



SAR TEST REPORT

No. 25T04Z100488-007

For

TCL Communication Ltd.

GSM Mobile phone

Model Name: T319E

with

Hardware Version: 1896_MB_V1.0

Software Version: T319E_ALAV_2SIM_V07_20250408_UNLOCK

FCC ID: 2ACCJB238

Issued Date: 2025-05-09

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TTL.

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REPORT HISTORY

Report Number	Revision	Issue Date	Description
25T04Z100488-007	Rev.0	2025-04-25	Initial creation of test report
25T04Z100488-007	Rev.1	2025-05-09	Corrected a typographical error in section2 Table 2.3

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1 Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China 100191

1.3. Testing Environment

Normal Temperature: 18-25°C

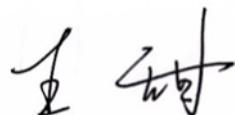
Relative Humidity: 30-70%

1.4. Project data

Testing Start Date: April 18, 2025

Testing End Date: April 24, 2025

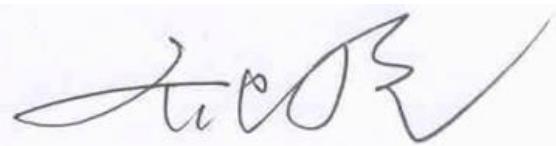
1.5. Signature



Wang Tian
(Prepared this test report)



Lin Jun
(Reviewed this test report)



Qi Dianyuan
Deputy Director of the laboratory
(Approved this test report)

2 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for TCL Communication Ltd. GSM Mobile phone T319E are as follows:

Table 2.1: Highest Reported SAR (1g)

Band	Highest Reported SAR (1g)			
	1g SAR Head	1g SAR Hotspot	1g SAR Body-worn	10g SAR Phablet
GSM 850	0.37	\	0.91	\
PCS 1900	0.46	\	0.69	\
BT	<0.01	\	<0.01	\

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/kg as averaged over any 1g tissue according to the ANSI C95.1-1992.

For body operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and which provides a minimum separation distance of 15 mm between this device and the body of the user. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output.

The measurement together with the test system set-up is described in annex C of this test report. A detailed description of the equipment under test can be found in chapter 4 of this test report. The highest reported SAR value is obtained at the case of (**Table 2.1**), and the values are:

Head: 0.46 W/kg(1g)

Body-worn: 0.91 W/kg(1g)

Table 2.2: Simultaneous Transmission-Head

	Position	Main antenna	BT	Sum
Highest SAR value for Head	Right head, Cheek	0.46 (GSM1900)	<0.01	0.46

Note1: the test positions of above tables are for the worse case that have been evaluated.

Table 2.3: Simultaneous Transmission-Body

	Position	Main antenna	BT	Sum
Highest SAR value for Body	Rear 15mm	0.91 (GSM850)	<0.01	0.91

Note1: the test positions of above tables are for the worse case that have been evaluated.

According to the above tables, the highest sum of reported SAR values is **0.91 W/kg (1g)**. The detail for simultaneous transmission consideration is described in chapter 13.

Conclusion:

According to the above tables, the sum of reported SAR values is <1.6W/kg for 1g SAR. So the simultaneous transmission SAR with volume scans is not required.

3 Client Information

3.1 Applicant Information

Company Name:	TCL Communication Ltd.
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Fax	0086-755-36612000-81722

3.2 Manufacturer Information

Company Name:	TCL Communication Ltd.
Address/Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person:	Ting Wang
Contact Email:	ting.wang.hz@tcl.com
Telephone:	+86 752 2639091
Fax	0086-755-36612000-81722

4 Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1 About EUT

Description:	GSM Mobile phone
Model name:	T319E
Tested Band:	GSM850/1900, BT
Tx Frequency:	824 – 849 MHz (GSM 850)
	1850 – 1910 MHz (GSM 1900)
	2400 – 2483.5 MHz (Bluetooth)
GPRS Multislot Class:	12
Test device production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna

4.2 Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
EUT1	353104320021267	1896_MB_V1.0	T319E_ALAV_2SIM_V07_20
	353104320025268		250408_UNLOCK
EUT2	353104320020095	1896_MB_V1.0	T319E_ALAV_2SIM_V07_20
	353104320024097		250408_UNLOCK

*EUT ID: is used to identify the test sample in the lab internally.

Note: It is performed to test SAR with the EUT1 and conducted power with the EUT2.

4.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	TLi010CB	/	ShenzhenAerospaceElectronic Co.,Ltd.
AE2	Battery	TLi010F5	/	SHEN ZHEN UTILITY ENERGY CO.,LTD.
AE3	Headset	JWEP1227-C02R	/	HUIZHOU JUWEI ELECTRONICS CO.,LTD.

*AE ID: is used to identify the test sample in the lab internally.

