REPORT No.：SZ18050200S01

SAR TEST REPORT

APPLICANT	:	Shenzhen Chainway Information Technology Co.,Ltd.
PRODUCT NAME	:	Mobile Data Terminal
MODEL NAME	:	C75
BRAND NAME	:	CHAINWAY
FCC ID	:	2AC6AC75
STANDARD(S)	:	47CFR 2.1093 IEEE 1528-2013
TEST DATE	:	2018-06-19 to 2018-06-25
ISSUE DATE	:	2018-07-02

Tested by: Gan Yueming

Gan Yueming(Test engineer)

Approved by: Peng Huarui

Peng Huarui(Supervisor)

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DIRECTORY

Change History		
Issue	**Date**	**Reason for change**
1.0	2018-07-02	First edition

1. Technical Information

Note: Provide by manufacturer.

1.1. Applicant and Manufacturer Information

Applicant:	Shenzhen Chainway Information Technology Co.,Ltd.
Applicant Address:	9/F, Building 2, Daqian Industrial Park, Longchang Rd., District 67, Bao'an, Shenzhen
Manufacturer:	Shenzhen Chainway Information Technology Co.,Ltd.
Manufacturer Address:	9/F, Building 2, Daqian Industrial Park, Longchang Rd., District 67, Bao'an, Shenzhen

1.2. Equipment Under Test (EUT) Description

Model Name:	C75
Brand Name:	CHAINWAY
Hardware Version:	C70_MB_V11
Software Version:	C75A_MT6737_V1.2_AM_GITe4dc346_201805181532
Frequency Bands:	GSM850: 824.2 MHz ~ 848.8MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band II: 1852.4 MHz ~ 1907.6MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6MHz WCDMA Band V: 826.4 MHz ~ 846.6MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 17: 704 MHz ~ 716 MHz WLAN 2.4GHz: 2412 MHz ~ 2462 MHz WLAN 5GHz Band 1: 5150 MHz ~ 5250 MHz; WLAN 5GHz Band 2: 5250 MHz ~ 5350 MHz; WLAN 5GHz Band 3: 5470 MHz ~ 5725 MHz; WLAN 5GHz Band 4: 5725 MHz ~ 5850 MHz; Bluetooth: 2402 MHz ~ 2480 MHz
Modulation Mode:	GSM/GPRS: GMSK EDGE: 8PSK WCDMA: QPSK WLAN2.4GHz 802.11b:DSSS WLAN2.4GHz 802.11g/n HT20/HT40: OFDM

	WLAN5GHz 802.11a/n HT20/HT40: OFDM Bluetooth: GFSK, π/4-DQPSK, 8-DPSK		
Multi-slot Class:	GPRS: Multi-slot Class 12; EDGE: Multi-slot Class 12;		
Operation mode:	Class B		
Hotspot function:	Support Hotspot		
Antenna type:	FPC Antenna		
Battery Model:	BL9503		
Battery specification:	2800mAh 3.85V		
SIM cards description:	Single SIM card		
Max Scaled SAR-1g(W/Kg)	Head	0.479W/kg	Limit(W/kg): 1.6W/kg
	Body-worn	0.655W/kg	

Note: For a more detailed description, please refer to specification or user's manual supplied by the applicant and/or manufacturer.

1.3. Summary of Maximum SAR Value

Frequency Band		Highest SAR Summary	
		Head (Separation 0mm)	Body-worn (Separation 10mm)
		1g SAR (W/kg)	
WWAN	GSM850	0.126	0.498
	GSM1900	0.083	0.172
	WCDMA Band II	0.071	0.156
	WCDMA Band IV	0.077	**0.655**
	WCDMA Band V	0.077	0.202
	LTE Band 2	0.059	0.159
	LTE Band 4	0.048	0.517
	LTE Band 12	0.047	0.424
	LTE Band 17	0.023	0.021
WLAN	2.4GHz WLAN	**0.479**	0.087
	5GHz WLAN	0.457	0.164
2.4GHz Band	Bluetooth	N/A	0.093
Highest Simultaneous Transmission 1g SAR (W/kg)		Head	Body-worn
WWAN+WLAN 2.4GHz		0.558	0.674
WWAN+WLAN 5GHz		0.540	0.807
WWAN+Bluetooth		N/A	0.748

Note:

1、The summary maximum simultaneous transmission SAR is combined at the same exposure position.

2、Bluetooth is not required for SAR testing.

1.4. Photographs of the EUT

Please refer to the External Photos for the Photos of the EUT

1.5. Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title
1	**47 CFR§2.1093**	Radiofrequency Radiation Exposure Evaluation: Portable Devices
2	**IEEE 1528-2013**	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
3	**KDB 447498 D01v06**	General RF Exposure Guidance
4	**KDB 248227 D01v02r02**	SAR Measurement Procedures for 802.11 Transmitters
5	**KDB 865664 D01v01r04**	SAR Measurement 100 MHz to 6 GHz
6	**KDB 865664 D02v01r02**	RF Exposure Reporting
7	**KDB 648474 D04v01r03**	Handset SAR
8	**KDB 941225 D01v03r01**	3G SAR Measurement Procedures
9	**KDB 941225 D05v02r05**	SAR Evaluation Consideration for LTE Devices
10	**KDB 941225 D06v02r01**	SAR Evaluation Procedures For Portable Devices With Wireless Router Capabilities

2. Device Category and SAR Limits

Uncontrolled Environment

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

Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

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

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Note: This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

3. Specific Absorption Rate (SAR)

3.1. Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/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 Middle than the limits for general population/uncontrolled.

3.2. SAR Definition

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

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

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

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

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

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

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

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

4. SAR Measurement Setup

4.1. The Measurement System

Como SAR is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The Como SAR system consists of the Following items:

- Main computer to control all the system
- 6 axis robot
- Data acquisition system
- Miniature E-field probe
- Phone holder
- Head simulating tissue

The Following figure shows the system.

The EUT under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The OpenSAR software computes the results to give a SAR value in a 1g or 10g mass.

4.2. Probe

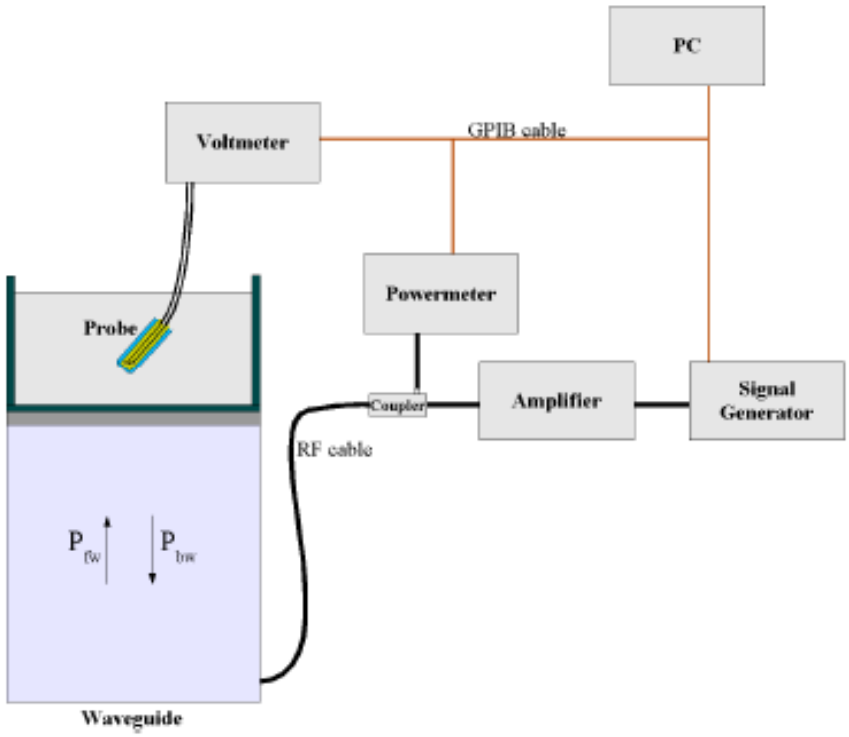
For the measurements the Specific Dosimetric E-Field Probe SN 37/08 EP80 with Following specifications is used

- Dynamic range: 0.01-100 W/kg

- Tip Diameter: 6.5 mm
- Distance between probe tip and sensor center: 2.5mm
- Distance between sensor center and the inner phantom surface: 4 mm
  (repeatability better than +/- 1mm)
- Probe linearity: <0.25 dB
- Axial Isotropy: <0.25 dB
- Spherical Isotropy: <0.25 dB
- Calibration range: 835to 2500MHz for head & body simulating liquid.

Angle between probe axis (evaluation axis) and surface normal line: less than 30°

Probe calibration is realized, in compliance with CENELEC EN 62209 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 622091 annex technique using reference guide at the five frequencies.



$$SAR = \frac{4\,(P_{fw} - P_{bw})}{ab\delta} \cos^2\left(\pi \frac{y}{a}\right) e^{-(2z/\delta)}$$

Where :

Pfw = Forward Power

Pbw = Backward Power

a and b = Waveguide dimensions

ı = Skin depth

Keithley configuration:

Rate = Medium; Filter =ON; RDGS=10; FILTER TYPE =MOVING AVERAGE; RANGE AUTO

After each calibration, a SAR measurement is performed on a validation dipole and compared with aNPL calibrated probe, to verify it.

The calibration factors, CF(N), for the 3 sensors corresponding to dipole 1, dipole 2 and dipole 3 are:

$$CF(N)=SAR(N)/Vlin(N) \qquad (N=1,2,3)$$

The linearised output voltage Vlin(N) is obtained from the displayed output voltage V(N) using

$$Vlin(N)=V(N)*(1+V(N)/DCP(N)) \qquad (N=1,2,3)$$

Where DCP is the diode compression point in mV.

4.3. Probe Calibration Process

Dosimetric Assessment Procedure

Each E-Probe/Probe Amplifier combination has unique calibration parameters. SATIMO Probe calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm^2) using an with CALISAR, Antenna proprietary calibration system.

Free Space Assessment Procedure

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/cm^2.

Temperature Assessment Procedure

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulating head tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

Where:

δt = exposure time (30 seconds),

C = heat capacity of tissue (brainor muscle),

δT = temperature increase due to RF exposure.

SAR is proportional to ΔT/Δt, the initial rate of tissue heating, before thermal diffusion takes place. The electric field in the simulated tissue can be used to estimate SAR by equating the thermally derived SAR to that with the E- field component.

