LTE Devices v02r05
KDB 941225 D06	Hotspot Mode SAR v02r01
KDB 248227 D01	SAR Guidance for IEEE 802 11 Wi-Fi SAR v02r02
KDB 648474 D04	Handset SAR v01r03
KDB 447498 D04	General RF Exposure Guidance v01
KDB 865664 D01	SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02	RF Exposure Reporting v01r02
KDB 690783 D01	SAR Listings on Grants v01r03

1.6 RF exposure limits

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

Notes:
* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time
** The Spatial Average value of the SAR averaged over the whole body.
*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.
Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation.)

2 Laboratory Environment

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

Table 1： The Ambient Conditions

3 SAR Measurements System Configuration

3.1 The SAR Measurement System

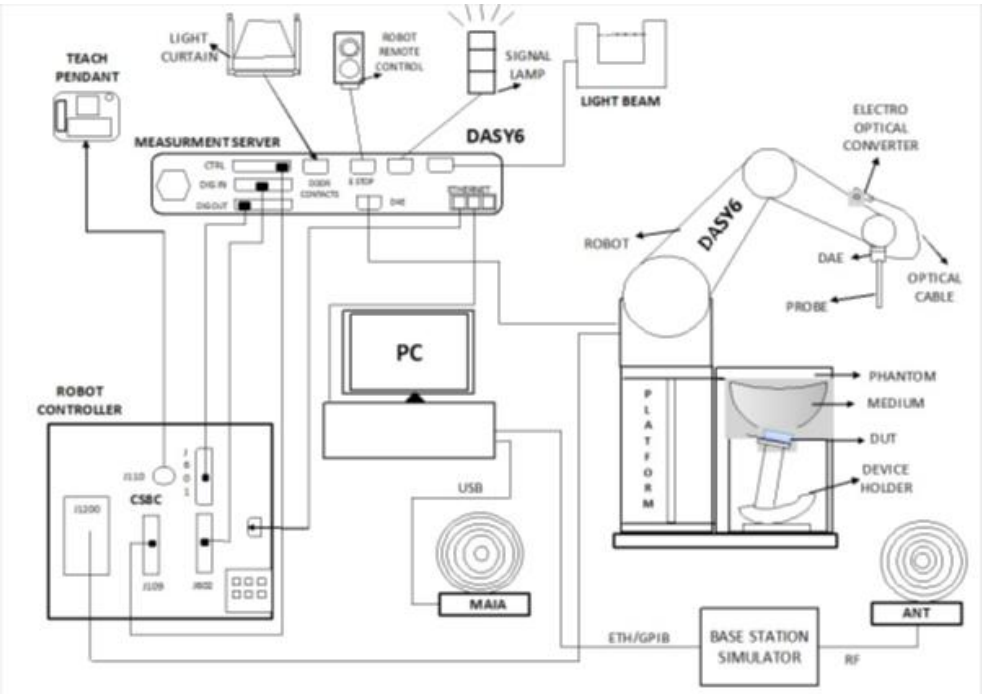
This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-Simulate.

The DASY system for performing compliance tests consists of the following items:
A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software. An arm extension for accommodation the data acquisition electronics (DAE).

A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.



F-1. SAR Measurement System Configuration

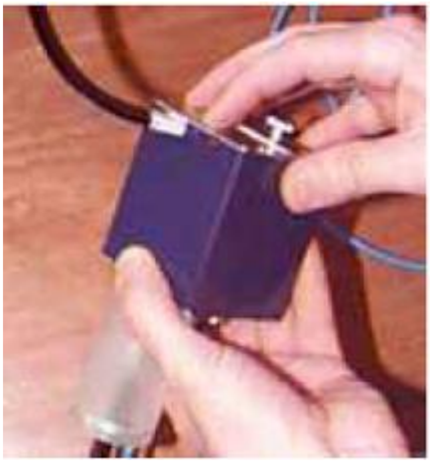
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY6 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand, right-hand and Body Worn usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validating the proper functioning of the system.

3.2 Isotropic E-field Probe EX3DV4

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

3.3 Data Acquisition Electronics (DAE)

Model	DAE
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY4/5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV,400mV)
Input Offset Voltage	< 5μV (with auto zero)
Input Bias Current	< 50 f A
Dimensions	60 x 60 x 68 mm



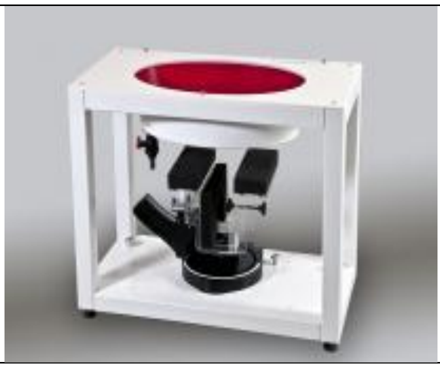
3.4 SAM Twin Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions (incl. Wooden Support)	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters
Wooden Support	SPEAG standard phantom table

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

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

3.5 ELI Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	
Wooden Support	SPEAG standard phantom table	

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEEE 1528 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.
ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure.

3.6 Device Holder for Transmitters

F-2. **Device Holder for Transmitters**

- The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centres for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.
- The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity ε=3 and loss tangent δ=0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

3.7 Measurement procedure

3.7.1 Scanning procedure

Step 1: Power reference measurement

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure.

Step 2: Area scan

The SAR distribution at the exposed side of the head was measured at a distance of 4mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm*15mm or 12mm*12mm or 10mm*10mm.Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Zoom scan

Around this point, a volume of 32mm*32mm*30mm (f≤2GHz), 30mm*30mm*30mm (f for 2-3GHz) and 24mm*24mm*22mm (f for 5-6GHz) was assessed by measuring 5x5x7 points (f≤2GHz), 7x7x7 points (f for 2-3GHz) and 7x7x12 points (f for 5-6GHz). On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the centre of the dipoles is 2.0mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. Refer to the probe specification).The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points were interpolated to calculate the average. All neighbouring volumes were evaluated until no neighboring volume with a higher average value was found.