5 TEST METHODOLOGY

5.1 Applicable Limit Regulations

ANSI C95.1-1992: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

It specifies the maximum exposure limit of **4.0 W/kg** as averaged over any 10 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

5.2 Applicable Measurement Standards

IEEE Std 1528-2013: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.

EN IEC/IEEE 62209-1528:2021 Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from head-held and body-mounted wireless communication devices (Frequency range of 4 MHz to 10 GHz)

5.3 KDB and Workshop Procedures

KDB447498 D01: General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

KDB648474 D04 Handset SAR v01r03: SAR Evaluation Considerations for Wireless Handsets.

KDB941225 D06 Hotspot Mode SAR v02r01: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

KDB248227 D01 802.11 Wi-Fi SAR v02r02: SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS

KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz.

KDB865664 D02 RF Exposure Reporting v01r02: RF Exposure Compliance Reporting and Documentation Considerations

6 Specific Absorption Rate (SAR)

6.1 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/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

6.2 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:

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

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c \left(\frac{\delta T}{\delta t} \right)$$

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

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

Where: σ is the conductivity of the tissue, ρ is the mass density of tissue and E is the RMS electrical field strength.

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

7 Tissue Simulating Liquids

7.1 Targets for tissue simulating liquid

Table 7.1: Targets for tissue simulating liquid

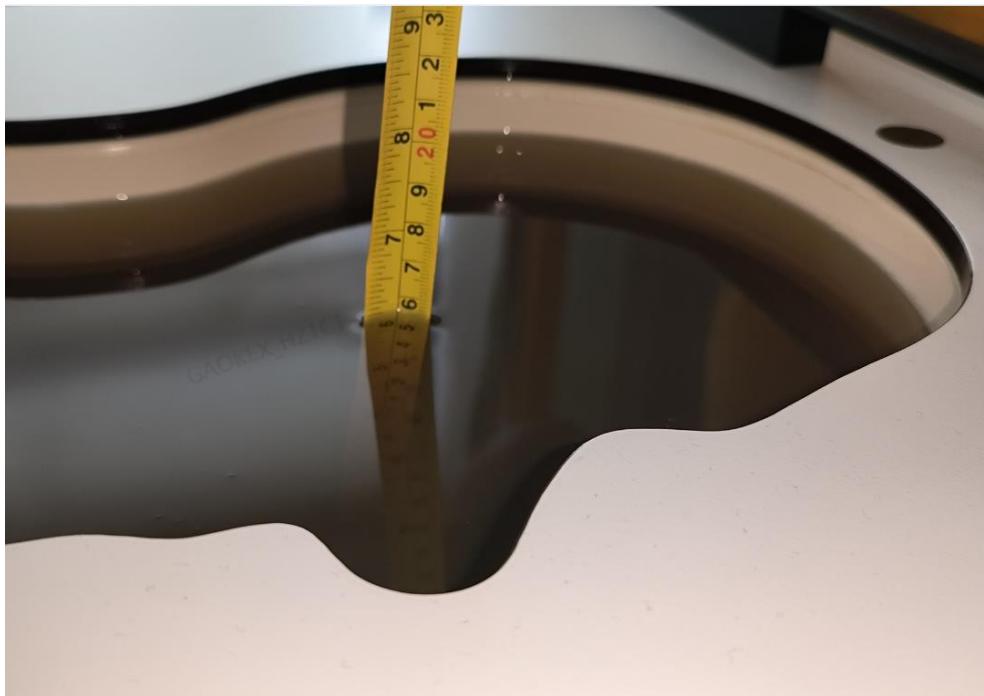
Frequency(MHz)	Liquid Type	Conductivity(σ)	$\pm 5\%$ Range	Permittivity(ϵ)	$\pm 5\%$ Range
750	Head	0.89	0.85~0.93	41.94	39.8~44.0
835	Head	0.90	0.86~0.95	41.5	39.4~43.6
1750	Head	1.37	1.30~1.44	40.08	38.1~42.1
1900	Head	1.40	1.33~1.47	40.0	38.0~42.0
2450	Head	1.80	1.62~1.98	39.2	35.28~43.12
2600	Head	1.96	1.76~2.16	39.01	35.11~42.91
3500	Head	2.91	2.76~3.06	37.93	36.03~39.83
3700	Head	3.22	3.06~3.38	37.6	35.72~39.48
3900	Head	3.32	3.15~3.49	37.5	35.63~39.38
5250	Head	4.71	4.47~4.95	35.93	34.13~37.73
5600	Head	5.07	4.82~5.32	35.53	33.8~37.3
5750	Head	5.22	4.96~5.48	35.36	33.59~37.13
6500	Head	6.07	5.77~6.37	34.50	32.78~36.23