Where:

σ = simulated tissue conductivity,

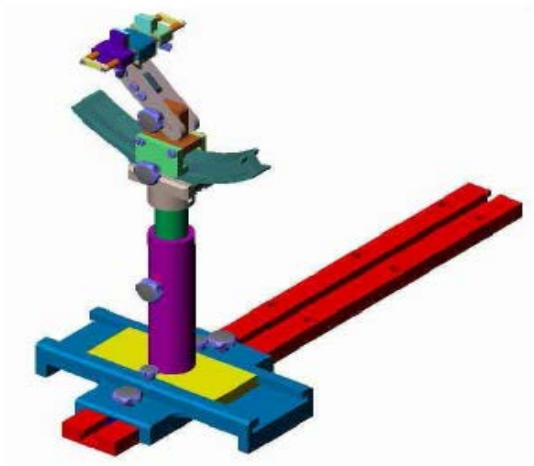
ρ = Tissue density (1.25 g/cm³ for brain tissue)

4.4. Phantom

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

4.5. Device Holder

The positioning system allows obtaining cheek and tilting position with a very good accuracy. In compliance with CENELEC, the tilt angle uncertainty is Middle than 1°.



Device holder

System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005

5. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

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

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

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

<SAR measurement>

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

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

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

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

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

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

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

(a) Power reference measurement

(b) Area scan

(c) Zoom scan

(d) Power drift measurement

5.1. Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value. The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

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

(a) Extraction of the measured data (grid and values) from the Zoom Scan

(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)

(c) Generation of a high-resolution mesh within the measured volume

(d) Interpolation of all measured values form the measurement grid to the high-resolution grid

(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface

(f)Calculation of the averaged SAR within masses of 1g and 10g

5.2. Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	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.	

5.3. Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.
Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{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: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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 *reported* 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.

5.4. Power Drift Monitoring

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

6. Tissue Simulating Liquids

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with Homogeneous tissue simulating liquid to a depth of at least 15cm. For head SAR testing, the liquid height from the ear reference point(ERP) of the phantom to the liquid top surface is larger than15cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than15cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in below table.

Fig 5.1 Photo of Liquid Height for Head SAR

Fig 5.2 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquids

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

Note: Please refer to the validation results for dielectric parameters of each frequency band.

The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using an Agilent 85033E Dielectric Probe Kit and an Agilent Network Analyzer.

Table : Dielectric Performance of Tissue Simulating Liquid

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Conductivity Target (σ)	Delta (σ) (%)	Limit (%)	Date
750	HSL	21.2	0.886	0.89	-0.45	±5	2018.06.23
835	HSL	21.2	0.892	0.90	-0.89	±5	2018.06.23
1800	HSL	22.6	1.365	1.40	-2.50	±5	2018.06.19
2000	HSL	22.4	1.415	1.40	1.07	±5	2018.06.19
2450	HSL	21.8	1.837	1.80	2.06	±5	2018.06.21
2600	HSL	21.8	1.976	1.96	0.82	±5	2018.06.21
5200	HSL	22.1	4.672	4.66	0.26	±5	2018.06.22
5600	HSL	22.1	5.110	5.07	0.79	±5	2018.06.22
5800	HSL	22.1	5.320	5.27	0.95	±5	2018.06.22
750	MSL	21.2	1.031	0.96	-0.94	±5	2018.06.25
835	MSL	21.2	1.070	0.97	-0.62	±5	2018.06.25
1800	MSL	22.6	1.516	1.52	-0.26	±5	2018.06.24
2000	MSL	22.4	1.515	1.52	-0.33	±5	2018.06.24
2450	MSL	21.8	1.967	1.95	0.87	±5	2018.06.21
2600	MSL	21.8	2.113	2.16	-2.18	±5	2018.06.21
5200	MSL	22.1	5.450	5.30	2.83	±5	2018.06.20
5600	MSL	22.1	5.751	5.77	-0.33	±5	2018.06.20
5800	MSL	22.1	5.932	6.00	-1.13	±5	2018.06.20

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Permittivity (ε_r)	Permittivity Target (ε_r)	Delta (ε_r) (%)	Limit (%)	Date
750	HSL	21.2	41.340	41.90	-1.34	±5	2018.06.23
835	HSL	21.2	41.183	41.50	-0.76	±5	2018.06.23
1800	HSL	22.6	40.096	40.00	0.24	±5	2018.06.19
2000	HSL	22.4	39.985	40.00	-0.04	±5	2018.06.19
2450	HSL	21.8	39.295	39.20	0.24	±5	2018.06.21
2600	HSL	21.8	39.013	39.00	0.03	±5	2018.06.21
5200	HSL	22.1	36.127	36.00	0.35	±5	2018.06.22
5600	HSL	22.1	35.565	35.50	0.18	±5	2018.06.22
5800	HSL	22.1	5.320	35.30	0.07	±5	2018.06.22

750	MSL	21.2	53.518	55.50	-3.57	±5	2018.06.25
835	MSL	21.2	55.384	55.20	0.33	±5	2018.06.25
1800	MSL	22.6	53.296	53.30	-0.01	±5	2018.06.24
2000	MSL	22.4	53.286	53.30	-0.03	±5	2018.06.24
2450	MSL	21.8	1.968	52.70	0.36	±5	2018.06.21
2600	MSL	21.8	52.365	52.50	-0.26	±5	2018.06.21
5200	MSL	22.1	48.286	49.00	-1.46	±5	2018.06.20
5600	MSL	22.1	48.395	48.50	-0.22	±5	2018.06.20
5800	MSL	22.1	48.095	48.20	-0.22	±5	2018.06.20

7. Uncertainty Assessment

The Following table includes the uncertainty table of the IEEE 1528. The values are determined by Antennessa.

7.1. Uncertainty Evaluation For EUT SAR Test

a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+- %)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	5.83	N	1	1	1	5.83	5.83	∞
Axial Isotropy	E.2.2	3.5	R	$\sqrt{3}$	1	1	2.02	2.02	∞
Hemispherical Isotropy	E.2.2	5.9	R	$\sqrt{3}$	1	1	3.41	3.41	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	E.2.4	4.7	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation Response	E.2.4	4.1	R	$\sqrt{3}$	1	1	2.4	2.4	∞
Readout Electronics	E.2.6	0.5	N	1	1	1	0.5	0.5	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	3.0	3.0	∞
Integration Time	E.2.8	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioner Mechanical Tolerance	E.6.2	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to Phantom Shell	E.6.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	2.3	R	$\sqrt{3}$	1	1	1.33	1.33	∞
Test sample Related									
Test sample positioning	E.4.2.1	2.6	N	1	1	1	2.6	2.6	N-1
Device Holder Uncertainty	E.4.1.	3.0	N	1	1	1	3.0	3.0	N-1

	1								
Output power Power drift - SAR drift measurement	6.6.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	4.0	R	$\sqrt{3}$	1	1	2.31	2.31	∞
Liquid conductivity - deviation from target value	E.3.2	2.0	R	$\sqrt{3}$	0.64	0.43	1.69	1.13	∞
Liquid conductivity - measurement uncertainty	E.3.3	2.5	N	1	0.64	0.43	3.20	2.15	M
Liquid permittivity - deviation from target value	E.3.2	2.5	R	$\sqrt{3}$	0.6	0.49	1.28	1.04	∞
Liquid permittivity - measurement uncertainty	E.3.3	5.0	N	1	0.6	0.49	6.00	4.90	M
Liquid conductivity–temperature uncertainty	E.3.4		R	$\sqrt{3}$	0.78	0.41			∞
Liquidpermittivity–temperature uncertainty	E.3.4		R	$\sqrt{3}$	0.23	0.26			∞
Combined Standard Uncertainty			RSS				11.55	12.07	
Expanded Uncertainty (95% Confidence interval)			K=2				± 23.20	± 24.17	

7.2. Uncertainty For System Performance Check

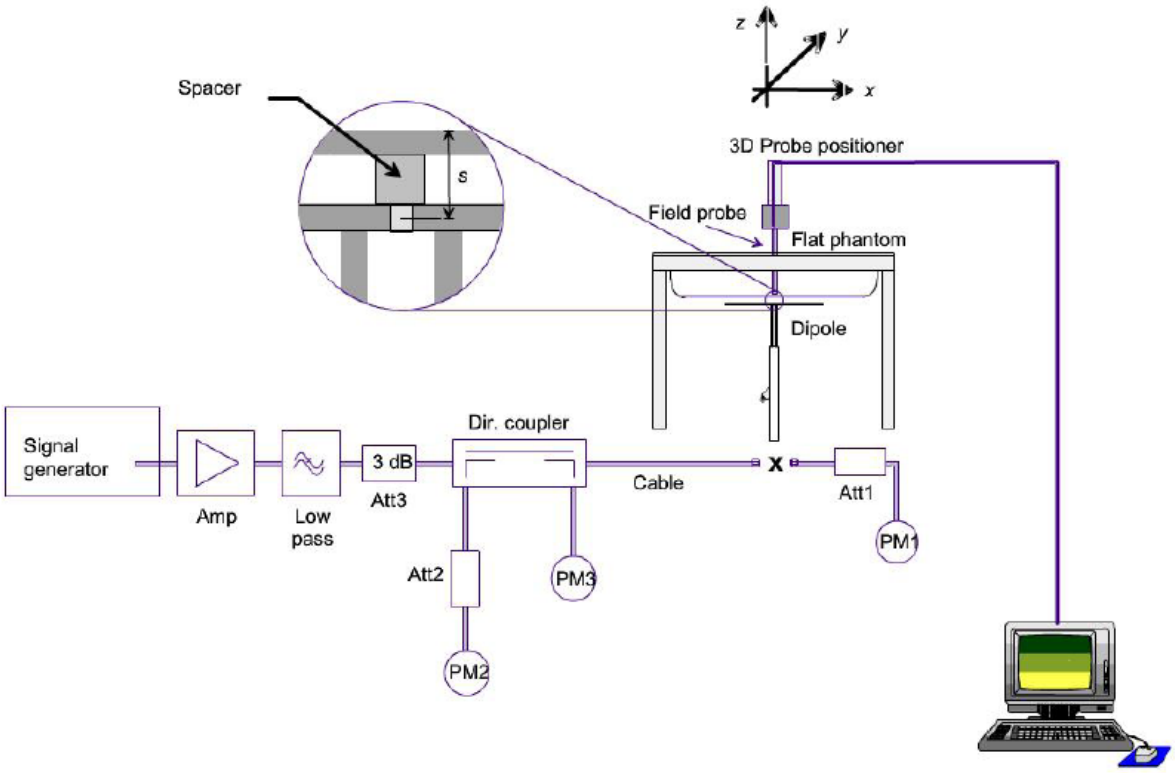
a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+-%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	4.76	N	1	1	1	4.76	4.7	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.0	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	0.7	0.7	1.62	1.6	∞

Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1	0.58	0.5	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1	1	2.89	2.8	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1	0.58	0.5	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.0	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.7	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.1	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1	1.73	1.7	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Dipole									
Dipole axis to liquid Distance	8,E.4.2	1.00	N	$\sqrt{3}$	1	1	0.58	0.58	∞
Input power and SAR drift measurement	8,6.6.2	4.04	R	$\sqrt{3}$	1	1	2.33	2.33	∞
Phantom and Tissue Parameters									
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	1	1	0.03	0.03	∞
Liquid conductivity - deviation from target value	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.13	∞
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	$\sqrt{3}$	0.64	0.43	1.85	1.24	M
Liquid permittivity - deviation from target value	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.04	∞
Liquid permittivity - measurement uncertainty	E.3.3	10.00	N	$\sqrt{3}$	0.6	0.49	3.46	2.83	M
Combined Standard Uncertainty			RSS				8.83	8.37	
Expanded Uncertainty (95% Confidence interval)			K=2				17.66	16.73	

8. SAR Measurement Evaluation

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 which comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below



The validation dipole is placed beneath the flat phantom with the specifics pacer in place. The distances pacer is touch the phantom surface with alight pressure at the reference marking and be oriented parallel to the long side of the phantom. The power meter PM1 measures the forward power at the location of the system check dipole connector. The signal generator is adjusted for the desired forward power (250mWisusedfor700MHzto3GHz, 100mWisusedfor3.5GHzto6 GHz)at the dipole connector and the power meter PM2 is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter.