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std. 1528-2013.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>$>$ 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
</table>

Step 4: Power reference measurement (drift)

The Power Drift Measurement job measures the field at the same location as the most recent power reference measurement job within the same procedure, and with the same settings. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %

3.7.2 Data Storage

The DASY software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated. The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [m W/g], [m W/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

3.7.3 Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters: - Sensitivity Normi, ai0, ai1, ai2
- Conversion factor ConvFi
- Diode compression point Dcpi
Device parameters: - Frequency f
- Crest factor cf
Media parameters: - Conductivity ε
- Density ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

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

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

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

E-field probes:

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

H-field probes:

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

With Vi = compensated signal of channel i (i = x, y, z)
Normi = sensor sensitivity of channel I (i = x, y, z)
[mV/(V/m)2] for E-field Probes
ConvF = sensitivity enhancement in solution
aij = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
Ei = electric field strength of channel i in V/m
Hi = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

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

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

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

with SAR = local specific absorption rate in mW/g
Etot = total field strength in V/m
σ= conductivity in [mho/m] or [Siemens/m]
ε= equivalent tissue density in g/cm3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

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

with Ppwe = equivalent power density of a plane wave in mW/cm2
Etot = total electric field strength in V/m
Htot = total magnetic field strength in A/m

4 SAR measurement variability and uncertainty

4.1 SAR measurement variability

Per KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.
1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ⩾ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ⩾ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ⩾1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

4.2 SAR measurement uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

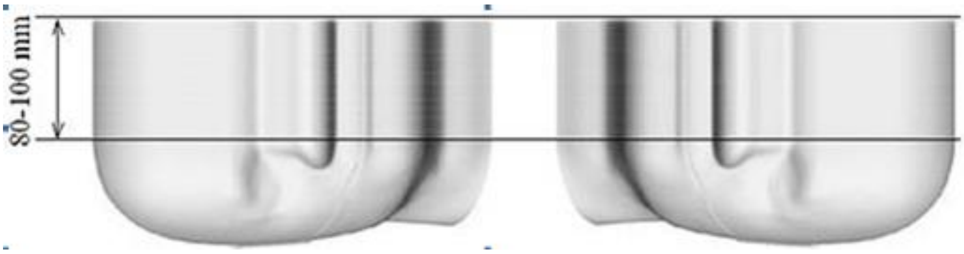
5 Description of Test Position

5.1 The Head Test Position

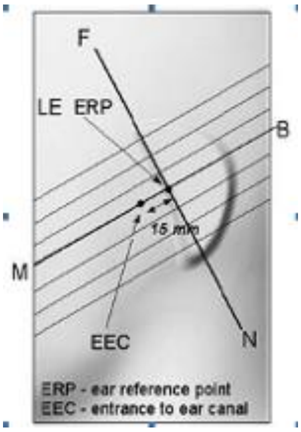
5.1.1 SAM Phantom Shape

F-3. Front, back, and side views of SAM (model for the phantom shell). Full-head model is for illustration purposes only-procedures in this recommended practice are intended primarily for the phantom setup.

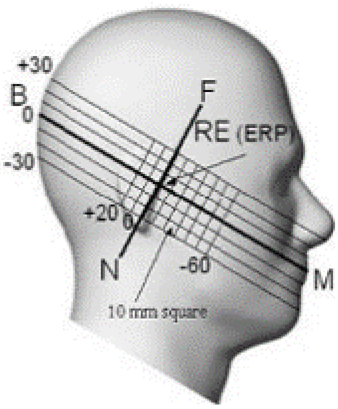
Note: The centre strip including the nose region has a different thickness tolerance.



F-4. Sagittally bisected phantom with extended perimeter (shown placed on its side as used for SAR measurements)

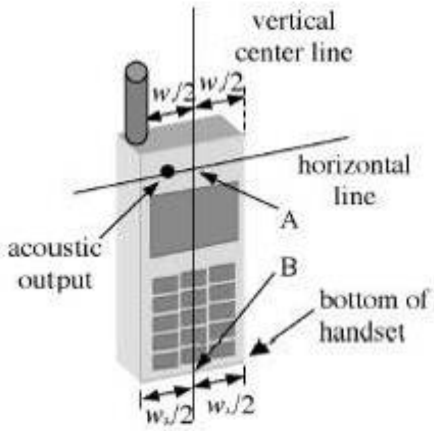


F-5. Close-up side view of phantom, showing the ear region, N-F and B-M lines, and seven cross-sectional plane locations

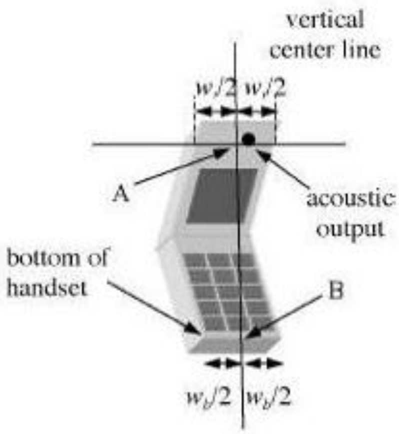


F-6. Side view of the phantom showing relevant markings and seven cross-sectional plane locations

5.1.2 EUT constructions



F-7. Handset vertical and horizontal reference lines-“fixed case”



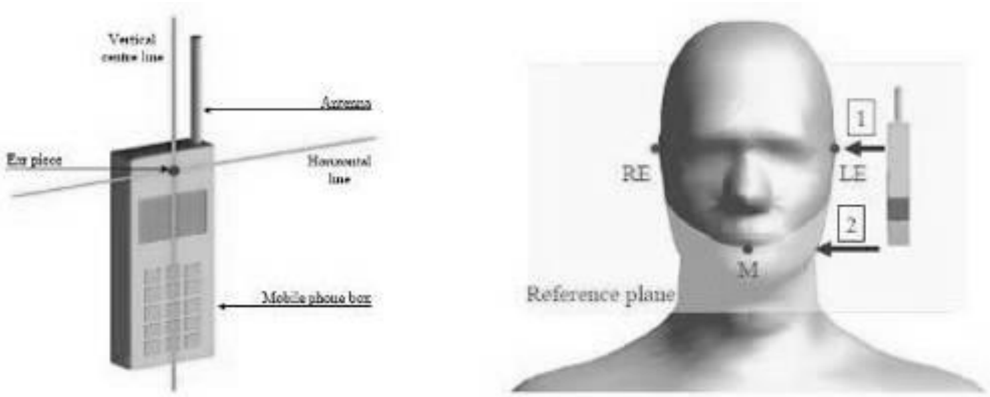
F-8. Handset vertical and horizontal reference lines-“clam-shell case”

5.1.3 Definition of the “cheek” position

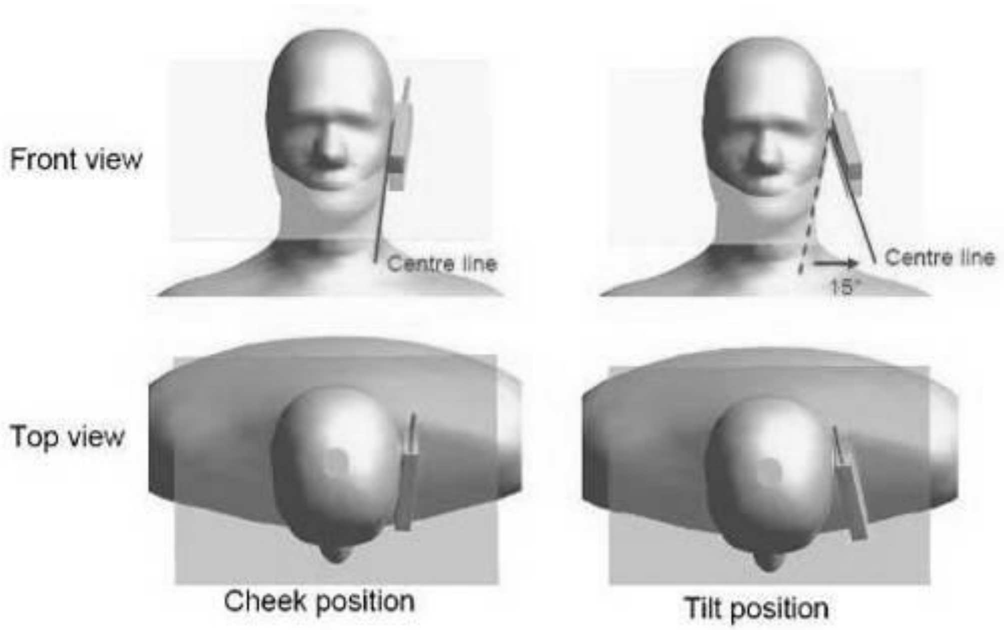
a) Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom ("initial position"). While maintaining the device in this plane, align the vertical centre line with the reference plane containing the three ear and mouth reference points (M, RE and LE) and align the centre of the ear piece with the line RE-LE.
b) Translate the mobile phone box towards the phantom with the ear piece aligned with the line LE-RE until telephone touches the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the box until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.