7.2 Dielectric Performance

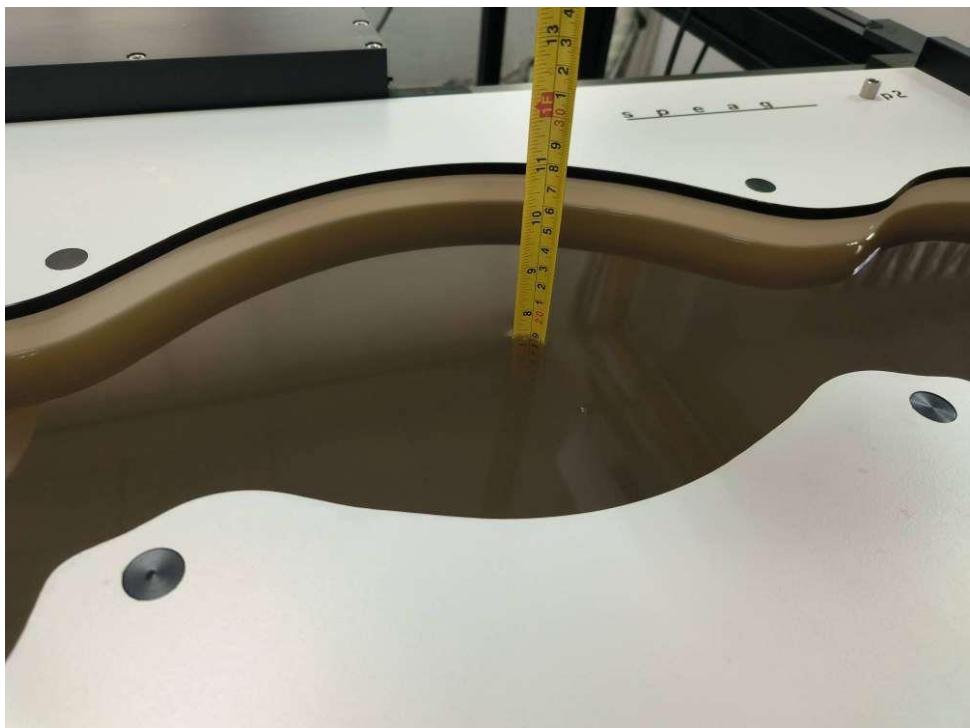
Table 7.2: Dielectric Performance of Tissue Simulating Liquid

Measurement Date (yyyy-mm-dd)	Type	Frequency	Permittivity ϵ	Drift (%)	Conductivity σ (S/m)	Drift (%)
2025/4/21	Head	900 MHz	43.25	4.22%	0.926	-4.54%
2025/4/23	Head	1900 MHz	41.58	3.95%	1.455	3.93%
2025/4/24	Head	2450 MHz	40.9	4.34%	1.87	3.89%

Note: The liquid temperature is 22.0°C



Picture 1 Liquid depth in the Head Phantom

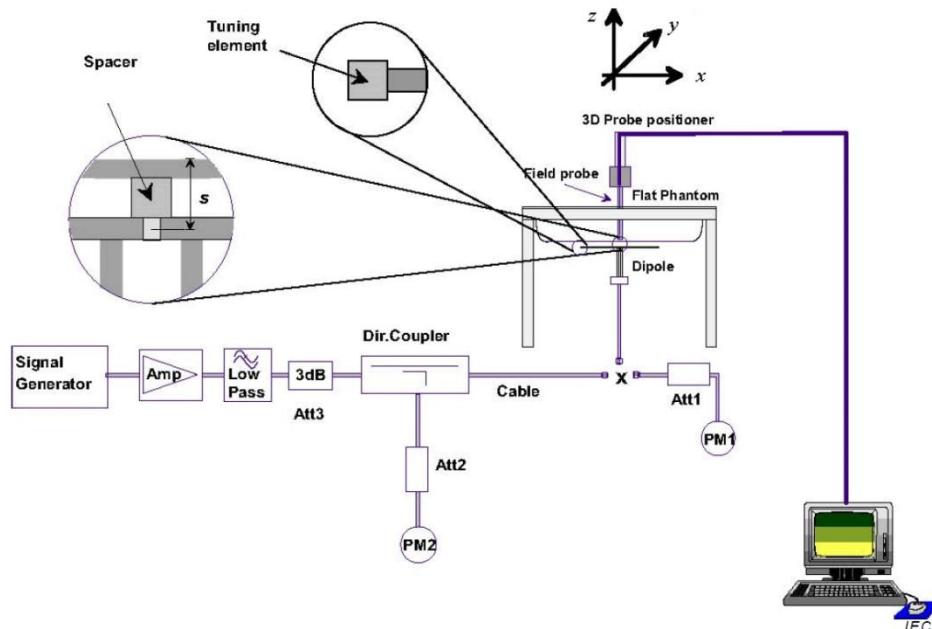


Picture 2 Liquid depth in the Flat Phantom

8 System verification

8.1 System Setup

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 that 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 equipment setup is shown below:



Picture 3 System Setup for System Evaluation



Picture 4 Photo of Dipole Setup

8.2 System Verification

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device.