8.2. Validation Results

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.

<1g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2018.06.23	750	HSL	100	D750V3-259	EP80	0.78	8.41	7.8	-7.25
2018.06.23	835	HSL	100	D835V2-DIPC99	EP80	0.97	9.61	9.7	0.94
2018.06.19	1800	HSL	100	D1800V2-DIPF101	EP80	3.70	37.05	37	-0.13
2018.06.19	2000	HSL	100	D2000V2-DIPI102	EP80	4.26	42.70	42.6	-0.23
2018.06.21	2450	HSL	100	D2450V2-263	EP80	5.33	53.34	53.3	-0.07
2018.06.21	2600	HSL	100	D2600V2-265	EP80	5.68	56.94	56.8	-0.25
2018.06.22	5200	HSL	100	D5GHzV2-DIPB98	EP80	16.40	164.05	164	-0.03
2018.06.22	5600	HSL	100	D5GHzV2-DIPB98	EP80	17.14	177.81	171.4	-3.60
2018.06.22	5800	HSL	100	D5GHzV2-DIPB98	EP80	17.71	185.02	177.1	-4.28
2018.06.25	750	MSL	100	D750V3-259	EP80	0.91	8.69	9.1	4.72
2018.06.25	835	MSL	100	D835V2-DIPC99	EP80	0.99	9.88	9.9	0.20
2018.06.24	1800	MSL	100	D1800V2-DIPF101	EP80	3.75	37.78	37.5	-0.74
2018.06.24	2000	MSL	100	D2000V2-DIPI102	EP80	4.12	41.43	41.2	-0.56
2018.06.21	2450	MSL	100	D2450V2-263	EP80	5.08	50.93	50.8	-0.26
2018.06.21	2600	MSL	100	D2600V2-265	EP80	5.39	54.07	53.9	-0.31
2018.06.20	5200	MSL	100	D5GHzV2-DIPB98	EPG193	16.28	163.36	162.8	-0.34
2018.06.20	5600	MSL	100	D5GHzV2-DIPB98	EPG193	17.20	172.11	172	-0.06
2018.06.20	5800	MSL	100	D5GHzV2-DIPB98	EPG193	17.70	177.10	177	-0.06

<10g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2018.06.23	750	HSL	100	D750V3-259	EP80	0.54	5.52	5.4	-2.17
2018.06.23	835	HSL	100	D835V2-DIPC99	EP80	0.62	6.17	6.2	0.49
2018.06.19	1800	HSL	100	D1800V2-DIPF101	EP80	2.05	19.85	20.5	3.27
2018.06.19	2000	HSL	100	D2000V2-DIPI102	EP80	1.99	21.39	19.9	-6.97
2018.06.21	2450	HSL	100	D2450V2-263	EP80	2.38	24.22	23.8	-1.73
2018.06.21	2600	HSL	100	D2600V2-265	EP80	2.50	25.06	25	-0.24
2018.06.22	5200	HSL	100	D5GHzV2-DIPB98	EP80	5.65	57.03	56.5	-0.93
2018.06.22	5600	HSL	100	D5GHzV2-DIPB98	EP80	6.06	60.90	60.6	-0.49
2018.06.22	5800	HSL	100	D5GHzV2-DIPB98	EP80	5.99	62.43	59.9	-4.05
2018.06.25	750	MSL	100	D750V3-259	EP80	0.61	5.78	6.1	5.54
2018.06.25	835	MSL	100	D835V2-DIPC99	EP80	0.63	6.48	6.3	-2.78
2018.06.24	1800	MSL	100	D1800V2-DIPF101	EP80	2.04	20.15	20.4	1.24
2018.06.24	2000	MSL	100	D2000V2-DIPI102	EP80	2.09	20.86	20.9	0.19
2018.06.21	2450	MSL	100	D2450V2-263	EP80	2.38	23.26	23.8	2.32
2018.06.21	2600	MSL	100	D2600V2-265	EP80	2.37	24.27	23.7	-2.35
2018.06.20	5200	MSL	100	D5GHzV2-DIPB98	EPG193	5.62	57.09	56.2	-1.56
2018.06.20	5600	MSL	100	D5GHzV2-DIPB98	EPG193	5.90	58.61	59	0.67
2018.06.20	5800	MSL	100	D5GHzV2-DIPB98	EPG193	5.98	59.95	59.8	-0.25

Note: System checks the specific test data please see Annex C

9. RF Exposure Positions

9.1. Information on the testing

The mobile phone antenna and battery are those specified by the manufacturer. The battery is fully charged before each measurement. The output power and frequency are controlled using a base station simulator. The mobile phone is set to transmit at its highest output peak power level.
The mobile phone is test in the “cheek” and “tilted” positions on the left and right sides of the phantom. The mobile phone is placed with the vertical centre line of the body of the mobile phone and the horizontal line crossing the centre of the earpiece in a plane parallel to the sagittal plane of the phantom.

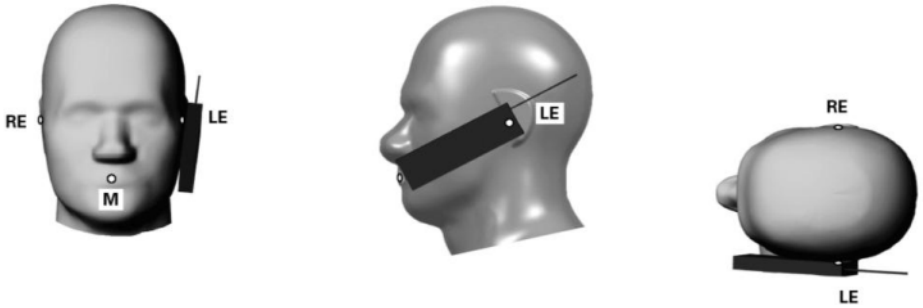


Fig 9.1 Illustration for Cheek Position

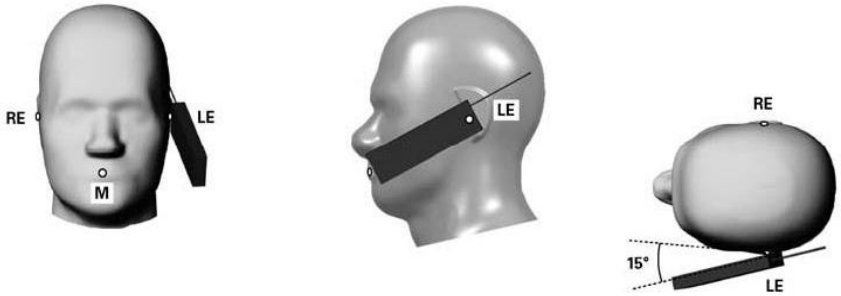


Fig 9.2 Illustration for Tilted Position

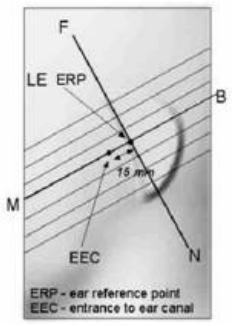


Fig 9.3 Close-up side view of phantom showing the ear region.

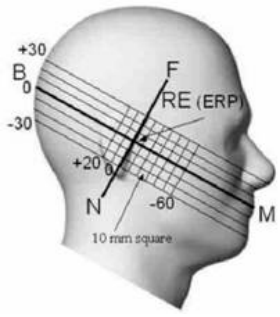


Fig 9.4 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

Description of the “cheek” position:
The mobile phone is well placed in the reference plane and the earpiece is in contact with the ear. Then the mobile phone is moved until any point on the front side get in contact with the cheek of the phantom or until contact with the ear is lost.

Description of the “tilted” position:
The mobile phone is well placed in the “cheek” position as described above. Then the mobile phone is moved outward away from the month by an angle of 15 degrees or until contact with the ear lost.

Remark: Please refer to Appendix B for the test setup photos.

9.2. Body-worn Configurations

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

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

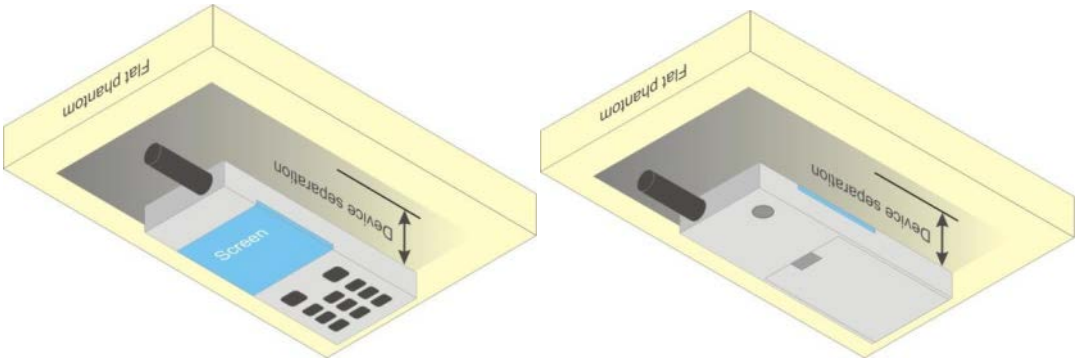


Fig 9.5 Illustration for Body-Worn Position

9.3. Hotspot Mode Exposure Position Conditions

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing functions, the relevant hand and body exposure conditions are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge. When the form factor of a handset is smaller than 9 cm x 5 cm, a test separation distance of 5 mm (instead of 10 mm) is

required for testing hotspot mode. When the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface).