5.1.4 Definition of the “tilted” position

a) Position the device in the “cheek” position described above;
b) While maintaining the device in the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.



F-9. Definition of the reference lines and points, on the phone and on the phantom and initial position



F-10. “Cheek” and “tilt” positions of the mobile phone on the left side

5.2 The Body Test Position

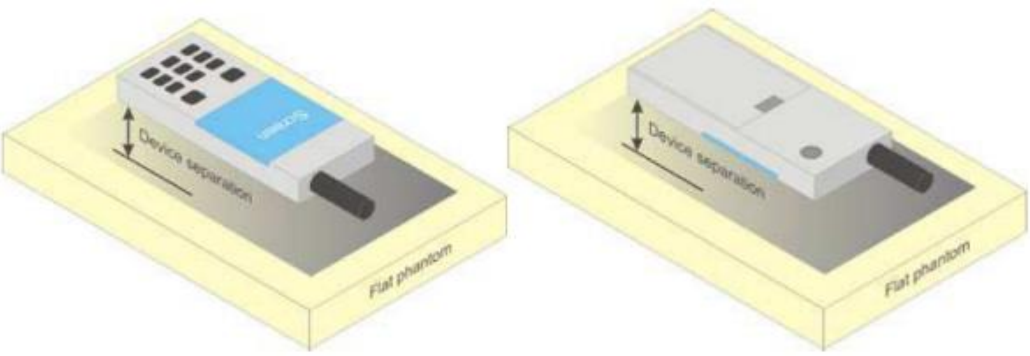
5.2.1 Body-worn exposure conditions

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations.

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D04 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person’s face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.



F-11. **Test positions for body-worn devices.**

5.2.2 Wireless Router exposure conditions

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. For devices with form factors smaller than 9 cm x 5 cm, a test separation distance of 5 mm is required.

5.3 Extremity exposure conditions

Per FCC KDB 648474 D04, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the device is marketed as “Phablet”. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for Product Specific 10-g SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, Product Specific 10-g 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 phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.
Due to the SAR result, only the WIFI 5G and NFC need to test with 0mm for the Product Specific 10-g SAR, the others are not required.

6 SAR System Verification Procedure

6.1 Tissue Simulate Liquid

6.1.1 Recipes for Tissue Simulate Liquid

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

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

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

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

Table 2： Recipe of Tissue Simulate Liquid

6.1.2 Measurement for Tissue Simulate Liquid

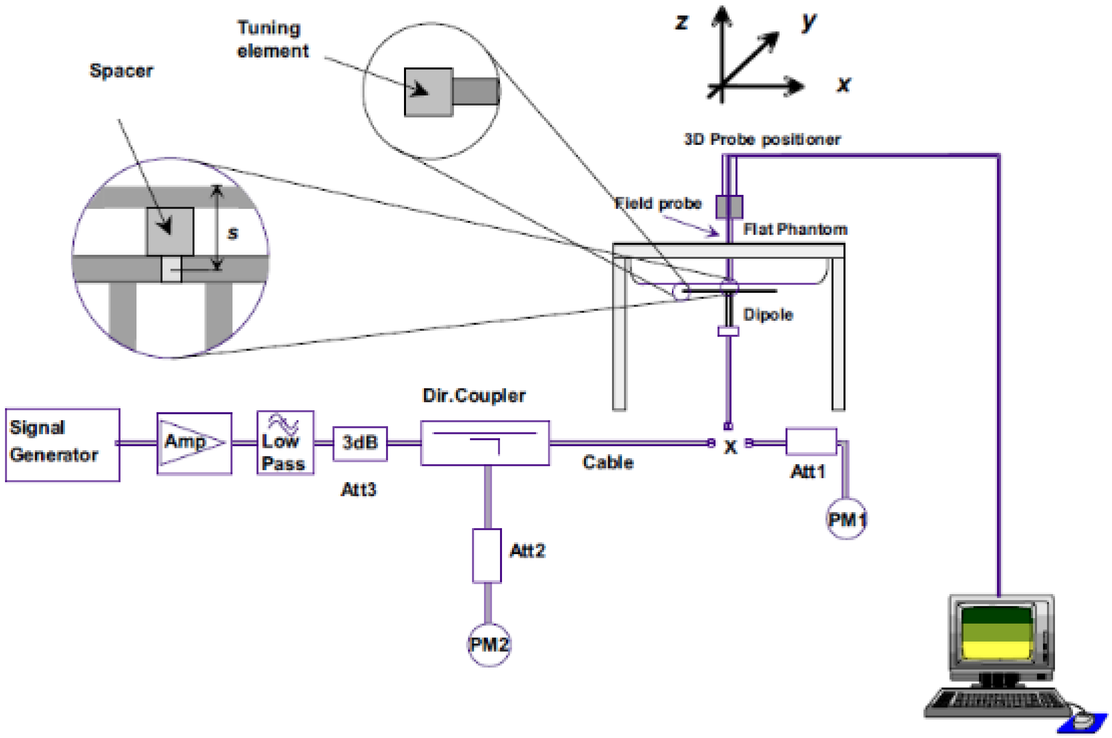
The Conductivity (σ) and Permittivity (ρ) are listed in bellow table. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was 22±2°C.

Tissue Type	Measured Frequency （MHz）	Measured Tissue		Target Tissue (±5%)		Deviation (Within ±5%)		Liquid Temp. (℃)	Test Date
		ε_r	σ(S/m)	ε_r	σ(S/m)	ε_r	σ(S/m)		
1800 Head	1800	40.0	1.37	40.0	1.40	0.00%	-2.14%	22.6	2025/6/9
2450 Head	2450	39.2	1.82	39.2	1.80	0.00%	1.11%	22.8	2025/6/9
5250 Head	5250	36.5	4.74	35.9	4.71	1.67%	0.64%	22.9	2025/6/9

Table 3： Measurement result of Tissue electric parameters.