Table 8.1: System Verification of Head

Measurement Date (yyyy-mm-dd)	Frequency	Target value (W/kg)		Measured value(W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
2025/4/21	900 MHz	6.93	10.9	6.76	10.64	-2.45%	-2.39%
2025/4/23	1900 MHz	20.6	39.1	20.4	38.6	-1.17%	-1.18%
2025/4/24	2450 MHz	24.5	52.2	24.7	52.8	0.73%	1.15%

9 Measurement Procedures

9.1 Tests to be performed

In order to determine the highest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in picture 5.

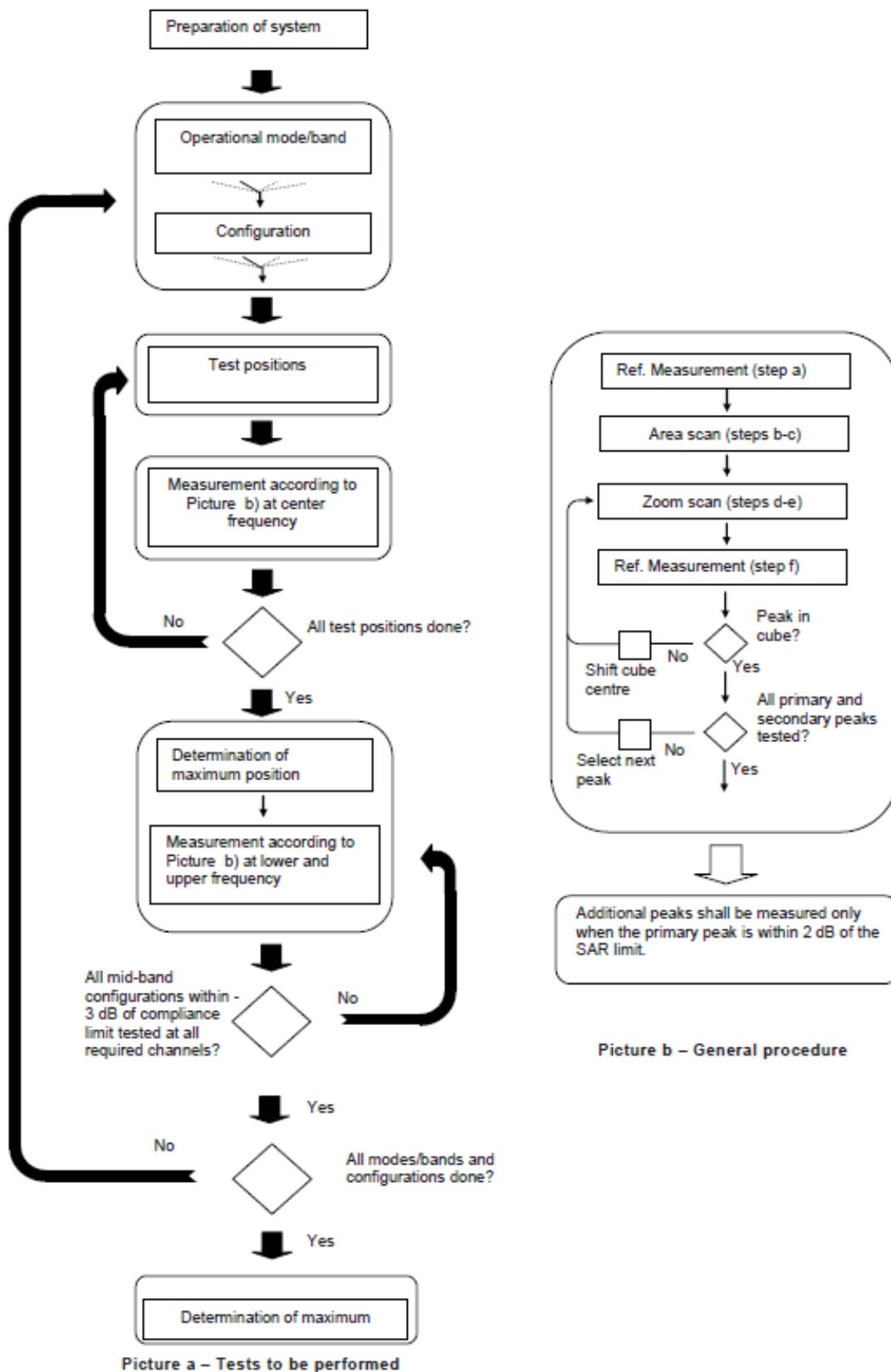
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

- a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, as described in annex D),
- b) all configurations for each device position in a), e.g., antenna extended and retracted, and
- c) all operational modes, e.g., analogue and digital, for each device position in a) and configuration in b) in each frequency band.