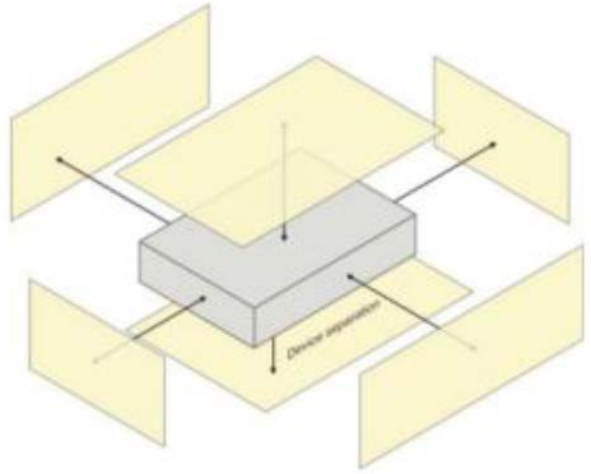


Fig 9.6 Illustration for Hotspot Position

9.4. Measurement procedure

The Following steps are used for each test position

1. Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface.
2. Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
3. Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
4. Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

9.5. Description of interpolation/extrapolation scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe

body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

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

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

10. SAR Evaluation Procedures for LTE

1. LTE Target MPR Level

The device implements maximum power reduction per 3GPP 36.101 requirements where the MPR target is as below table. The MPR settings are implemented configured into firmware and cannot be disabled by the end user or LTE carrier network.

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR	3GPP
	1.4	3.0	5	10	15	20	Target	MPR
	MHz	MHz	MHz	MHz	MHz	MHz	(dB)	(dB)
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	1	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	2	≤ 2

Note: The measurement result showed some difference from the target MPR level, due to expected 0.5dB measurement tolerance

2. LTE Bands

LTE Bands	Channel bandwidth / Transmission bandwidth configuration [RB]					
	1.4	3.0	5	10	15	20
	MHz	MHz	MHz	MHz	MHz	MHz
2	v	v	v	v	v	v
4	v	v	v	v	v	v
7	N/A	N/A	v	v	v	v
12	v	v	v	v	N/A	N/A
17	v	v	v	v	N/A	N/A

3. 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 for 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.6 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*.

4. QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 1. are applied to measure the SAR for QPSK with50% RB allocation.

5. 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 ≤ 0.8W/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.

6. Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 1. and 2.and 3. to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power or the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the *reported* SAR for the QPSK configuration is > 1.45 W/kg.

7. Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section 5.2 to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the *reported* SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

The equivalent channel configuration for the RB allocation, RB offset and modulation etc. Is determined for the smaller channel bandwidth according to the same number of RB allocated in The largest channel bandwidth. For example, 50 RB in 10 MHz channel bandwidth does not apply to5MHz channel bandwidth; therefore, this cannot be tested in the smaller channel bandwidth. However, 50% RB allocation in 10 MHz channel bandwidths equivalent to 100% RB allocation in 5 MHz channel bandwidth; therefore, these are the equivalent configurations to be compared to determine the specific channel and configuration in the smaller channel bandwidth that need SAR testing."

11. Measurement of Conducted output power

GSM Conducted Average output power

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	128	190	251		128	190	251	
Frequency (MHz)	824.2	836.6	848.8		824.2	836.6	848.8	
GSM 1 Tx slot	32.09	32.12	32.15	32.50	23.09	23.12	23.15	23.50
GPRS 1 Tx slot	32.15	32.19	32.22	32.50	23.15	23.19	23.22	23.50
GPRS 2 Tx slots	31.57	31.64	31.62	32.00	25.57	25.64	25.62	26.00
GPRS 3 Tx slots	29.94	29.95	29.93	30.00	25.68	25.69	25.67	25.74
GPRS 4 Tx slots	28.74	28.78	28.78	29.00	25.74	25.78	25.78	26.00

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	27.52	27.91	28.41	28.50	18.52	18.91	19.41	19.50
GPRS 1 Tx slot	27.34	27.71	28.49	28.50	18.34	18.71	19.49	19.50
GPRS 2 Tx slots	26.89	27.31	28.03	28.50	20.89	21.31	22.03	22.50
GPRS 3 Tx slots	25.23	25.87	27.01	27.50	20.97	21.61	22.75	23.24
GPRS 4 Tx slots	24.36	24.97	25.99	26.00	21.36	21.97	22.99	23.00

Timeslot consignations:

No. of Slots	Slot 1	Slot 2	Slot 3	Slot 4
Slot Consignation	1Up4Down	2Up3Down	3Up2Down	4Up1Down
Duty Cycle	1:83	1:4.15	1:2.77	1:208
Correct Factor	-9.03dB	-6.02dB	-4.26dB	-3.01dB

Note: The Max Average Power at Slot 4, so it is used for test.

WCDMA Conducted Average output power

Band	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)
TX Channel	9262	9400	9538		1312	1413	1513	
Rx Channel	9662	9800	9938		1537	1638	1738	
Frequency (MHz)	1852.4	1880	1907.6		1712.4	1732.6	1752.6	
RMC 12.2Kbps	20.93	20.99	21.27	21.50	21.54	21.54	21.56	22.00
HSDPA Subtest-1	20.09	20.13	20.50	21.00	20.63	20.66	20.63	21.00
HSDPA Subtest-2	20.03	20.12	20.51	21.00	20.64	20.70	20.67	21.00
HSDPA Subtest-3	19.59	19.70	20.08	20.50	20.21	20.23	20.21	20.50
HSDPA Subtest-4	19.56	19.64	20.07	20.50	20.18	20.22	20.21	20.50
HSUPA Subtest-1	18.07	18.19	18.45	19.00	18.73	18.70	18.71	21.00
HSUPA Subtest-2	17.98	18.08	18.47	18.50	18.67	18.70	18.73	19.00
HSUPA Subtest-3	19.02	19.07	19.43	19.50	19.68	19.69	19.72	20.00
HSUPA Subtest-4	17.60	17.68	17.89	18.50	18.12	18.14	18.15	19.00
HSUPA Subtest-5	19.98	20.02	20.39	20.50	20.65	20.65	20.63	21.00
HSPA+ (16QAM) Subtest-1	22.10	22.36	22.40	22.50	21.48	21.64	21.65	22.00

Band	WCDMA V			Tune-up Limit (dBm)
TX Channel	4132	4182	4233	
Rx Channel	4357	4407	4458	
Frequency (MHz)	826.4	836.4	846.6	
RMC 12.2Kbps	22.21	21.98	22.10	22.50
HSDPA Subtest-1	21.10	20.98	21.19	21.50
HSDPA Subtest-2	21.16	21.02	21.18	21.50
HSDPA Subtest-3	20.69	20.56	20.70	21.00
HSDPA Subtest-4	20.66	20.56	20.67	21.00
HSUPA Subtest-1	19.21	19.03	19.18	21.50
HSUPA Subtest-2	19.15	19.05	19.14	19.50
HSUPA Subtest-3	20.14	20.05	20.18	20.50
HSUPA Subtest-4	18.68	18.49	18.66	19.50
HSUPA Subtest-5	21.19	21.01	21.12	21.50
HSPA+ (16QAM) Subtest-1	21.77	21.66	21.70	22.00

LTE Conducted Average output power

< LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	23.26	**23.38**	23.36	23.5
20	QPSK	1	49	23.16	23.05	23.01	
20	QPSK	1	99	22.95	23.29	23.27	
20	QPSK	50	0	22.16	22.09	22.13	22.5
20	QPSK	50	24	22.09	22.12	22.02	
20	QPSK	50	50	22.13	22.09	22.01	
20	QPSK	100	0	21.19	21.20	21.13	
20	16QAM	1	0	21.73	22.21	22.43	22.5
20	16QAM	1	49	21.88	22.28	22.29	
20	16QAM	1	99	21.93	22.02	22.20	
20	16QAM	50	0	20.83	20.98	21.07	21.5
20	16QAM	50	24	20.74	20.91	21.04	
20	16QAM	50	50	20.77	20.99	21.13	
20	16QAM	100	0	20.77	21.00	21.15	
Channel				18675	18900	19125	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	23.12	23.10	23.21	23.5
15	QPSK	1	37	23.08	23.06	23.00	
15	QPSK	1	74	23.12	23.10	23.01	
15	QPSK	36	0	22.08	22.07	22.10	22.5
15	QPSK	36	20	22.12	22.10	22.08	
15	QPSK	36	39	22.11	22.08	22.10	
15	QPSK	75	0	22.31	22.41	22.38	
15	16QAM	1	0	21.71	22.26	22.47	22.5
15	16QAM	1	37	21.86	22.28	22.25	
15	16QAM	1	74	21.82	21.89	22.35	
15	16QAM	36	0	20.65	20.92	20.98	21.5
15	16QAM	36	20	20.62	20.92	21.01	
15	16QAM	36	39	20.64	20.89	21.04	

15	16QAM	75	0	20.64	20.92	21.05	
Channel				18650	18900	19150	Tune-up limit (dBm)
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	22.49	22.76	22.91	23.5
10	QPSK	1	25	23.05	23.01	23.31	
10	QPSK	1	49	22.88	23.04	23.08	
10	QPSK	25	0	22.31	22.29	22.18	22.5
10	QPSK	25	12	22.34	22.30	22.28	
10	QPSK	25	25	22.25	22.15	22.10	
10	QPSK	50	0	22.16	22.21	22.08	
10	16QAM	1	0	21.46	21.64	21.83	22.5
10	16QAM	1	25	21.94	22.30	22.17	
10	16QAM	1	49	21.85	21.87	22.03	
10	16QAM	25	0	20.57	20.88	20.98	21.5
10	16QAM	25	12	20.49	20.84	20.96	
10	16QAM	25	25	20.51	20.88	21.07	
10	16QAM	50	0	20.59	20.93	21.05	
Channel				18625	18900	19175	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	22.88	22.86	22.92	23.5
5	QPSK	1	12	22.96	22.91	22.90	
5	QPSK	1	24	23.01	22.98	22.80	
5	QPSK	12	0	21.81	21.93	21.89	22.5
5	QPSK	12	7	21.78	21.82	21.79	
5	QPSK	12	13	22.05	22.12	22.03	
5	QPSK	25	0	22.03	22.10	22.05	
5	16QAM	1	0	21.36	21.57	21.96	22.5
5	16QAM	1	12	21.80	22.08	22.35	
5	16QAM	1	24	21.45	21.81	21.75	
5	16QAM	12	0	20.62	20.83	21.08	21.5
5	16QAM	12	7	20.50	20.82	21.00	
5	16QAM	12	13	20.55	20.86	21.10	
5	16QAM	25	0	20.48	20.86	20.96	
Channel				18615	18900	19185	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1908.5	

