FCC SAR REPORT

APPLICANT	:	Hot Pepper, Inc.
PRODUCT NAME	:	4G Smart Phone
MODEL NAME	:	VLE5
BRAND NAME	:	Hot Pepper
FCC ID	:	2APD4-A80C
STANDARD(S)	:	47CFR 2.1093 IEEE 1528-2013
TEST DATE	:	2018-06-30 to 2018-07-11
ISSUE DATE	:	2018-07-19

Tested by: Gan Yueming

Gan Yueming(Test engineer)

Approved by: Peng Huarui

Peng Huarui(Supervisor)

DIRECTORY

Change History		
Issue	**Date**	**Reason for change**
1.0	2018-07-19	First edition

1. Technical Information

Note: Provide by manufacturer.

1.1. Applicant and Manufacturer Information

Applicant:	Hot Pepper, Inc.
Applicant Address:	5151 California Ave., Suite 100, Irvine 92617, USA
Manufacturer:	Hot Pepper, Inc.
Manufacturer Address:	5151 California Ave., Suite 100, Irvine 92617, USA

1.2. Equipment Under Test (EUT) Description

Model Name:	VLE5
Brand Name:	Hot Pepper
Hardware Version:	HXF-M 94V-0
Software Version:	HPP-VLE5180706
Frequency Bands:	CDMA BC 0: 824.7 ~ 848.31 MHz CDMA BC 1: 1851.25 ~ 1908.75 MHz CDMA BC 10: 817.9 ~ 823.1 MHz LTE Band 25 : 1850MHz ~ 1915MHz LTE Band 26 : 814MHz ~ 849MHz LTE Band 41 : 2496MHz ~ 2690MHz Bluetooth: 2402 MHz ~ 2480 MHz Wi-Fi: 802.11b/g/n-HT20: 2412MHz ~ 2462 MHz 802.11n-HT40 :2422MHz~2452MHz
Modulation Mode:	CDMA2000 1XRTT: QPSK CDMA2000 1XEV-DO: QPSK LTE:QPSK/16QAM Bluetooth: GFSK/π-4DQPSK/8DPSK Wi-Fi: 802.11b: DSSS, 802.11g/n: OFDM
Hotspot Function:	Support Hotspot
Antenna Type:	PIFA internal Antenna
Antenna Gain:	LTE/CDMA: -3dBi BT/WIFI: 0.2dBi
Battery Model:	H2018VL5
Battery specification:	3.8V 2000mAh
SIM Cards Description:	Single SIM card

Max Scaled SAR-1g(W/Kg)	Head	1.091 W/kg	Limit(W/kg): 1.6W/kg
	Body-worn	0.903 W/kg	
	Hotspot	1.120 W/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)	Hotspot (Separation 10mm)
		1g SAR (W/kg)		
CDMA	CDMA2000 BC0	0.018	0.387	0.387
	CDMA2000 BC1	0.045	0.727	0.727
	CDMA2000 BC10	0.017	0.383	0.383
LTE	LTE Band 25	**1.091**	0.740	0.740
	LTE Band 26	0.687	0.830	0.830
	LTE Band 41	0.600	**0.903**	**1.120**
WLAN	2.4GHz WLAN	0.196	0.032	0.032
2.4GHz Band	Bluetooth	N/A	0.353	0.353
Highest Simultaneous Transmission		1.261	1.256	1.120

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:

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

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

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

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

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

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

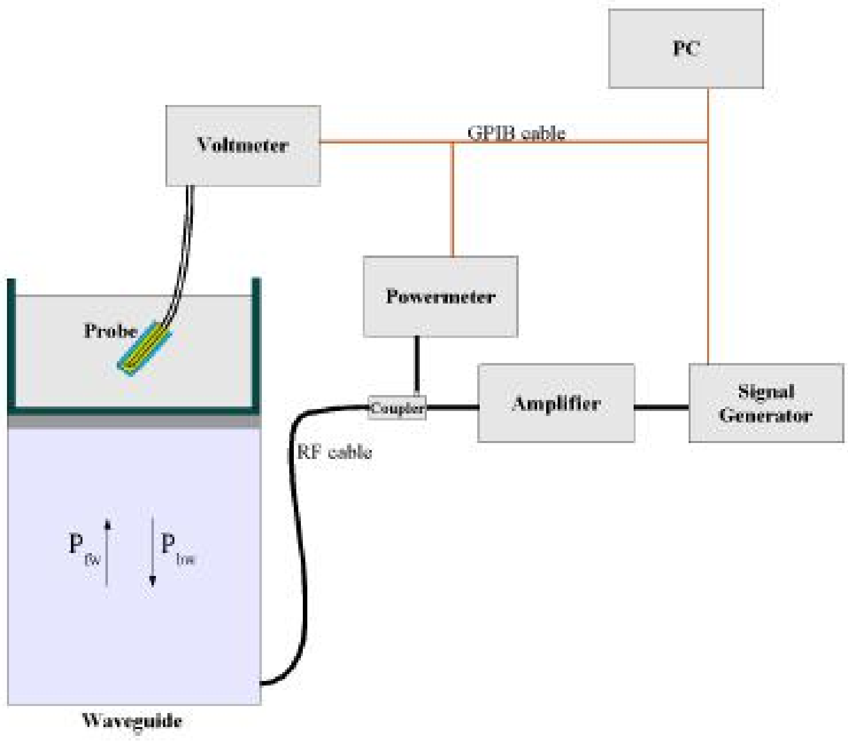
For the measurements the Specific Dosimetric E-Field Probe SN 37/08 EP80 with Following specifications is used