If more than three frequencies need to be tested according to 11.1 (i.e., $N_c > 3$), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

Step 2: For the condition providing highest peak spatial-average SAR determined in Step 1, perform all tests described in 9.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall be tested as well.

Step 3: Examine all data to determine the highest value of the peak spatial-average SAR found in Steps 1 to 2.



Picture 5 Block diagram of the tests to be performed

9.2 General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. 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 1528-2003. The results should be documented as part of the system validation records and may be requested to support test results when all the measurement parameters in the following table are not satisfied.

		≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location		$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
		≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$		When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be \leq the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$		≤ 2 GHz: ≤ 8 mm $2 - 3$ GHz: ≤ 5 mm*	$3 - 4$ GHz: ≤ 5 mm* $4 - 6$ GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$	≤ 5 mm	$3 - 4$ GHz: ≤ 4 mm $4 - 5$ GHz: ≤ 3 mm $5 - 6$ GHz: ≤ 2 mm
	graded grid $\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface $\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	≤ 4 mm $\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	$3 - 4$ GHz: ≤ 3 mm $4 - 5$ GHz: ≤ 2.5 mm $5 - 6$ GHz: ≤ 2 mm
Minimum zoom scan volume	x, y, z	≥ 30 mm	$3 - 4$ GHz: ≥ 28 mm $4 - 5$ GHz: ≥ 25 mm $5 - 6$ GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.			
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.			

9.3 WCDMA Measurement Procedures for SAR

The following procedures are applicable to WCDMA handsets operating under 3GPP Release99, Release 5 and Release 6. The default test configuration is to measure SAR with an established radio link between the DUT and a communication test set using a 12.2kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR is selectively confirmed for other physical channel configurations (DPCCH & DPDCH_n), HSDPA and HSPA (HSUPA/HSDPA) modes according to output power, exposure conditions and device operating capabilities. Both uplink and downlink should be configured with the same RMC or AMR, when required. SAR for Release 5 HSDPA and Release 6 HSPA are measured using the applicable FRC (fixed reference channel) and E-DCH reference channel configurations. Maximum output power is verified according to applicable versions of 3GPP TS 34.121 and SAR must be measured according to these maximum output conditions. When Maximum Power Reduction (MPR) is not implemented according to Cubic Metric (CM) requirements for Release 6 HSPA, the following procedures do not apply.

For Release 5 HSDPA Data Devices:

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}	CM/dB
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15	15/15	64	12/15	24/25	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

For Release 6 HSPA Data Devices

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (dB)	MPR (dB)	AG Index	E-TFCI
1	11/15	15/15	64	11/15	22/15	209/225	1039/225	4	1	1.5	1.5	20	75
2	6/15	15/15	64	6/15	12/15	12/15	12/15	4	1	1.5	1.5	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}:47/15$ $\beta_{ed2}:47/15$	4	2	1.5	1.5	15	92
4	2/15	15/15	64	2/15	4/15	4/15	56/75	4	1	1.5	1.5	17	71
5	15/15	15/15	64	15/15	24/15	30/15	134/15	4	1	1.5	1.5	21	81

Rel.8 DC-HSDPA (Cat 24)

SAR test exclusion for Rel.8 DC-HSDPA must satisfy the SAR test exclusion requirements of Rel.5 HSDPA. SAR test exclusion for DC-HSDPA devices is determined by power measurements according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to qualify for SAR test exclusion.

9.4 SAR Measurement for LTE

SAR tests for LTE are performed with a base station simulator, Rohde & Rchwarz CMW500. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. All powers were measured with the CMW 500.

It is performed for conducted power and SAR based on the KDB941225 D05.

SAR is evaluated separately according to the following procedures for the different test positions in each exposure condition – head, body, body-worn accessories and other use conditions. The procedures in the following subsections are applied separately to test each LTE frequency band.

1) QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

2) QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 1) are applied to measure the SAR for QPSK with 50% RB allocation.

3) QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in 1) and 2) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

TDD test:

TDD testing is performed using guidance from FCC KDB 941225 D05 and the SAR test guidance provided in April 2013 TCB works hop notes. TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211.