3	QPSK	1	0	22.48	22.81	22.78	23.5
3	QPSK	1	8	22.38	22.40	22.43	
3	QPSK	1	14	22.35	22.72	22.61	
3	QPSK	8	0	21.96	22.02	21.96	22.5
3	QPSK	8	4	21.95	21.86	21.79	
3	QPSK	8	7	21.86	21.79	21.63	
3	QPSK	15	0	21.99	21.88	21.66	
3	16QAM	1	0	21.88	22.27	22.21	22.5
3	16QAM	1	8	21.52	21.78	22.15	
3	16QAM	1	14	21.54	21.93	22.31	
3	16QAM	8	0	20.47	20.97	20.92	21.5
3	16QAM	8	4	20.40	20.87	21.10	
3	16QAM	8	7	20.51	20.83	21.05	
3	16QAM	15	0	20.53	20.95	20.98	
Channel				18607	18900	19193	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	22.84	22.84	22.85	23.5
1.4	QPSK	1	3	22.96	23.06	22.93	
1.4	QPSK	1	5	22.99	23.01	23.10	
1.4	QPSK	3	0	23.01	23.10	23.02	
1.4	QPSK	3	1	22.98	22.97	23.09	
1.4	QPSK	3	3	22.86	22.96	22.96	
1.4	QPSK	6	0	22.12	22.13	22.02	22.5
1.4	16QAM	1	0	21.32	21.68	22.01	22.5
1.4	16QAM	1	3	21.74	22.28	22.19	
1.4	16QAM	1	5	21.40	21.64	21.96	
1.4	16QAM	3	0	21.47	22.21	21.91	
1.4	16QAM	3	1	21.46	21.99	22.14	
1.4	16QAM	3	3	21.38	21.79	22.12	
1.4	16QAM	6	0	20.46	20.87	21.07	21.5

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	23.96	23.98	**23.99**	24.0
20	QPSK	1	49	23.78	23.69	23.88	
20	QPSK	1	99	23.89	23.88	23.90	
20	QPSK	50	0	23.32	23.31	23.35	23.5
20	QPSK	50	24	23.25	23.16	23.39	
20	QPSK	50	50	23.26	23.13	23.21	
20	QPSK	100	0	23.10	23.08	23.12	
20	16QAM	1	0	22.60	22.33	22.66	23.5
20	16QAM	1	49	22.54	22.50	22.59	
20	16QAM	1	99	22.14	22.44	22.77	
20	16QAM	50	0	21.23	21.24	21.44	22.5
20	16QAM	50	24	21.11	21.10	21.46	
20	16QAM	50	50	21.02	21.20	21.74	
20	16QAM	100	0	21.14	21.18	21.55	
Channel				20025	20175	20325	Tune-up limit (dBm)
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	23.80	23.82	23.91	24.5
15	QPSK	1	37	23.79	23.86	23.96	
15	QPSK	1	74	23.88	23.96	23.99	
15	QPSK	36	0	22.96	23.03	23.21	23.5
15	QPSK	36	20	23.01	23.10	23.02	
15	QPSK	36	39	23.12	23.01	23.00	
15	QPSK	75	0	22.98	22.98	23.02	
15	16QAM	1	0	22.49	22.37	22.51	23.5
15	16QAM	1	37	22.42	22.12	22.95	
15	16QAM	1	74	22.10	22.18	22.91	
15	16QAM	36	0	21.18	21.13	21.46	22.5
15	16QAM	36	20	21.12	21.05	21.63	
15	16QAM	36	39	21.03	21.09	21.78	
15	16QAM	75	0	21.10	21.13	21.61	

Channel				20000	20175	20350	Tune-up limit (dBm)
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	23.08	23.09	23.01	23.5
10	QPSK	1	25	23.01	23.03	23.10	
10	QPSK	1	49	23.12	23.10	23.08	
10	QPSK	25	0	23.22	23.21	23.12	23.5
10	QPSK	25	12	23.23	23.12	22.98	
10	QPSK	25	25	23.01	22.97	22.90	
10	QPSK	50	0	22.98	22.96	22.96	
10	16QAM	1	0	21.85	22.12	22.46	22.5
10	16QAM	1	25	22.29	22.36	22.80	
10	16QAM	1	49	22.28	22.37	23.17	
10	16QAM	25	0	21.07	21.06	21.54	21.5
10	16QAM	25	12	21.02	20.98	21.61	
10	16QAM	25	25	21.01	21.07	21.76	
10	16QAM	50	0	21.04	21.13	21.70	
Channel				19975	20175	20375	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	23.05	22.91	23.01	23.5
5	QPSK	1	12	23.12	23.01	23.11	
5	QPSK	1	24	23.41	23.10	23.57	
5	QPSK	12	0	23.20	23.18	23.08	23.5
5	QPSK	12	7	23.20	23.02	23.12	
5	QPSK	12	13	23.12	23.23	23.36	
5	QPSK	25	0	23.21	23.22	23.26	
5	16QAM	1	0	22.14	21.89	22.63	22.5
5	16QAM	1	12	22.41	22.13	23.09	
5	16QAM	1	24	21.93	21.68	22.41	
5	16QAM	12	0	21.06	21.16	21.71	21.5
5	16QAM	12	7	21.06	20.95	21.69	
5	16QAM	12	13	21.10	21.00	21.68	
5	16QAM	25	0	21.01	20.95	21.65	
Channel				19965	20175	20385	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	22.98	23.38	23.43	23.5

3	QPSK	1	8	22.96	23.25	23.41	
3	QPSK	1	14	23.01	23.34	23.44	
3	QPSK	8	0	22.12	22.10	22.16	22.5
3	QPSK	8	4	22.32	22.31	22.26	
3	QPSK	8	7	22.41	22.40	22.43	
3	QPSK	15	0	22.46	22.35	22.25	
3	16QAM	1	0	22.15	22.19	22.01	22.5
3	16QAM	1	8	22.04	22.31	22.86	
3	16QAM	1	14	22.47	22.40	23.09	
3	16QAM	8	0	20.95	21.19	21.56	21.5
3	16QAM	8	4	21.07	21.09	21.60	
3	16QAM	8	7	21.05	20.99	21.87	
3	16QAM	15	0	21.08	21.17	21.70	
Channel				19957	20175	20393	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	23.69	23.74	23.69	24
1.4	QPSK	1	3	23.58	23.70	23.66	
1.4	QPSK	1	5	23.46	23.50	23.56	
1.4	QPSK	3	0	23.16	23.20	23.46	
1.4	QPSK	3	1	23.60	23.69	23.87	
1.4	QPSK	3	3	23.77	23.78	23.80	
1.4	QPSK	6	0	22.89	22.80	22.79	23
1.4	16QAM	1	0	21.92	21.72	22.56	23
1.4	16QAM	1	3	22.27	22.42	22.74	
1.4	16QAM	1	5	21.92	21.89	22.52	
1.4	16QAM	3	0	22.34	22.07	22.82	
1.4	16QAM	3	1	22.13	22.18	22.75	
1.4	16QAM	3	3	21.93	22.10	22.70	
1.4	16QAM	6	0	21.01	21.00	21.71	22

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Measured Power			Tune-up limit (dBm)
Channel				20850	21100	21350	
Frequency (MHz)				2510	2535	2560	
20	QPSK	1	0	23.79	23.87	**24.18**	24.5
20	QPSK	1	49	24.01	23.88	24.12	
20	QPSK	1	99	23.00	23.87	23.98	
20	QPSK	50	0	23.02	23.48	23.01	23.5
20	QPSK	50	24	23.13	23.03	23.25	
20	QPSK	50	50	23.26	23.16	23.06	
20	QPSK	100	0	23.41	23.34	23.30	
20	16QAM	1	0	22.78	22.93	23.44	23.5
20	16QAM	1	49	22.95	22.93	23.07	
20	16QAM	1	99	22.87	23.09	22.85	
20	16QAM	50	0	21.58	21.77	21.92	22
20	16QAM	50	24	20.59	21.48	21.82	
20	16QAM	50	50	20.76	21.67	21.77	
20	16QAM	100	0	20.68	21.80	21.93	
Channel				20825	21100	21375	Tune-up limit (dBm)
Frequency (MHz)				2507.5	2535	2562.5	
15	QPSK	1	0	23.88	23.96	24.01	24.5
15	QPSK	1	37	23.86	23.89	23.99	
15	QPSK	1	74	23.94	24.03	24.06	
15	QPSK	36	0	22.96	23.12	23.05	23.5
15	QPSK	36	20	23.01	23.22	23.22	
15	QPSK	36	39	23.06	23.05	23.01	
15	QPSK	75	0	23.41	23.12	23.10	
15	16QAM	1	0	21.86	23.06	22.84	23.5
15	16QAM	1	37	22.12	22.92	22.84	
15	16QAM	1	74	21.85	22.93	22.85	
15	16QAM	36	0	20.43	21.62	21.77	22.5
15	16QAM	36	20	20.60	21.49	21.81	
15	16QAM	36	39	20.67	21.60	21.81	
15	16QAM	75	0	20.56	21.56	21.83	
Channel				20800	21100	21400	Tune-up limit
Frequency (MHz)				2505	2535	2565	

							(dBm)
10	QPSK	1	0	23.98	23.94	24.01	24.5
10	QPSK	1	25	23.76	23.86	23.99	
10	QPSK	1	49	23.89	24.04	24.06	
10	QPSK	25	0	22.90	23.10	23.05	23.5
10	QPSK	25	12	23.01	23.27	23.22	
10	QPSK	25	25	23.08	23.06	23.02	
10	QPSK	50	0	23.48	23.11	23.12	
10	16QAM	1	0	21.58	22.63	22.68	23
10	16QAM	1	25	21.74	22.71	23.02	
10	16QAM	1	49	21.82	22.68	23.12	
10	16QAM	25	0	20.42	21.56	21.75	22.5
10	16QAM	25	12	20.39	21.42	21.69	
10	16QAM	25	25	20.57	21.51	21.80	
10	16QAM	50	0	20.50	21.51	21.79	
Channel				20775	21100	21425	Tune-up limit (dBm)
Frequency (MHz)				2502.5	2535	2567.5	
5	QPSK	1	0	23.29	23.55	23.68	24.5
5	QPSK	1	12	23.12	23.10	23.22	
5	QPSK	1	24	23.27	23.59	23.63	
5	QPSK	12	0	23.40	23.48	23.40	23.5
5	QPSK	12	7	23.24	23.20	23.15	
5	QPSK	12	13	23.35	23.12	23.10	
5	QPSK	25	0	23.30	23.15	23.11	
5	16QAM	1	0	22.21	22.53	22.67	23.5
5	16QAM	1	12	21.57	22.75	22.93	
5	16QAM	1	24	22.05	22.81	22.72	
5	16QAM	12	0	20.29	21.63	21.77	22.5
5	16QAM	12	7	20.34	21.37	21.81	
5	16QAM	12	13	20.32	21.54	21.83	
5	16QAM	25	0	20.31	21.54	21.74	

<LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				23060	23095	23130
Frequency (MHz)				704	707.5	711
10	QPSK	1	0	22.22	**22.29**	21.97
10	QPSK	1	25	22.18	22.19	22.01
10	QPSK	1	49	22.22	22.12	21.84
10	QPSK	25	0	21.18	21.19	21.13
10	QPSK	25	12	21.13	21.01	21.08
10	QPSK	25	25	21.08	21.03	21.00
10	QPSK	50	0	21.14	21.15	21.08
10	16QAM	1	0	21.48	21.46	20.93
10	16QAM	1	25	21.48	21.49	21.08
10	16QAM	1	49	21.40	21.02	20.88
10	16QAM	25	0	20.26	20.20	19.96
10	16QAM	25	12	20.12	20.06	19.85
10	16QAM	25	25	20.07	20.04	19.73
10	16QAM	50	0	20.22	20.12	19.92
Channel				23035	23095	23155
Frequency (MHz)				701.5	707.5	713.5
5	QPSK	1	0	22.27	22.10	21.96
5	QPSK	1	12	22.13	22.09	21.96
5	QPSK	1	24	21.99	21.79	21.25
5	QPSK	12	0	21.19	21.20	21.08
5	QPSK	12	7	21.10	21.13	21.11
5	QPSK	12	13	21.12	21.09	21.12
5	QPSK	25	0	21.13	21.15	21.14
5	16QAM	1	0	21.37	21.10	20.74
5	16QAM	1	12	21.49	21.27	21.22
5	16QAM	1	24	21.15	21.09	20.32
5	16QAM	12	0	20.41	20.18	19.84
5	16QAM	12	7	20.15	20.09	19.67
5	16QAM	12	13	20.24	20.08	19.47
5	16QAM	25	0	20.29	20.04	19.60
Channel				23025	23095	23165

Frequency (MHz)				700.5	707.5	714.5
3	QPSK	1	0	22.09	21.99	22.06
3	QPSK	1	8	21.98	21.89	21.96
3	QPSK	1	14	21.94	21.78	21.89
3	QPSK	8	0	21.12	21.37	21.32
3	QPSK	8	4	21.08	21.34	21.28
3	QPSK	8	7	21.43	21.35	21.28
3	QPSK	15	0	21.01	21.08	21.13
3	16QAM	1	0	21.22	21.44	20.95
3	16QAM	1	8	21.32	21.36	20.45
3	16QAM	1	14	21.46	21.46	20.55
3	16QAM	8	0	20.45	20.10	19.45
3	16QAM	8	4	20.35	20.18	19.28
3	16QAM	8	7	20.46	19.94	19.30
3	16QAM	15	0	20.26	20.14	19.58
Channel				23017	23095	23173
Frequency (MHz)				699.7	707.5	715.3
1.4	QPSK	1	0	22.11	21.74	21.22
1.4	QPSK	1	3	22.03	22.02	21.99
1.4	QPSK	1	5	22.12	22.01	22.03
1.4	QPSK	3	0	22.08	21.87	21.86
1.4	QPSK	3	1	21.98	21.88	21.88
1.4	QPSK	3	3	21.92	21.89	21.96
1.4	QPSK	6	0	20.90	20.98	20.89
1.4	16QAM	1	0	21.10	21.08	20.35
1.4	16QAM	1	3	21.47	21.47	20.74
1.4	16QAM	1	5	21.25	21.01	20.10
1.4	16QAM	3	0	21.41	21.50	20.56
1.4	16QAM	3	1	21.50	21.22	20.62
1.4	16QAM	3	3	21.46	21.08	20.49
1.4	16QAM	6	0	20.31	20.11	19.49

<LTE Band 17>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				23780	23790	23800
Frequency (MHz)				709	710	711
10	QPSK	1	0	**22.46**	22.26	22.31
10	QPSK	1	25	22.34	22.08	21.99
10	QPSK	1	49	22.31	22.01	21.91
10	QPSK	25	0	21.40	21.38	21.08
10	QPSK	25	12	21.38	21.14	21.22
10	QPSK	25	25	21.78	21.77	21.93
10	QPSK	50	0	21.18	21.18	21.09
10	16QAM	1	0	21.50	21.20	21.41
10	16QAM	1	25	21.37	21.58	21.24
10	16QAM	1	49	21.36	21.28	20.93
10	16QAM	25	0	20.28	20.33	20.10
10	16QAM	25	12	20.27	20.13	19.97
10	16QAM	25	25	20.12	19.94	19.80
10	16QAM	50	0	20.19	20.15	19.95
Channel				23755	23790	23825
Frequency (MHz)				706.5	710	713.5
5	QPSK	1	0	22.16	22.16	21.40
5	QPSK	1	12	22.23	22.28	22.19
5	QPSK	1	24	22.19	22.18	22.21
5	QPSK	12	0	21.32	21.28	21.59
5	QPSK	12	7	21.52	21.36	21.28
5	QPSK	12	13	21.29	21.23	21.21
5	QPSK	25	0	21.12	21.16	21.24
5	16QAM	1	0	21.01	21.34	20.95
5	16QAM	1	12	21.50	21.58	20.87
5	16QAM	1	24	21.00	21.23	20.54
5	16QAM	12	0	20.37	20.34	19.83
5	16QAM	12	7	20.27	20.07	19.72
5	16QAM	12	13	20.24	20.17	19.51
5	16QAM	25	0	20.24	20.07	19.72

2.4GHz Wi-Fi Average output power

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty cycle %
2.4GHz WLAN	802.11b 1Mbps	CH 1	2412	16.07	16.50	100
		CH 6	2437	**16.09**	**16.50**	100
		CH 11	2462	15.96	16.50	100
	802.11g 6Mbps	CH 1	2412	12.09	12.50	100
		CH 6	2437	14.06	14.50	100
		CH 11	2462	13.84	14.50	100
	802.11n-HT20 MCS0	CH 1	2412	12.04	12.50	100
		CH 6	2437	14.01	14.50	100
		CH 11	2462	13.83	14.50	100
	802.11n-HT40 MCS0	CH 3	2422	13.20	13.50	100
		CH 6	2437	13.19	13.50	100
		CH 9	2452	13.05	13.50	100

5GHz Wi-Fi Average output power

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty cycle %
5.2GHz WLAN	802.11a 6Mbps	CH 36	5180	13.79	14.00	100
		CH 44	5220	13.14	14.00	100
		CH 48	5240	13.83	14.00	100
	802.11n-HT20 MCS0	CH 36	5180	13.90	14.50	100
		CH 44	5220	**13.91**	**14.50**	100
		CH 48	5240	13.18	13.50	100
	802.11n-HT40 MCS0	CH 38	5190	13.52	14.00	100
		CH 46	5230	13.53	14.00	100

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty cycle %
5.3GHz WLAN	802.11a 6Mbps	CH 52	5260	13.08	13.50	100
		CH 60	5300	**13.84**	**14.50**	100
		CH 64	5320	13.61	14.00	100
	802.11n-HT20 MCS0	CH 52	5260	13.56	14.00	100
		CH 60	5300	12.94	13.50	100
		CH 64	5320	13.65	14.00	100
	802.11n-HT40 MCS0	CH 54	5270	13.39	14.00	100
		CH 62	5310	13.38	14.00	100

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty cycle %
5.5GHz WLAN	802.11a 6Mbps	CH 100	5500	14.60	15.00	100
		CH 120	5600	14.46	15.00	100
		CH 140	5700	**14.80**	**15.50**	100
	802.11n-HT20 MCS0	CH 100	5500	14.03	14.50	100
		CH 120	5600	14.57	15.00	100
		CH 140	5700	14.26	14.50	100
	802.11n-HT40 MCS0	CH 102	5510	13.35	14.00	100
		CH 126	5630	13.55	14.00	100
		CH 142	5710	13.83	14.00	100

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty cycle %
5.8GHz WLAN	802.11a 6Mbps	CH 149	5745	13.23	13.50	100
		CH 157	5785	12.88	13.50	100
		CH 165	5825	**13.49**	**14.00**	100
	802.11n-HT20 MCS0	CH 149	5745	13.28	13.50	100
		CH 157	5785	13.36	13.50	100
		CH 165	5825	12.90	13.50	100
	802.11n-HT40 MCS0	CH 151	5755	12.46	13.00	100
		CH 159	5795	13.19	13.50	100

BT average output power

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	3.87	3.14	3.25
	CH 39	2441	5.94	4.94	5.01
	CH 78	2480	5.01	5.04	4.15
Tune-up Limit(dBm)			6.5	5.5	5.5

Mode	Channel	Frequency (MHz)	Peak power (dBm)
			GFSK
LE	CH 00	2402	-3.16
	CH 19	2440	-3.21
	CH 39	2480	-3.98

12. Test Results List

Test Guidance:

<GSM>

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (4Tx slots) for GSM850/GSM1900 is considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes.

<WCDMA>

1. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode, SAR measurement is not required for the secondary mode.
2. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
3. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
4. For HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
5. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.

<LTE>

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
   e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is: ≤ 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
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.

<WLAN>

1. SAR is measured for 2.4 GHz 802.11b DSSS using either the 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 position 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. 2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for
3. 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is >

1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.

4. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured. Justification for test configurations for WLAN per KDB Publication 248227 D02DR02-41929 for 2.4 GHz WI-FI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR.