6.2 SAR System Check

The microwave circuit arrangement for system Check is sketched in F-12. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the following table (A power level of 250mW (below 3GHz) or 100mW (3-6GHz) was input to the dipole antenna). During the tests, the ambient temperature of the laboratory was in the range 22±2°C, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 15±0.5 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.



F-12. the microwave circuit arrangement used for SAR system check

6.2.1 Justification for Extended SAR Dipole Calibrations

1) Instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.

a) There is no physical damage on the dipole;
b) System check with specific dipole is within 10% of calibrated value;
c) Return-loss is within 20% of calibrated measurement;
d) Impedance is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

6.2.2 Summary System Check Result(s)

Validation Kit	Measured SAR 250mW	Measured SAR 250mW	Measured SAR (normalized to 1W)	Measured SAR (normalized to 1W)	Target SAR (normalized to 1W)	Target SAR (normalized to 1W)	Deviation (Within ±10%)		Liquid Temp. (℃)	Test Date
	1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)	1-g(W/kg)	10-g(W/kg)		
D1800V2_Head	9.69	5.28	38.76	21.12	38.9	20.7	-0.36%	2.03%	22.6	2025/6/9
D2450V2_Head	13.4	6.36	53.60	25.44	52.7	24.6	1.71%	3.41%	22.8	2025/6/9
Validation Kit	Measured SAR 100mW	Measured SAR 100mW	Measured SAR (normalized to 1W)	Measured SAR (normalized to 1W)	Target SAR (normalized to 1W)	Target SAR (normalized to 1W)	Deviation (Within ±10%)		Liquid Temp. (℃)	Test Date
	1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)	1-g(W/kg)	10-g(W/kg)		
D5GHzV2_5.25G_Head	7.83	2.27	78.30	22.70	77.20	21.90	1.42%	3.65%	22.9	2025/6/9

Table 4： SAR System Check Result.

6.2.3 Detailed System Check Results

Please see the Appendix A

7 Test Configuration

7.1 Operation Configurations

7.1.1 WCDMA Test Configuration

1) <u>Output Power Verification</u>

Maximum output power is verified on the high, middle and low channels according to procedures described in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all "1's" for WCDMA/HSDPA or by applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) are required in the SAR report. All configurations that are not supported by the handset or cannot be measured due to technical or equipment limitations must be clearly identified.

2) <u>Head SAR</u>

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure.

3) <u>Body SAR</u>

SAR for body configurations is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreaing code or DPDCHn, for the highest reported body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When more than 2 DPDCHn are supported by the handset, it may be necessary to configure additional DPDCHn using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

4) <u>HSDPA / HSUPA</u>

RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power for production units in HSDPA / HSUPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest measured SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power of HSDPA / HSUPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.5 W/kg, SAR measurement is not required for HSDPA / HSUPA.

<u>a) HSDPA</u>

HSDPA is configured according to the applicable UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms and a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors (βc, βd), and HS-DPCCH power offset parameters (ΔACK, ΔNACK, ΔCQI) are set according to values indicated in the following table The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Sub-test	βc	Bd	βd(SF)	βc/βd	βhs	CM(dB)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5
Note1: △ACK, △NACK and △CQI= 8 Ahs = βhs/βc=30/15 βhs=30/15*βc Note2:For the HS-DPCCH power mask requirement test in clause 5.2C,5.7A,and the Error Vector Magnitude(EVM) with HS-DPCCH test in clause 5.13.1.A,and HSDPA EVM with phase discontinuity in clause 5.13.1AA, △ACK and △NACK= 8 (Ahs=30/15) with βhs=30/15*βc,and △CQI= 7 (Ahs=24/15) with βhs=24/15*βc. Note3: CM=1 forβc/βd =12/15, βhs/βc=24/15. For all other combinations of DPDCH, DPCCH and							

HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI‟s
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

Table 5： settings of required H-Set 1 QPSK acc. to 3GPP 34.121

HS-DSCH Category	MaximumHS-DSCH Codes Received	Minimum Inter-TTI Interval	MaximumHS-DSCH TransportBlockBits/HS-DSCH TTI	TotalSoft Channel Bits
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

Table 6： HSDPA UE category

b) HSUPA

Due to inner loop power control requirements in HSUPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSUPA should be configured according to the values indicated below as well as other applicable procedures described in the WCDMA Handset and Release 5 HSUPA Data Device sections of 3G device.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ec} (SF)	β_{ed} (code)	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ ACK, Δ NACK and Δ CQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference

Note 3 : For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$

Note 4 : For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$

Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Table 7: Subtests for UMTS Release 6 HSUPA

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Speading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	10	2SF2&2SF4	11484	5.76
	4	4	2		20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF4	22996	?
	4	4	10		20000	?
NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.UE categories 1 to 6 support QPSK only. UE category 7 supports QPSK and 16QAM.(TS25.306-7.3.0).						