- 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.



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

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) (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)) (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,

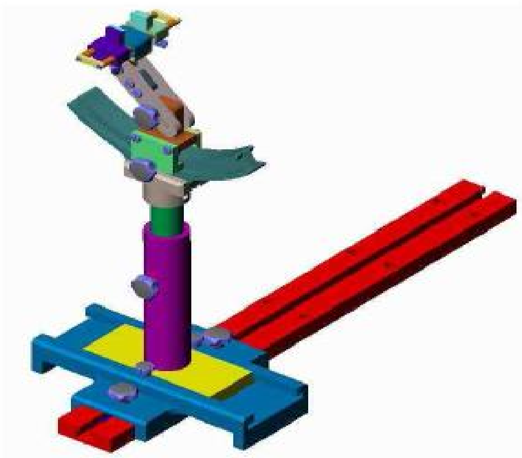
ρ = Tissue density (1.25 g/cm³ for brain tissue)

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	$\le 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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
835	HSL	21.4	0.876	0.90	-2.67	±5	2018.07.06
1800	HSL	21.5	1.365	1.40	-2.50	±5	2018.06.30
2000	HSL	21.5	1.415	1.40	1.07	±5	2018.06.30
2450	HSL	21.3	1.840	1.80	2.22	±5	2018.07.10
2600	HSL	21.5	1.969	1.96	0.46	±5	2018.06.30
835	MSL	21.8	0.968	0.97	-0.21	±5	2018.07.02
1800	MSL	21.4	1.517	1.52	-0.20	±5	2018.07.05
2000	MSL	21.4	1.515	1.52	-0.33	±5	2018.07.05
2450	MSL	21.5	1.965	1.95	0.77	±5	2018.07.11
2600	MSL	21.4	2.110	2.16	-2.31	±5	2018.07.05

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Permittivity (ε_r)	Permittivity Target (ε_r)	Delta (ε_r) (%)	Limit (%)	Date
835	HSL	21.4	41.185	41.50	-0.76	±5	2018.07.06
1800	HSL	21.5	40.095	40.00	0.24	±5	2018.06.30
2000	HSL	21.5	39.985	40.00	-0.04	±5	2018.06.30
2450	HSL	21.3	39.291	39.20	0.23	±5	2018.07.10
2600	HSL	21.5	39.026	39.00	0.07	±5	2018.06.30
835	MSL	21.8	55.384	55.20	0.33	±5	2018.07.02
1800	MSL	21.4	53.294	53.30	-0.01	±5	2018.07.05
2000	MSL	21.4	53.286	53.30	-0.03	±5	2018.07.05
2450	MSL	21.5	52.887	52.70	0.35	±5	2018.07.11
2600	MSL	21.4	52.371	52.50	-0.25	±5	2018.07.05