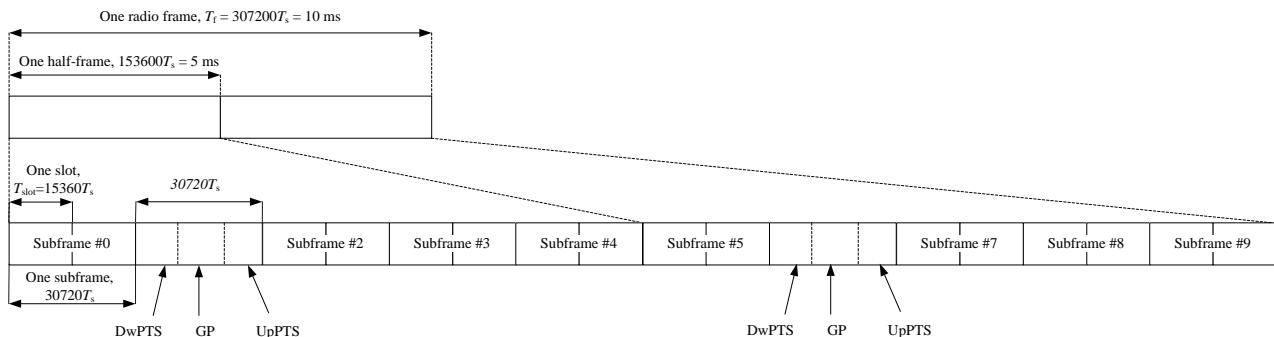


Figure 9.2: Frame structure type 2 (for 5 ms switch-point periodicity)

Table 9.1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	2192 $\cdot T_s$	2560 $\cdot T_s$	$7680 \cdot T_s$	2192 $\cdot T_s$	2560 $\cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$		
5	$6592 \cdot T_s$	4384 $\cdot T_s$	5120 $\cdot T_s$	$20480 \cdot T_s$	4384 $\cdot T_s$	5120 $\cdot T_s$
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Table 9.2: Uplink-downlink configurations

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Duty factor is calculated by:

Duty factor = uplink frame*6+UpPTS*2/one frame length

$$= (30720 \cdot T_s \cdot 6 + 5120 \cdot T_s \cdot 2) / 307200 \cdot T_s$$

$$= 0.633$$

9.5 Bluetooth & Wi-Fi Measurement Procedures for SAR

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable. Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

9.6 NR Measurement Procedures for SAR

Due to test setup limitations, SAR testing for NR was performed using Factory Test Mode software to establish the connection and perform SAR with 100% transmission.

9.7 Power Drift

To control the output power stability during the SAR test, DASY5 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in section14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

10 Conducted Output Power

10.1 GSM Measurement result

GSM850

GSM 850 Speech (GMSK)	Measured timeslot-averaged output power (dBm)			Tune up	calculation	Source-based time-averaged output power (dBm)		
	251	190	128			251	190	128
1 Txslot	33.02	33.08	33.13	33.50	/	/	/	/
GSM 850 GPRS (GMSK)	Measured timeslot-averaged output power (dBm)			Tune up	calculation	Source-based time-averaged output power (dBm)		
	251	190	128			251	190	128
1 Txslot	32.98	33.03	33.09	33.50	-9.03	23.95	24.00	24.06
2 Txslots	31.17	31.23	31.25	31.50	-6.02	25.15	25.21	25.23
3Txslots	29.57	29.64	29.65	30.00	-4.26	25.31	25.38	25.39
4 Txslots	27.83	27.99	28.08	28.50	-3.01	24.82	24.98	25.07

GSM1900

GSM 1900 Speech (GMSK)	Measured timeslot-averaged output power (dBm)			Tune up	calculation	Source-based time-averaged output power (dBm)		
	810	661	512			810	661	512
1 Txslot	28.78	28.80	28.84	30.00	/	/	/	/
GSM 1900 GPRS (GMSK)	Measured timeslot-averaged output power (dBm)			Tune up	calculation	Source-based time-averaged output power (dBm)		
	810	661	512			810	661	512
1 Txslot	28.76	28.81	28.87	30.00	-9.03	19.73	19.78	19.84
2 Txslots	27.49	27.58	27.64	28.00	-6.02	21.47	21.56	21.62
3Txslots	26.02	26.15	26.19	26.50	-4.26	21.76	21.89	21.93
4 Txslots	24.29	24.35	24.42	25.00	-3.01	21.28	21.34	21.41

10.2 BT Measurement result

		GFSK			EDR2M-4_DQPSK			EDR3M-8DPSK		
		Chan nel 0	Chan nel 39	Chan nel 78	Chan nel 0	Chan nel 39	Chan nel 78	Chan nel 0	Chan nel 39	Chan nel 78
Maximum Transmit Power(<20dBm)		9.52	9.38	9.17	8.26	8.49	7.93	8.26	8.44	7.90
Tune up		10	10	10	8.5	8.5	8.5	8.5	8.5	8.5

11 SAR Test Result

Note:

KDB 447498 D01 General RF Exposure Guidance:

For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor

For BT/WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor

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:

≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz

≤ 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

KDB 648474 D04 Handset SAR:

With headset attached, when the reported SAR for 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.

KDB 248227 D01 SAR meas for 802.11:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

To determine the initial test position, Area Scans were performed to determine the position with the Maximum Value of SAR (measured). The position that produced the highest Maximum Value of SAR is considered the worst case position; thus used as the initial test position.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The initial test position(s) is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the reported SAR for the initial test position is:

≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.

> 0.4 W/kg, SAR is repeated using the same wireless mode test configuration tested in the initial test position to measure the subsequent next closest/smallest test separation distance and maximum

coupling test position, on the highest maximum output power channel, until the reported SAR is $\leq 0.8 \text{ W/kg}$ or all required test positions are tested.