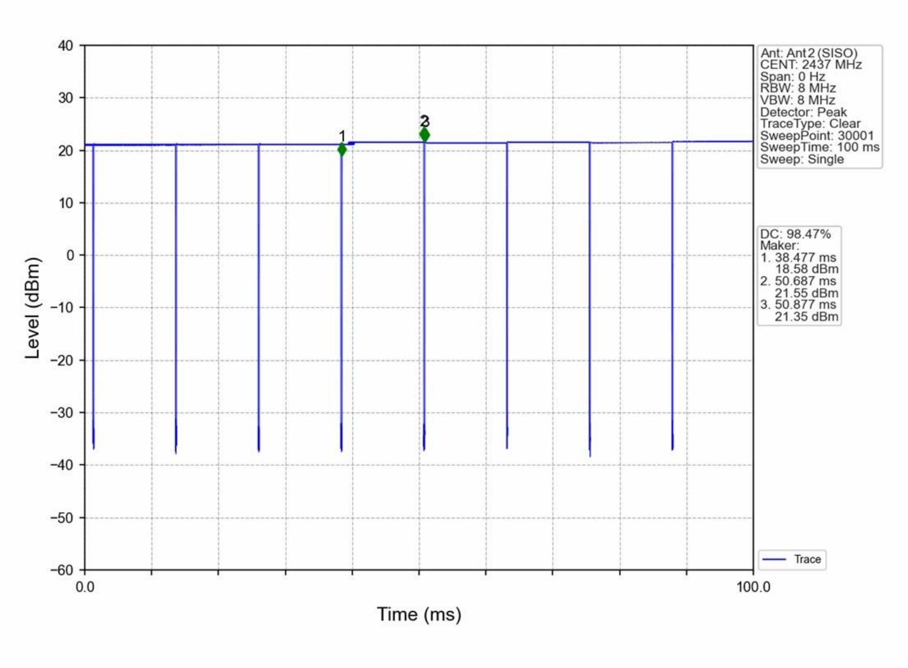
Table 8: HSUPA UE category

7.1.2 WiFi Test Configuration

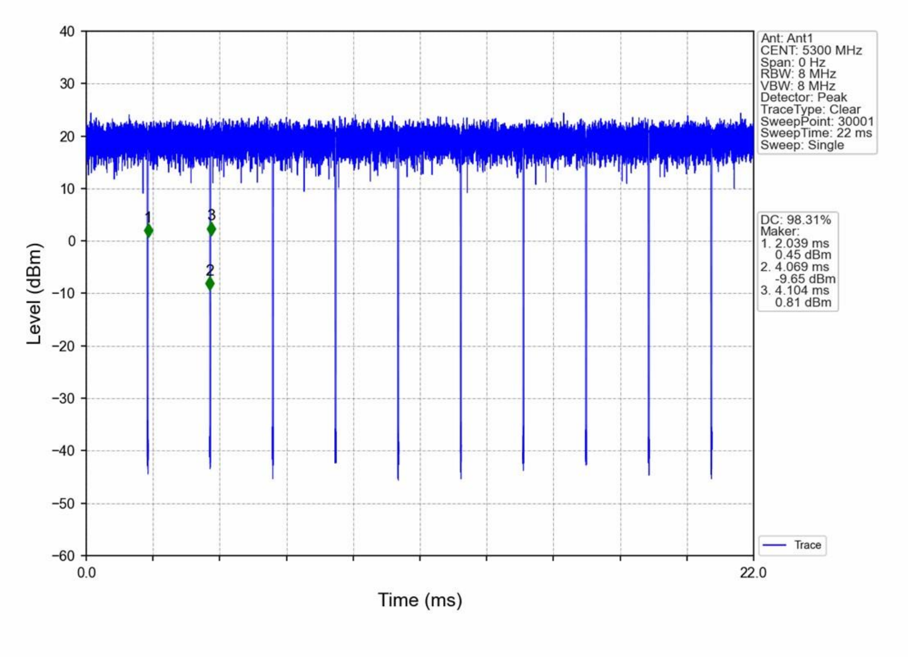
A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

7.1.3 Duty cycle

Wi-Fi 2.4GHz 802.11b:
Duty cycle= 98.47%



Wi-Fi 5GHz 802.11a:
Duty cycle=98.31%



7.1.3.1 Initial Test Position SAR Test Reduction Procedure

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

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

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

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

7.1.3.2 Initial Test Configuration Procedures

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

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

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

7.1.3.3 Subsequent Test Configuration Procedures

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

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

2）. When the highest *reported* SAR for the initial test configuration (when applicable, include subsequent highest output channels), according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

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

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

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

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

7.1.3.4 2.4 GHz WiFi SAR Procedures

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

- **802.11b DSSS SAR Test Requirements**

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

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

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

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

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

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

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

- **SAR Test Requirements for OFDM configurations**

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

7.1.3.5 5 GHz WiFi SAR Procedures

- **U-NII-1 and U-NII-2A Bands**

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

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR.
2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.
3) The two U-NII bands may be aggregated to support a 160 MHz channel on channel number 50. Without additional testing, the maximum output power for this is limited to the lower of the maximum output power certified for the two bands. When SAR measurement is required for at least one of the bands and the highest reported SAR adjusted by the ratio of specified maximum output power of aggregated to standalone band is > 1.2 W/kg, SAR is required for the 160 MHz channel. This procedure does not apply to an aggregated band with maximum output higher than the standalone band(s); the aggregated band must be tested independently for SAR. SAR is not required when the 160 MHz channel is operating at a reduced maximum power and also qualifies for SAR test exclusion.

- **U-NII-2C and U-NII-3 Bands**

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

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

OFDM Transmission Mode SAR Test Configuration and Channel Selection Requirements

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

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

- **SAR Test Requirements for OFDM configurations**

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

8 Test Result

8.1 Measurement of RF Conducted Power

The detailed power data can be referred to Appendix E Conducted RF Output Power.

8.2 Measurement of SAR Data

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.

2) Per KDB 447498 D04, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

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

3) For WiFi SAR test, as the highest reported SAR is smaller than 1.2 W/kg , and the tune-up of the other 802.11 modes are not higher than SAR measurement mode, therefore the adjusted SAR is ⩽ 1.2 W/kg for other 802.11 modes, SAR test for the other 802.11 modes are not required. For Product specific 10gSAR the highest reported SAR is smaller than 3.0 W/kg, SAR test for the other 802.11 modes are also not required.

8.2.1 SAR Result of WCDMA Band IV

WCDMA Band IV SAR Test Record										
Ant 4 Test Record										
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**SAR (W/kg) 1-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 1-g (W/kg)**	**Liquid Temp.(℃)**
Body worn Test data(Separate 10mm)										
Back side	RMC	1412/1732.4	1:1	0.701	0.11	23.81	25.00	1.315	**0.922**	22.6
Hotspot Test data(Separate 10mm)										
Back side	RMC	1412/1732.4	1:1	0.701	0.11	23.81	25.00	1.315	**0.922**	22.6

8.2.2 SAR Result of WIFI 2.4G

Wi-Fi 2.4G SAR Test Record											
Ant2 Test Record											
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**Duty Cycle Scaled factor**	**SAR (W/kg) 1-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 1-g (W/kg)**	**Liquid Temp.(℃)**
Head Test Data											
Left cheek	802.11b	6/2437	98.47%	1.016	0.341	-0.01	17.66	19.00	1.361	**0.471**	22.8

8.2.3 SAR Result of WIFI 5G

Wi-Fi 5G SAR Test Record											
Ant1 Test Record											
Test position	**Test mode**	**Test ch./Freq.**	**Duty Cycle**	**Duty Cycle Scaled factor**	**SAR (W/kg) 10-g**	**Power drift (dB)**	**Conducted Power(dBm)**	**Tune up Limit(dBm)**	**Scaled factor**	**Scaled SAR 10-g (W/kg)**	**Liquid Temp.(℃)**
Product specific 10gSAR Test data of U-NII-2A (Separate 0mm)											
Right side	802.11a	60/5300	98.31%	1.017	2.050	0.07	19.30	20.50	1.318	**2.749**	22.9

8.3 Multiple Transmitter Evaluation

8.3.1 Simultaneous SAR test evaluation

•Simultaneous Transmission Possibilities

No.	Simultaneous Tx Combination	Head	Body	Hotspot	Product specific 10g
1	WWAN + WLAN 2.4GHz	Yes	Yes	Yes	Yes
2	WWAN + WLAN 5GHz + BT	Yes	Yes	Yes	Yes

8.3.2 Simultaneous Transmission SAR Summation Scenario

Head:

Test position		SARmax (W/kg)				Summed SAR	
		Main Ant0	WiFi 2.4G Ant2	WiFi 5G Ant1	BT		
		1	2	3	4	1+2	1+3+4
GSM850	Left cheek	0.091	0.473	0.338	0.133	0.564	0.562
	Left tilted	0.043	0.300	0.385	0.097	0.343	0.525
	Right cheek	0.040	0.133	0.405	0.042	0.173	0.487
	Right tilted	0.018	0.126	0.408	0.039	0.144	0.465
GSM1900	Left cheek	0.164	0.473	0.338	0.133	0.637	0.635
	Left tilted	0.069	0.300	0.385	0.097	0.369	0.551
	Right cheek	0.082	0.133	0.405	0.042	0.215	0.529
	Right tilted	0.037	0.126	0.408	0.039	0.163	0.484
WCDMA BII	Left cheek	0.285	0.473	0.338	0.133	0.758	0.756
	Left tilted	0.254	0.300	0.385	0.097	0.554	0.736
	Right cheek	0.234	0.133	0.405	0.042	0.367	0.681
	Right tilted	0.129	0.126	0.408	0.039	0.255	0.576
WCDMA BIV	Left cheek	0.330	0.473	0.338	0.133	0.803	0.801
	Left tilted	0.153	0.300	0.385	0.097	0.453	0.635
	Right cheek	0.272	0.133	0.405	0.042	0.405	0.719
	Right tilted	0.134	0.126	0.408	0.039	0.260	0.581
WCDMA BV	Left cheek	0.133	0.473	0.338	0.133	0.606	0.604
	Left tilted	0.057	0.300	0.385	0.097	0.357	0.539
	Right cheek	0.115	0.133	0.405	0.042	0.248	0.562
	Right tilted	0.051	0.126	0.408	0.039	0.177	0.498
LTE B7	Left cheek	0.069	0.473	0.338	0.133	0.542	0.540
	Left tilted	0.049	0.300	0.385	0.097	0.349	0.531
	Right cheek	0.063	0.133	0.405	0.042	0.196	0.510
	Right tilted	0.035	0.126	0.408	0.039	0.161	0.482
LTE B12(17)	Left cheek	0.121	0.473	0.338	0.133	0.594	0.592
	Left tilted	0.069	0.300	0.385	0.097	0.369	0.551
	Right cheek	0.115	0.133	0.405	0.042	0.248	0.562
	Right tilted	0.070	0.126	0.408	0.039	0.196	0.517
LTE B13	Left cheek	0.196	0.473	0.338	0.133	0.669	0.667
	Left tilted	0.124	0.300	0.385	0.097	0.424	0.606
	Right cheek	0.183	0.133	0.405	0.042	0.316	0.630
	Right tilted	0.114	0.126	0.408	0.039	0.240	0.561
LTE B14	Left cheek	0.182	0.473	0.338	0.133	0.655	0.653
	Left tilted	0.114	0.300	0.385	0.097	0.414	0.596
	Right cheek	0.177	0.133	0.405	0.042	0.310	0.624
	Right tilted	0.113	0.126	0.408	0.039	0.239	0.560
LTE B25(2)	Left cheek	0.274	0.473	0.338	0.133	0.747	0.745
	Left tilted	0.120	0.300	0.385	0.097	0.420	0.602
	Right cheek	0.257	0.133	0.405	0.042	0.390	0.704
	Right tilted	0.107	0.126	0.408	0.039	0.233	0.554
LTE B26(5)	Left cheek	0.083	0.473	0.338	0.133	0.556	0.554
	Left tilted	0.058	0.300	0.385	0.097	0.358	0.540
	Right cheek	0.067	0.133	0.405	0.042	0.200	0.514
	Right tilted	0.047	0.126	0.408	0.039	0.173	0.494

LTE B30	Left cheek	0.236	0.473	0.338	0.133	0.709	0.707
	Left tilted	0.085	0.300	0.385	0.097	0.385	0.567
	Right cheek	0.174	0.133	0.405	0.042	0.307	0.621
	Right tilted	0.076	0.126	0.408	0.039	0.202	0.523
LTE B40	Left cheek	0.073	0.473	0.338	0.133	0.546	0.544
	Left tilted	0.037	0.300	0.385	0.097	0.337	0.519
	Right cheek	0.061	0.133	0.405	0.042	0.194	0.508
	Right tilted	0.057	0.126	0.408	0.039	0.183	0.504
LTE B41(38)	Left cheek	0.029	0.473	0.338	0.133	0.502	0.500
	Left tilted	0.017	0.300	0.385	0.097	0.317	0.499
	Right cheek	0.006	0.133	0.405	0.042	0.139	0.453
	Right tilted	0.002	0.126	0.408	0.039	0.128	0.449
LTE B66(4)	Left cheek	0.295	0.473	0.338	0.133	0.768	0.766
	Left tilted	0.161	0.300	0.385	0.097	0.461	0.643
	Right cheek	0.192	0.133	0.405	0.042	0.325	0.639
	Right tilted	0.124	0.126	0.408	0.039	0.250	0.571
LTE B71	Left cheek	0.121	0.473	0.338	0.133	0.594	0.592
	Left tilted	0.093	0.300	0.385	0.097	0.393	0.575
	Right cheek	0.101	0.133	0.405	0.042	0.234	0.548
	Right tilted	0.081	0.126	0.408	0.039	0.207	0.528

Body-worn:

Test position		SARmax (W/kg)				Summed SAR		Case N0	SPLSR Results
		Main Ant0	WiFi 2.4G Ant2	WiFi 5G Ant1	BT				
		1	2	3	4	1+2	1+3+4		
GSM850	Front side	0.089	0.126	0.305	0.034	0.215	0.428	/	/
	Back side	0.248	0.303	0.507	0.080	0.551	0.835	/	/
GSM1900	Front side	0.162	0.126	0.305	0.034	0.288	0.501	/	/
	Back side	0.295	0.303	0.507	0.080	0.598	0.882	/	/
WCDMA BII	Front side	0.450	0.126	0.305	0.034	0.576	0.789	/	/
	Back side	0.487	0.303	0.507	0.080	0.790	1.074	/	/
WCDMA BIV	Front side	0.685	0.126	0.305	0.034	0.811	1.024	/	/
	Back side	1.077	0.303	0.507	0.080	1.380	1.664	1#	0.01
WCDMA BV	Front side	0.333	0.126	0.305	0.034	0.459	0.672	/	/
	Back side	0.544	0.303	0.507	0.080	0.847	1.131	/	/
LTE B7	Front side	0.413	0.126	0.305	0.034	0.539	0.752	/	/
	Back side	0.638	0.303	0.507	0.080	0.941	1.225	/	/
LTE B12(17)	Front side	0.188	0.126	0.305	0.034	0.314	0.527	/	/
	Back side	0.296	0.303	0.507	0.080	0.599	0.883	/	/
LTE B13	Front side	0.353	0.126	0.305	0.034	0.479	0.692	/	/
	Back side	0.385	0.303	0.507	0.080	0.688	0.972	/	/
LTE B14	Front side	0.340	0.126	0.305	0.034	0.466	0.679	/	/
	Back side	0.381	0.303	0.507	0.080	0.684	0.968	/	/
LTE B25(2)	Front side	0.347	0.126	0.305	0.034	0.473	0.686	/	/
	Back side	0.444	0.303	0.507	0.080	0.747	1.031	/	/
LTE B26(5)	Front side	0.201	0.126	0.305	0.034	0.327	0.540	/	/
	Back side	0.310	0.303	0.507	0.080	0.613	0.897	/	/
LTE B30	Front side	0.645	0.126	0.305	0.034	0.771	0.984	/	/
	Back side	0.492	0.303	0.507	0.080	0.795	1.079	/	/
LTE B40	Front side	0.229	0.126	0.305	0.034	0.355	0.568	/	/
	Back side	0.186	0.303	0.507	0.080	0.489	0.773	/	/
LTE B41(38)	Front side	0.412	0.126	0.305	0.034	0.538	0.751	/	/
	Back side	0.924	0.303	0.507	0.080	1.227	1.511	/	/
LTE B66(4)	Front side	0.520	0.126	0.305	0.034	0.646	0.859	/	/
	Back side	0.851	0.303	0.507	0.080	1.154	1.438	/	/
LTE B71	Front side	0.204	0.126	0.305	0.034	0.330	0.543	/	/
	Back side	0.322	0.303	0.507	0.080	0.625	0.909	/	/