<Bluetooth>

1. According to KDB 447498 section 4.3.1, the 1-g SAR test exclusion thresholds at test separation distances ≤ 50 mm are determined by following:

Test distance: 10mm			
Band	**Highest power(mW) per tune up**	**1-g SAR test threshold**	**Test required?**
Bluetooth	4.47	[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤ 3.0 for 1-g SAR	No

2. The BT stand-alone SAR is not required, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
(Max power=4.47 mW; min. test separation distance= 10mm for Body; f=2.4GHz)
Bluetooth estimated Body SAR =0.093W/Kg (1g)

12.1. Head SAR

Plot No.	Band	Mode	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
1#	GSM850	GSM Voice	Right Cheek	251	32.15	32.50	1.083	0.116	**0.126**
	GSM850	GSM Voice	Right Tilt	251	32.15	32.50	1.083	0.025	0.027
	GSM850	GSM Voice	Left Cheek	251	32.15	32.50	1.083	0.073	0.079
	GSM850	GSM Voice	Left Tilt	251	32.15	32.50	1.083	0.027	0.029
	GSM1900	GSM Voice	Right Cheek	810	28.41	28.50	1.022	0.051	0.052
	GSM1900	GSM Voice	Right Tilt	810	28.41	28.50	1.022	0.049	0.050
	GSM1900	GSM Voice	Left Cheek	810	28.41	28.50	1.022	0.067	0.068
2#	GSM1900	GSM Voice	Left Tilt	810	28.41	28.50	1.022	0.081	**0.083**
	WCDMA Band II	RMC 12.2Kbps	Right Cheek	9538	21.27	21.50	1.054	0.052	0.055
	WCDMA Band II	RMC 12.2Kbps	Right Tilt	9538	21.27	21.50	1.054	0.047	0.050
	WCDMA Band II	RMC 12.2Kbps	Left Cheek	9538	21.27	21.50	1.054	0.058	0.061
3#	WCDMA Band II	RMC 12.2Kbps	Left Tilt	9538	21.27	21.50	1.054	0.067	**0.071**
	WCDMA Band IV	RMC 12.2Kbps	Right Cheek	1513	21.56	22.00	1.107	0.041	0.045
	WCDMA Band IV	RMC 12.2Kbps	Right Tilt	1513	21.56	22.00	1.107	0.040	0.044
4#	WCDMA Band IV	RMC 12.2Kbps	Left Cheek	1513	21.56	22.00	1.107	0.070	**0.077**
	WCDMA Band IV	RMC 12.2Kbps	Left Tilt	1513	21.56	22.00	1.107	0.058	0.064
5#	WCDMA Band V	RMC 12.2Kbps	Right Cheek	4132	22.21	22.50	1.069	0.072	**0.077**
	WCDMA Band V	RMC 12.2Kbps	Right Tilt	4132	22.21	22.50	1.069	0.012	0.013
	WCDMA Band V	RMC 12.2Kbps	Left Cheek	4132	22.21	22.50	1.069	0.068	0.073
	WCDMA Band V	RMC 12.2Kbps	Left Tilt	4132	22.21	22.50	1.069	0.017	0.018

Plot No.	Band	BW (MHz)	RB Size	RB offset	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20Mhz	1	0	Right Cheek	18900	23.38	23.50	1.029	0.026	0.027
	LTE Band 2	20Mhz	1	0	Right Tilt	18900	23.38	23.50	1.029	0.050	0.051
	LTE Band 2	20Mhz	1	0	Left Cheek	18900	23.38	23.50	1.029	0.051	0.052
6#	LTE Band 2	20Mhz	1	0	Left Tilt	18900	23.38	23.50	1.029	0.057	**0.059**
	LTE Band 2	20Mhz	50	0	Right Cheek	18900	22.19	22.50	1.074	0.025	0.027
	LTE Band 2	20Mhz	50	0	Right Tilt	18900	22.19	22.50	1.074	0.035	0.038
	LTE Band 2	20Mhz	50	0	Left Cheek	18900	22.19	22.50	1.074	0.037	0.040
	LTE Band 2	20Mhz	50	0	Left Tilt	18900	22.19	22.50	1.074	0.043	**0.046**
	LTE Band 4	20Mhz	1	0	Right Cheek	20300	23.99	24.50	1.124	0.020	0.022
	LTE Band 4	20Mhz	1	0	Right Tilt	20300	23.99	24.50	1.124	0.024	0.027
7#	LTE Band 4	20Mhz	1	0	Left Cheek	20300	23.99	24.50	1.124	0.043	**0.048**
	LTE Band 4	20Mhz	1	0	Left Tilt	20300	23.99	24.50	1.124	0.022	0.025
	LTE Band 4	20Mhz	50	0	Right Cheek	20300	23.35	23.50	1.035	0.021	0.022
	LTE Band 4	20Mhz	50	0	Right Tilt	20300	23.35	23.50	1.035	0.021	0.022
	LTE Band 4	20Mhz	50	0	Left Cheek	20300	23.35	23.50	1.035	0.035	**0.036**
	LTE Band 4	20Mhz	50	0	Left Tilt	20300	23.35	23.50	1.035	0.021	0.022
	LTE Band 7	20Mhz	1	0	Right Cheek	21350	24.18	24.50	1.078	0.023	0.025
	LTE Band 7	20Mhz	1	0	Right Tilt	21350	24.18	24.50	1.078	0.017	0.018
8#	LTE Band 7	20Mhz	1	0	Left Cheek	21350	24.18	24.50	1.078	0.044	**0.047**
	LTE Band 7	20Mhz	1	0	Left Tilt	21350	24.18	24.50	1.078	0.029	0.031
	LTE Band 7	20Mhz	50	0	Right Cheek	21100	23.28	23.50	1.052	0.023	0.024
	LTE Band 7	20Mhz	50	0	Right Tilt	21100	23.28	23.50	1.052	0.020	0.021
	LTE Band 7	20Mhz	50	0	Left Cheek	21100	23.28	23.50	1.052	0.028	**0.029**
	LTE Band 7	20Mhz	50	0	Left Tilt	21100	23.28	23.50	1.052	0.014	0.015
	LTE Band 12	10Mhz	1	0	Right Cheek	23095	22.29	22.50	1.051	0.016	0.017
	LTE Band 12	10Mhz	1	0	Right Tilt	23095	22.29	22.50	1.051	0.007	0.000
9#	LTE Band 12	10Mhz	1	0	Left Cheek	23095	22.29	22.50	1.051	0.022	**0.023**
	LTE Band 12	10Mhz	1	0	Left Tilt	23095	22.29	22.50	1.051	0.006	0.006

Plot No.	Band	BW (MHz)	RB Size	RB offset	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 12	10Mhz	25	0	Right Cheek	23095	21.19	21.50	1.075	0.019	**0.020**
	LTE Band 12	10Mhz	25	0	Right Tilt	23095	21.19	21.50	1.075	0.003	0.000
	LTE Band 12	10Mhz	25	0	Left Cheek	23095	21.19	21.50	1.075	0.017	0.018
	LTE Band 12	10Mhz	25	0	Left Tilt	23095	21.19	21.50	1.075	0.005	0.005
10#	LTE Band 17	10Mhz	1	0	Right Cheek	23780	22.46	23.00	1.133	0.019	**0.022**
	LTE Band 17	10Mhz	1	0	Right Tilt	23780	22.46	23.00	1.133	0.005	0.006
	LTE Band 17	10Mhz	1	0	Left Cheek	23780	22.46	23.00	1.133	0.015	0.017
	LTE Band 17	10Mhz	1	0	Left Tilt	23780	22.46	23.00	1.133	0.005	0.006
	LTE Band 17	10Mhz	25	25	Right Cheek	23780	21.78	22.00	1.052	0.019	**0.020**
	LTE Band 17	10Mhz	25	25	Right Tilt	23780	21.78	22.00	1.052	0.006	0.006
	LTE Band 17	10Mhz	25	25	Left Cheek	23780	21.78	22.00	1.052	0.016	0.017
	LTE Band 17	10Mhz	25	25	Left Tilt	23780	21.78	22.00	1.052	0.004	0.004

Plot No.	Band	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	Right Cheek	6	16.09	16.50	1.099	0.282	0.310
	WLAN2.4GHz	Right Tilt	6	16.09	16.50	1.099	0.296	0.325
11#	WLAN2.4GHz	Left Cheek	6	16.09	16.50	1.099	0.436	**0.479**
	WLAN2.4GHz	Left Tilt	6	16.09	16.50	1.099	0.336	0.369
	WLAN5GHz	Right Cheek	60	13.84	14.50	1.164	0.113	0.132
	WLAN5GHz	Right Tilt	60	13.84	14.50	1.164	0.060	0.070
	WLAN5GHz	Left Cheek	60	13.84	14.50	1.164	0.171	0.199
12#	WLAN5GHz	Left Tilt	60	13.84	14.50	1.164	0.181	**0.211**
	WLAN5GHz	Right Cheek	140	14.80	15.50	1.175	0.211	0.248
	WLAN5GHz	Right Tilt	140	14.80	15.50	1.175	0.214	0.251
	WLAN5GHz	Left Cheek	140	14.80	15.50	1.175	0.341	0.401
13#	WLAN5GHz	Left Tilt	140	14.80	15.50	1.175	0.349	**0.410**
	WLAN5GHz	Right Cheek	165	13.49	14.00	1.125	0.250	0.281
	WLAN5GHz	Right Tilt	165	13.49	14.00	1.125	0.278	0.313
	WLAN5GHz	Left Cheek	165	13.49	14.00	1.125	0.226	0.254
14#	WLAN5GHz	Left Tilt	165	13.49	14.00	1.125	0.406	**0.457**

12.2. Body-worn SAR(separation gap 10mm)

Plot No.	Band	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	Front Side	251	28.78	29	1.052	0.423	0.445
15#	GSM850	Back Side	251	28.78	29	1.052	0.473	**0.498**
16#	GSM1900	Front Side	810	25.99	26	1.002	0.172	**0.172**
	GSM1900	Back Side	810	25.99	26	1.002	0.162	0.162
17#	WCDMA Band II	Front Side	9538	21.27	21.50	1.054	0.148	**0.156**
	WCDMA Band II	Back Side	9538	21.27	21.50	1.054	0.128	0.135
	WCDMA Band IV	Front Side	1513	21.56	22.00	1.107	0.297	0.329
18#	WCDMA Band IV	Back Side	1513	21.56	22.00	1.107	0.592	**0.655**
	WCDMA Band V	Front Side	4132	22.21	22.50	1.069	0.082	0.088
19#	WCDMA Band V	Back Side	4132	22.21	22.50	1.069	0.189	**0.202**