- For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
- When it is unclear, all equivalent conditions must be tested.

For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is $> 0.8 \text{ W/kg}$, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is $\leq 1.2 \text{ W/kg}$ or all required test channels are considered.

- The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.

When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is $\leq 1.2 \text{ W/kg}$, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.

When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is $\leq 1.2 \text{ W/kg}$, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

Table 11.1: Duty Cycle

Mode	Duty Cycle
Speech for GSM	1:8.3
GPRS&EGPRS 1 Slot	1:8.3
GPRS&EGPRS 2 Slot	1:4
GPRS&EGPRS 3 Slot	1:2.67
GPRS&EGPRS 4 Slot	1:2
WCDMA<E FDD	1:1
TDD PC3	1:1.58
TDD PC2	1:2.31

B: 2nd Battery

S: 2nd SIM

11.1 SAR results for 2G

RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test setup	Distance	Figure No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Head	GSM850	190	836.6	GSM	Cheek Left	0mm	\	33.08	33.50	0.220	0.24	0.153	0.17	0.00
Head	GSM850	190	836.6	GSM	Tilt Left	0mm	\	33.08	33.50	0.115	0.13	0.080	0.09	0.05
Head	GSM850	251	848.8	GSM	Cheek Right	0mm	A.Fig.1	33.02	33.50	0.327	0.37	0.229	0.26	-0.01
Head	GSM850	190	836.6	GSM	Cheek Right	0mm	\	33.08	33.50	0.270	0.30	0.193	0.21	-0.14
Head	GSM850	128	824.2	GSM	Cheek Right	0mm	\	33.13	33.50	0.148	0.16	0.104	0.11	0.03
Head	GSM850	190	836.6	GSM	Tilt Right	0mm	\	33.08	33.50	0.173	0.19	0.120	0.13	-0.15
Body	GSM850	190	836.6	GPRS(3TX)	Front	15mm	\	29.64	30.00	0.281	0.31	0.187	0.20	-0.12
Body	GSM850	251	848.8	GPRS(3TX)	Rear	15mm	A.Fig.2	29.57	30.00	0.820	0.91	0.572	0.63	-0.03
Body	GSM850	190	836.6	GPRS(3TX)	Rear	15mm	\	29.64	30.00	0.694	0.75	0.472	0.51	-0.01
Body	GSM850	128	824.2	GPRS(3TX)	Rear	15mm	\	29.65	30.00	0.705	0.76	0.505	0.55	0.06
Body	GSM850	251	848.8	GPRS(3TX)	Rear	15mm	B	29.57	30.00	0.701	0.77	0.433	0.48	0.16
Body	GSM850	251	848.8	GPRS(3TX)	Rear	15mm	S	29.57	30.00	0.689	0.76	0.421	0.46	0.14
Head	GSM1900	661	1880	GSM	Cheek Left	0mm	\	28.80	30.00	0.285	0.38	0.186	0.25	-0.12
Head	GSM1900	661	1880	GSM	Tilt Left	0mm	\	28.80	30.00	0.274	0.36	0.146	0.19	-0.03
Head	GSM1900	810	1909.8	GSM	Cheek Right	0mm	\	28.78	30.00	0.259	0.34	0.169	0.22	0.05
Head	GSM1900	661	1880	GSM	Cheek Right	0mm	\	28.80	30.00	0.325	0.43	0.204	0.27	-0.04
Head	GSM1900	512	1850.2	GSM	Cheek Right	0mm	A.Fig.3	28.84	30.00	0.355	0.46	0.228	0.30	0.00
Head	GSM1900	661	1880	GSM	Tilt Right	0mm	\	28.80	30.00	0.298	0.39	0.142	0.19	-0.04
Body	GSM1900	661	1880	GPRS(3TX)	Front	15mm	\	26.15	26.50	0.426	0.46	0.252	0.27	-0.03
Body	GSM1900	810	1909.8	GPRS(3TX)	Rear	15mm	\	26.02	26.50	0.539	0.60	0.326	0.36	0.07
Body	GSM1900	661	1880	GPRS(3TX)	Rear	15mm	\	26.15	26.50	0.581	0.63	0.349	0.38	0.05
Body	GSM1900	512	1850.2	GPRS(3TX)	Rear	15mm	A.Fig.4	26.19	26.50	0.643	0.69	0.380	0.41	0.02