Hotspot:

Test position		SARmax (W/kg)				Summed SAR		Case N0	SPLSR Results
		Main Ant0	WiFi 2.4G Ant2	WiFi 5G Ant1	BT				
		1	2	3	4	1+2	1+3+4		
GSM850	Front side	0.089	0.126	0.205	0.034	0.215	0.328	/	/
	Back side	0.248	0.303	0.503	0.080	0.551	0.831	/	/
	Left side	0.094	0.000	0.000	0.000	0.094	0.094	/	/
	Right side	0.016	0.588	0.737	0.182	0.604	0.935	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.020	0.000	0.000	0.000	0.020	0.020	/	/
GSM1900	Front side	0.162	0.126	0.205	0.034	0.288	0.401	/	/
	Back side	0.295	0.303	0.503	0.080	0.598	0.878	/	/
	Left side	0.228	0.000	0.000	0.000	0.228	0.228	/	/
	Right side	0.019	0.588	0.737	0.182	0.607	0.938	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.181	0.000	0.000	0.000	0.181	0.181	/	/
WCDMA BII	Front side	0.450	0.126	0.205	0.034	0.576	0.689	/	/
	Back side	0.487	0.303	0.503	0.080	0.790	1.070	/	/
	Left side	0.403	0.000	0.000	0.000	0.403	0.403	/	/
	Right side	0.132	0.588	0.737	0.182	0.720	1.051	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.393	0.000	0.000	0.000	0.393	0.393	/	/
WCDMA BIV	Front side	0.685	0.126	0.205	0.034	0.811	0.924	/	/
	Back side	1.077	0.303	0.503	0.080	1.380	1.660	2#	0.01
	Left side	0.748	0.000	0.000	0.000	0.748	0.748	/	/
	Right side	0.216	0.588	0.737	0.182	0.804	1.135	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.572	0.000	0.000	0.000	0.572	0.572	/	/
WCDMA BV	Front side	0.333	0.126	0.205	0.034	0.459	0.572	/	/
	Back side	0.544	0.303	0.503	0.080	0.847	1.127	/	/
	Left side	0.280	0.000	0.000	0.000	0.280	0.280	/	/
	Right side	0.288	0.588	0.737	0.182	0.876	1.207	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.237	0.000	0.000	0.000	0.237	0.237	/	/
LTE B7	Front side	0.413	0.126	0.205	0.034	0.539	0.652	/	/
	Back side	0.638	0.303	0.503	0.080	0.941	1.221	/	/
	Left side	0.837	0.000	0.000	0.000	0.837	0.837	/	/
	Right side	0.174	0.588	0.737	0.182	0.762	1.093	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.241	0.000	0.000	0.000	0.241	0.241	/	/
LTE B12(17)	Front side	0.188	0.126	0.205	0.034	0.314	0.427	/	/
	Back side	0.296	0.303	0.503	0.080	0.599	0.879	/	/
	Left side	0.191	0.000	0.000	0.000	0.191	0.191	/	/
	Right side	0.165	0.588	0.737	0.182	0.753	1.084	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.110	0.000	0.000	0.000	0.110	0.110	/	/
LTE B13	Front side	0.353	0.126	0.205	0.034	0.479	0.592	/	/
	Back side	0.385	0.303	0.503	0.080	0.688	0.968	/	/
	Left side	0.201	0.000	0.000	0.000	0.201	0.201	/	/
	Right side	0.244	0.588	0.737	0.182	0.832	1.163	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.170	0.000	0.000	0.000	0.170	0.170	/	/
LTE B14	Front side	0.340	0.126	0.205	0.034	0.466	0.579	/	/
	Back side	0.381	0.303	0.503	0.080	0.684	0.964	/	/
	Left side	0.197	0.000	0.000	0.000	0.197	0.197	/	/

	Right side	0.253	0.588	0.737	0.182	0.841	1.172	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.182	0.000	0.000	0.000	0.182	0.182	/	/
LTE B25(2)	Front side	0.347	0.126	0.205	0.034	0.473	0.586	/	/
	Back side	0.444	0.303	0.503	0.080	0.747	1.027	/	/
	Left side	0.359	0.000	0.000	0.000	0.359	0.359	/	/
	Right side	0.112	0.588	0.737	0.182	0.700	1.031	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.313	0.000	0.000	0.000	0.313	0.313	/	/
LTE B26(5)	Front side	0.201	0.126	0.205	0.034	0.327	0.440	/	/
	Back side	0.310	0.303	0.503	0.080	0.613	0.893	/	/
	Left side	0.083	0.000	0.000	0.000	0.083	0.083	/	/
	Right side	0.122	0.588	0.737	0.182	0.710	1.041	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.102	0.000	0.000	0.000	0.102	0.102	/	/
LTE B30	Front side	0.645	0.126	0.205	0.034	0.771	0.884	/	/
	Back side	0.492	0.303	0.503	0.080	0.795	1.075	/	/
	Left side	0.556	0.000	0.000	0.000	0.556	0.556	/	/
	Right side	0.219	0.588	0.737	0.182	0.807	1.138	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.493	0.000	0.000	0.000	0.493	0.493	/	/
LTE B40	Front side	0.229	0.126	0.205	0.034	0.355	0.468	/	/
	Back side	0.186	0.303	0.503	0.080	0.489	0.769	/	/
	Left side	0.177	0.000	0.000	0.000	0.177	0.177	/	/
	Right side	0.103	0.588	0.737	0.182	0.691	1.022	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.193	0.000	0.000	0.000	0.193	0.193	/	/
LTE B41(38)	Front side	0.412	0.126	0.205	0.034	0.538	0.651	/	/
	Back side	0.924	0.303	0.503	0.080	1.227	1.507	/	/
	Left side	1.050	0.000	0.000	0.000	1.050	1.050	/	/
	Right side	0.115	0.588	0.737	0.182	0.703	1.034	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.347	0.000	0.000	0.000	0.347	0.347	/	/
LTE B66(4)	Front side	0.520	0.126	0.205	0.034	0.646	0.759	/	/
	Back side	0.851	0.303	0.503	0.080	1.154	1.434	/	/
	Left side	0.597	0.000	0.000	0.000	0.597	0.597	/	/
	Right side	0.120	0.588	0.737	0.182	0.708	1.039	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.508	0.000	0.000	0.000	0.508	0.508	/	/
LTE B71	Front side	0.204	0.126	0.205	0.034	0.330	0.443	/	/
	Back side	0.322	0.303	0.503	0.080	0.625	0.905	/	/
	Left side	0.209	0.000	0.000	0.000	0.209	0.209	/	/
	Right side	0.179	0.588	0.737	0.182	0.767	1.098	/	/
	Top side	0.000	0.173	0.577	0.053	0.173	0.630	/	/
	Bottom side	0.120	0.000	0.000	0.000	0.120	0.120	/	/