Plot No.	Band	BW (MHz)	RB Size	RB offset	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20Mhz	1	0	Front Side	18900	23.38	23.50	1.029	0.111	0.114
20#	LTE Band 2	20Mhz	1	0	Back Side	18900	23.38	23.50	1.029	0.155	**0.159**
	LTE Band 2	20Mhz	50	0	Front Side	18900	22.19	22.50	1.074	0.118	0.127
	LTE Band 2	20Mhz	50	0	Back Side	18900	22.19	22.50	1.074	0.124	**0.133**
	LTE Band 4	20Mhz	1	0	Front Side	20300	23.99	24.50	1.124	0.184	0.207
21#	LTE Band 4	20Mhz	1	0	Back Side	20300	23.99	24.50	1.124	0.460	**0.517**
	LTE Band 4	20Mhz	50	0	Front Side	20300	23.35	23.50	1.035	0.174	0.180
	LTE Band 4	20Mhz	50	0	Back Side	20300	23.35	23.50	1.035	0.378	**0.391**
	LTE Band 7	20Mhz	1	0	Front Side	21350	24.18	24.50	1.078	0.059	0.064
22#	LTE Band 7	20Mhz	1	0	Back Side	21350	24.18	24.50	1.078	0.393	**0.424**

Plot No.	Band	BW (MHz)	RB Size	RB offset	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 7	20Mhz	50	0	Front Side	21100	23.28	23.50	1.052	0.041	0.043
	LTE Band 7	20Mhz	50	0	Back Side	21100	23.28	23.50	1.052	0.217	**0.228**
23#	LTE Band 12	10Mhz	1	0	Front Side	23095	22.29	22.50	1.051	0.020	**0.021**
	LTE Band 12	10Mhz	1	0	Back Side	23095	22.29	22.50	1.051	0.012	0.013
	LTE Band 12	10Mhz	25	0	Front Side	23095	21.19	21.50	1.075	0.011	**0.012**
	LTE Band 12	10Mhz	25	0	Back Side	23095	21.19	21.50	1.075	0.009	0.010
24#	LTE Band 17	10Mhz	1	0	Front Side	23780	22.46	23.00	1.133	0.025	**0.028**
	LTE Band 17	10Mhz	1	0	Back Side	23780	22.46	23.00	1.133	0.017	0.019
	LTE Band 17	10Mhz	25	0	Front Side	23780	21.78	22.00	1.052	0.013	0.014
	LTE Band 17	10Mhz	25	0	Back Side	23780	21.78	22.00	1.052	0.020	**0.021**

Plot No.	Band	Test Position	Gap (mm)	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
25#	WLAN2.4GHz	Front Side	10mm	6	16.09	16.50	1.099	0.079	**0.087**
	WLAN2.4GHz	Back Side	10mm	6	16.09	16.50	1.099	0.017	0.019
26#	WLAN5GHz	Front Side	10mm	60	13.84	14.5	1.164	0.104	**0.121**
	WLAN5GHz	Back Side	10mm	60	13.84	14.5	1.164	0.065	0.076
27#	WLAN5GHz	Front Side	10mm	140	14.80	15.5	1.175	0.082	**0.096**
	WLAN5GHz	Back Side	10mm	140	14.80	15.5	1.175	0.038	0.045
28#	WLAN5GHz	Front Side	10mm	165	13.49	14	1.125	0.146	**0.164**
	WLAN5GHz	Back Side	10mm	165	13.49	14	1.125	0.135	0.152

12.3. Repeated SAR Measurement

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz. These 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.

13. Simultaneous Transmission Evaluation

No.	Simultaneous transmission Condition	Head	Body-worn
1	**GSM/GPRS/EDGE + WLAN 2.4GHz**	Yes	Yes
2	**WCDMA + WLAN 2.4GHz**	Yes	Yes
3	**LTE + WLAN 2.4GHz**	Yes	Yes
4	**GSM/GPRS/EDGE + WLAN 5GHz**	Yes	Yes
5	**WCDMA + WLAN 5GHz**	Yes	Yes
6	**LTE + WLAN 5GHz**	Yes	Yes
7	**GSM/GPRS/EDGE + Bluetooth**	Yes	Yes
8	**WCDMA + Bluetooth**	Yes	Yes
9	**LTE + Bluetooth**	Yes	Yes

Note:

1. When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the Wi-Fi transmitter and another WWAN transmitter. Both transmitter often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. The "Portable Hotspot" feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.
2. The hotspot SAR result may overlap with the body-worn accessory SAR requirements, per KDB 941225 D06, the more conservative configurations can be considered, thus excluding some unnecessary body-worn accessory SAR test.
3. GSM supports voice and data transmission, though not simultaneously. WCDMA supports voice and data transmission simultaneously.
4. Simultaneous Transmission SAR evaluation is not required for BT and Wi-Fi , because the software mechanism have been incorporated to guarantee that the WLAN and Bluetooth transmitters would not simultaneously operate.
5. Per KDB 447498D01v06, Simultaneous Transmission SAR Evaluation procedures is as followed:

   Step 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.

   Step 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.

   Step 3: If the ratio of SAR to peak separation distance is ≤ 0.04, Simultaneous SAR measurement is not required.

   Step 4: If the ratio of SAR to peak separation distance is > 0.04, Simultaneous SAR measurement is required and simultaneous transmission SAR value is calculated.

   (The ratio is determined by: (SAR1 + SAR2) ^ 1.5/Ri ≤ 0.04,

   Ri is the separation distance between the peak SAR locations for the antenna pair in mm)

Applicable Multiple Scenario Evaluation

<Head Exposure>

WWAN	Exposure Position	WWAN	WLAN 2.4GHz	WLAN 5GHz	WWAN+ 2.4GHz Summed 1g SAR (W/kg)	WWAN+ 5GHz Summed 1g SAR (W/kg)
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
GSM850	Right Cheek	0.126	0.310	0.281	0.436	0.407
	Right Tilt	0.027	0.325	0.313	0.352	0.340
	Left Cheek	0.079	0.479	0.401	0.558	0.480
	Left Tilt	0.029	0.369	0.457	0.398	0.486
GSM1900	Right Cheek	0.052	0.310	0.281	0.362	0.333
	Right Tilt	0.050	0.325	0.313	0.375	0.363
	Left Cheek	0.068	0.479	0.401	0.547	0.469
	Left Tilt	0.083	0.369	0.457	0.452	0.540
WCDMA Band II	Right Cheek	0.055	0.310	0.281	0.365	0.336
	Right Tilt	0.050	0.325	0.313	0.375	0.363
	Left Cheek	0.061	0.479	0.401	0.540	0.462
	Left Tilt	0.071	0.369	0.457	0.440	0.528
WCDMA Band IV	Right Cheek	0.045	0.310	0.281	0.355	0.326
	Right Tilt	0.044	0.325	0.313	0.369	0.357
	Left Cheek	0.077	0.479	0.401	0.556	0.478
	Left Tilt	0.064	0.369	0.457	0.433	0.521
WCDMA Band V	Right Cheek	0.077	0.310	0.281	0.387	0.358
	Right Tilt	0.013	0.325	0.313	0.338	0.326
	Left Cheek	0.073	0.479	0.401	0.552	0.474
	Left Tilt	0.018	0.369	0.457	0.387	0.475
LTE Band 2	Right Cheek	0.027	0.310	0.281	0.337	0.308
	Right Tilt	0.051	0.325	0.313	0.376	0.364
	Left Cheek	0.052	0.479	0.401	0.531	0.453
	Left Tilt	0.059	0.369	0.457	0.428	0.516
LTE Band 4	Right Cheek	0.022	0.310	0.281	0.332	0.303
	Right Tilt	0.027	0.325	0.313	0.352	0.340
	Left Cheek	0.048	0.479	0.401	0.527	0.449
	Left Tilt	0.025	0.369	0.457	0.394	0.482

WWAN	Exposure Position	WWAN	WLAN 2.4GHz	WLAN 5GHz	WWAN+ 2.4GHz Summed 1g SAR (W/kg)	WWAN+ 5GHz Summed 1g SAR (W/kg)
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
LTE Band 7	Right Cheek	0.025	0.310	0.281	0.335	0.306
	Right Tilt	0.021	0.325	0.313	0.346	0.334
	Left Cheek	0.047	0.479	0.401	0.526	0.448
	Left Tilt	0.031	0.369	0.457	0.400	0.488
LTE Band 12	Right Cheek	0.020	0.310	0.281	0.330	0.301
	Right Tilt	0.007	0.325	0.313	0.332	0.320
	Left Cheek	0.023	0.479	0.401	0.502	0.424
	Left Tilt	0.006	0.369	0.457	0.375	0.463
LTE Band 17	Right Cheek	0.022	0.310	0.281	0.332	0.303
	Right Tilt	0.006	0.325	0.313	0.331	0.319
	Left Cheek	0.017	0.479	0.401	0.496	0.418
	Left Tilt	0.006	0.369	0.457	0.375	0.463

<Body-worn Exposure>

WWAN	Exposure Position	WWAN	2.4GHz WLAN	WLAN 5GHz	Bluetooth	WWAN+ 2.4GHz Summed 1g SAR (W/kg)	WWAN+ 5GHz Summed 1g SAR (W/kg)	WWAN+ Bluetooth Summed 1g SAR (W/kg)
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)			
GSM850	Front	0.445	0.087	0.164	0.093	0.532	0.609	0.538
	Back	0.498	0.019	0.152	0.093	0.517	0.650	0.591
GSM1900	Front	0.172	0.087	0.164	0.093	0.259	0.336	0.265
	Back	0.162	0.019	0.152	0.093	0.181	0.314	0.255
WCDMA Band II	Front	0.156	0.087	0.164	0.093	0.243	0.320	0.249
	Back	0.135	0.019	0.152	0.093	0.154	0.287	0.228
WCDMA Band IV	Front	0.329	0.087	0.164	0.093	0.416	0.493	0.422
	Back	0.655	0.019	0.152	0.093	0.674	0.807	0.748
WCDMA Band V	Front	0.088	0.087	0.164	0.093	0.175	0.252	0.181
	Back	0.202	0.019	0.152	0.093	0.221	0.354	0.295
LTE Band 2	Front	0.127	0.087	0.164	0.093	0.214	0.291	0.220
	Back	0.159	0.019	0.152	0.093	0.178	0.311	0.252

LTE Band 4	Front	0.207	0.087	0.164	0.093	0.294	0.371	0.300
	Back	0.517	0.019	0.152	0.093	0.536	0.669	0.610
LTE Band 7	Front	0.064	0.087	0.164	0.093	0.151	0.228	0.157
	Back	0.424	0.019	0.152	0.093	0.443	0.576	0.517
LTE Band 12	Front	0.021	0.087	0.164	0.093	0.108	0.185	0.114
	Back	0.013	0.019	0.152	0.093	0.032	0.165	0.106
LTE Band 17	Front	0.028	0.087	0.164	0.093	0.115	0.192	0.121
	Back	0.021	0.019	0.152	0.093	0.040	0.173	0.114

Note:

According to KDB 447498D01v06, the sum of the Highest *reported* SAR of each antenna does not exceed the limit, simultaneous transmission SAR evaluation is not required.

END OF REPORT