11.2 SAR results for BT

RF Exposure Conditions	Frequency Band	Channel Number	Frequency (MHz)	Mode/RB	Test setup	Distance	Figure No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Head	BT	0	2402	GFSK	Cheek Left	0mm	\	9.52	10.00	<0.01	<0.01	<0.01	<0.01	\
Head	BT	0	2402	GFSK	Tilt Left	0mm	\	9.52	10.00	<0.01	<0.01	<0.01	<0.01	\
Head	BT	0	2402	GFSK	Cheek Right	0mm	\	9.52	10.00	<0.01	<0.01	<0.01	<0.01	\
Head	BT	0	2402	GFSK	Tilt Right	0mm	\	9.52	10.00	<0.01	<0.01	<0.01	<0.01	\
Body	BT	0	2402	GFSK	Front	15mm	\	9.52	10.00	<0.01	<0.01	<0.01	<0.01	\
Body	BT	0	2402	GFSK	Rear	15mm	\	9.52	10.00	<0.01	<0.01	<0.01	<0.01	\

12 SAR Measurement Variability

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. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

- 1) Repeated measurement is not required when the original highest measured SAR is $< 0.80 \text{ W/kg}$; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is $\geq 0.80 \text{ W/kg}$, 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 $\geq 1.45 \text{ W/kg}$ ($\sim 10\%$ from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is $\geq 1.5 \text{ W/kg}$ and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

Band	Frequency		Mode	Test Position	Distance (mm)	Highest Measured SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR (W/kg)
	Ch.	MHz							
GSM850	251	848.8	GPRS(3TX)	Rear	15mm	0.82	0.785	1.04	/

13 Simultaneous TX SAR Considerations

13.1 Transmit Antenna Separation Distances

The detail for transmit antenna separation distances is described in the additional document:

Appendix to test report No. 25T04Z100488-007

The photos of SAR test

13.2 Simultaneous Transmission Capabilities

The simultaneous transmission possibilities for this device are listed as below:

Capable Transmit Configurations			Head	Body
WWAN + BT			Yes	Yes

Note:

1. The reported SAR summation is calculated based on the same configuration and test position.
2. For the convenience of simultaneous transmission calculation, all SAR values less than 0.01 are uniformly written as 0.00

13.3 Evaluation of Simultaneous

Test Position		SAR 1g (W/kg)		
		GSM850	GSM1900	MAX. SAR 1g
Head	Left Cheek	0.24	0.38	0.38
	Left Tilt	0.13	0.36	0.36
	Right Cheek	0.37	0.46	0.46
	Right Tilt	0.19	0.39	0.39
	Front	0.31	0.46	0.46
	Rear	0.91	0.69	0.91

Test Position		SAR 1g (W/kg)		
		1	2	
Head	WWAN		BT	
	Left Cheek	0.38	0.00	
	Left Tilt	0.36	0.00	
	Right Cheek	0.46	0.00	
	Right Tilt	0.39	0.00	
	Body 15mm	Front	0.46	0.00

Test Position		SAR 1g (W/kg)		
		1+2		MAX. SAR 1g
Head	Left Cheek	0.38	0.38	
	Left Tilt	0.36	0.36	
	Right Cheek	0.46	0.46	
	Right Tilt	0.39	0.39	
	Body 15mm	Front	0.46	0.46
	Rear	0.91	0.91	0.91

Conclusion:

According to the above tables, the sum of reported SAR values is <1.6W/kg. So the simultaneous transmission SAR with volume scans is not required.

14 Measurement Uncertainty

14.1 Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.0	N	1	1	1	6.0	6.0	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	N	1	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521

Combined standard uncertainty	$u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					9.55	9.43	257
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$					19.1	18.9	

14.2 Measurement Uncertainty for Normal SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.55	N	1	1	1	6.55	6.55	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	∞
13	Post-processing	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞

21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
	Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					10.7	10.6	257
	Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$					21.4	21.1	

15 MAIN TEST INSTRUMENTS

Table 15.1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date		Valid Period	
01	Network analyzer	N5239A	MY55491241	May 21, 2024		One year	
02	Power sensor	NRP50S	101488	June 5, 2024		One year	
03	Power sensor	NRP50S	101489				
04	Signal Generator	MG3700A	6201052605	June 12 2024		One Year	
05	Amplifier	60S1G4	0331848	No Calibration Requested			
06	BTS	CMW500	159889	January 21, 2025		One year	
07	DAE	DAE4	1556	January 07, 2025		One year	
08	E-field Probe	EX3DV4	7548	January 06, 2025		One year	
09	Dipole Validation Kit	D900V2	1d051	July 9,2024		One year	
10	Dipole Validation Kit	D1900V2	5d101	July 8,2024		One year	
11	Dipole Validation Kit	D2450V2	853	July 10,2024		One year	

END OF REPORT BODY

Appendices

Refer to separated files for the following appendixes

ANNEX A Graph Results

ANNEX B System Verification Results

ANNEX C SAR Measurement Setup

ANNEX D Position of the wireless device in relation to the phantom

ANNEX E Equivalent Media Recipes

ANNEX F System Validation

ANNEX G Probe Calibration Certificate

ANNEX H Dipole Calibration Certificate

ANNEX I Accreditation Certificate