Product specific 10g SAR:

Test position	SARmax (W/kg)		Summed SAR
	WiFi 5G Ant1	NFC	
	1	2	1+2
Front side	0.404	0.058	0.462
Back side	1.258	0.064	1.322
Left side	0.000	0.000	0.000
Right side	2.923	0.000	2.923
Top side	0.881	0.000	0.881
Bottom side	0.000	0.000	0.000

8.3.3 SPLSR Evaluation Analysis

1) When standalone SAR is measured for both antennas in the pair, the peak location separation distance is computed by the square root of [(x1−x2)2 + (y1−y2)2 + (z1−z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates in the area scans or extrapolated peak SAR locations in the zoom scans, as appropriate.
2) SPLSR = (SAR1 + SAR2)1.5 / (min. separation distance, mm). If SPLSR ⩽ 0.04 for 1g SAR, or SPLSR ⩽ 0.10 for 10g SAR simultaneously transmission SAR measurement is not necessary.
3) Per April 2022 TCB Workshop Notes, WLAN antenna 1 was summed algebraically with the BT Antenna 2 separately for the purposes of hybrid SPLSR combination and they are located at the top of the device.
4) Per April 2022 TCB Workshop, instead of doing a small volume scan over a co-located antenna pair, used summing the SAR values of the co-located pair and using that value in SPLSR calculation. In the calculation used the minimum distance between the spatially separated antenna and the closest antenna of the co-located antenna pair to be conservative.

Case No.	Position	Band	SAR (W/kg)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
				X	Y	Z				
1#	Back side 10mm	WCDMA BIV Ant4	1.077	-10.8	-83.1	-207	162.443	**1.664**	0.01	Not Required
		WiFi 5G Ant1	0.507	-55.4	73.1	-207				
		BT Ant2	0.080	-59.5	73.2	-207				
		WCDMA BIV Ant4	1.077	-10.8	-83.1	-207	163.711	**1.664**	0.01	Not Required
		BT Ant2	0.080	-59.5	73.2	-207				
		WiFi 5G Ant1	0.507	-55.4	73.1	-207				

Case No.	Position	Band	SAR (W/kg)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
				X	Y	Z				
2#	Back side 10mm	WCDMA BIV Ant4	1.077	-10.8	-83.1	-207	162.443	**1.660**	0.01	Not Required
		WiFi 5G Ant1	0.503	-55.4	73.1	-207				
		BT Ant2	0.080	-59.5	73.2	-207				
		WCDMA BIV Ant4	1.077	-10.8	-83.1	-207	163.711	**1.660**	0.01	Not Required
		BT Ant2	0.080	-59.5	73.2	-207				
		WiFi 5G Ant1	0.503	-55.4	73.1	-207				

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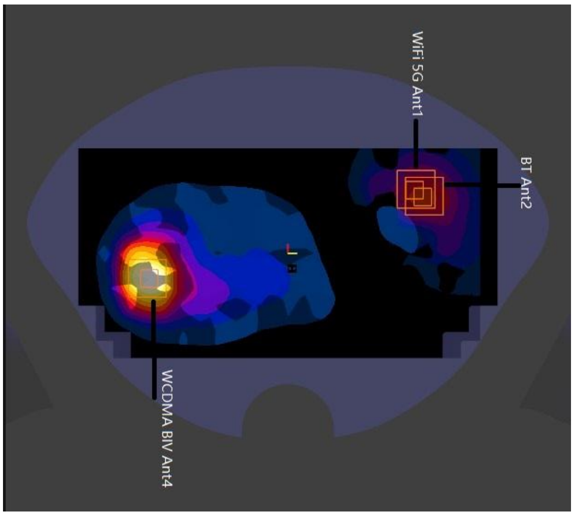

9 Equipment list

Test Platform		SPEAG DASY6 Professional				
Description		SAR Test System				
Software Reference		cDASY6 V16.4.0.5005				
Hardware Reference						
Equipment		Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	Twin Phantom	SPEAG	Twin-SAM V8.0	2031	NCR	NCR
☒	DAE	SPEAG	DAE4	1740	2025-02-17	2026-02-16
☒	E-Field Probe	SPEAG	EX3DV4	7735	2025-01-29	2026-01-28
☒	Validation Kits	SPEAG	D1800V2	2d170	2025-03-31	2028-03-30
☒	Validation Kits	SPEAG	D2450V2	922	2023-08-28	2026-08-27
☒	Validation Kits	SPEAG	D5GHzV2	1174	2023-08-23	2026-08-22
☒	Dielectric parameter probes	SPEAG	DAKS-3.5	1120	2024-08-20	2025-08-19
☒	Vector Network Analyzer and Vector Reflectometer	SPEAG	DAKS_VNA R140	50920	2024-08-19	2025-08-18
☒	Universal Radio Communication Tester	R&S	CMW500	111637	2024-09-12	2025-09-11
☒	RF Bi-Directional Coupler	Agilent	86205-60001	MY31400031	NCR	NCR
☒	Signal Generator	R&S	SMB100A	182393	2025-02-05	2026-02-04
☒	Preamplifier	Qiji	YX28980933	202104001	NCR	NCR
☒	USB Average Power Sensor	Keysight	U2002H	MY5639004	2024-09-10	2025-09-09
☒	USB Average Power Sensor	Agilent	U2002H	MY48200110	2024-11-21	2025-11-20
☒	Average Power Sensor	R&S	NRP6A	103953	2024-11-20	2025-11-19
☒	Average Power Sensor	R&S	NRP6A	103954	2024-11-20	2025-11-19
☒	Attenuator	SHX	TS2-3dB	30704	NCR	NCR
☒	Coaxial low pass filter	Mini-Circuits	VLF-2500(+)	NA	NCR	NCR
☒	Coaxial low pass filter	Microlab Fxr	LA-F13	NA	NCR	NCR
☒	DC POWER SUPPLY	SAKO	SK1730SL5A	NA	NCR	NCR
☒	Speed reading thermometer	LKM	DTM3000	NA	2024-09-14	2025-09-13
☒	Humidity and Temperature Indicator	MingGao	MingGao	NA	2024-09-16	2025-09-15

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

10 Calibration certificate

Please see the Appendix C

11 Photographs

Please see the Appendix D

Appendix A: Detailed System Check Results

Appendix B: Detailed Test Results

Appendix C: Calibration certificate

Appendix D: Photographs

Appendix E: Conducted RF Output Power

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