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

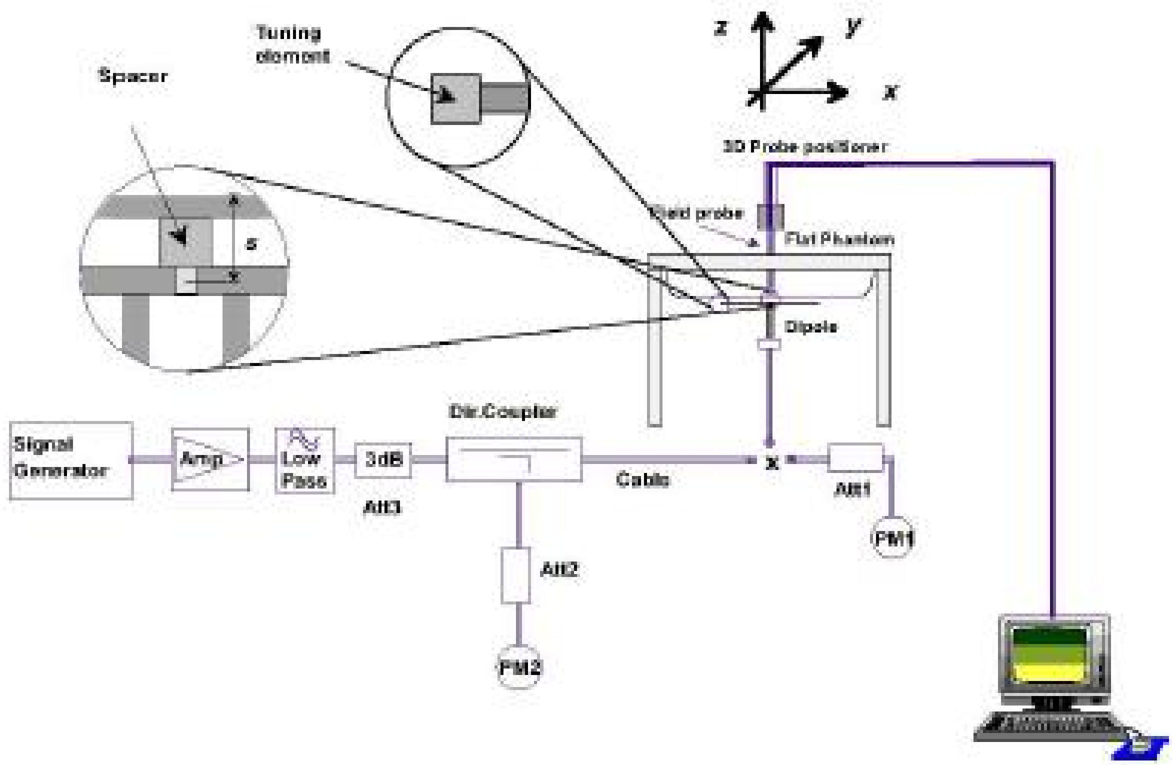
a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+-%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	4.76	N	1	1	1	4.76	4.7	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.0	∞
Hemispherical Isotropy	E.2.2	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 (%)
2018.07.06	835	HSL	100	D835V2-DIPC99	EP80	0.969	9.61	9.69	0.83
2018.06.30	1800	HSL	100	D1800V2-DIPF101	EP80	3.695	37.05	36.95	-0.27
2018.06.30	2000	HSL	100	D2000V2-DIPI102	EP80	4.26	42.70	42.6	-0.23
2018.07.10	2450	HSL	100	D2450V2-263	EP80	5.326	53.34	53.26	-0.15
2018.06.30	2600	HSL	100	D2600V2-265	EP80	5.682	56.94	56.82	-0.21
2018.07.02	835	MSL	100	D835V2-DIPC99	EP80	0.987	9.88	9.87	-0.10
2018.07.05	1800	MSL	100	D1800V2-DIPF101	EP80	3.760	37.78	37.6	-0.48
2018.07.05	2000	MSL	100	D2000V2-DIPI102	EP80	4.12	41.43	41.2	-0.56
2018.07.11	2450	MSL	100	D2450V2-263	EP80	5.090	50.93	50.9	-0.06
2018.07.05	2600	MSL	100	D2600V2-265	EP80	5.385	54.07	53.85	-0.41

<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 (%)
2018.07.06	835	HSL	100	D835V2-DIPC99	EP80	0.625	6.17	6.25	1.30
2018.06.30	1800	HSL	100	D1800V2-DIPF101	EP80	2.048	19.85	20.48	3.17
2018.06.30	2000	HSL	100	D2000V2-DIPI102	EP80	1.99	21.39	19.9	-6.97
2018.07.10	2450	HSL	100	D2450V2-263	EP80	2.381	24.22	23.81	-1.69
2018.06.30	2600	HSL	100	D2600V2-265	EP80	2.501	25.06	25.01	-0.20
2018.07.02	835	MSL	100	D835V2-DIPC99	EP80	0.630	6.48	6.3	-2.78
2018.07.05	1800	MSL	100	D1800V2-DIPF101	EP80	2.039	20.15	20.39	1.19
2018.07.05	2000	MSL	100	D2000V2-DIPI102	EP80	2.09	20.86	20.9	0.19
2018.07.11	2450	MSL	100	D2450V2-263	EP80	2.378	23.26	23.78	2.24
2018.07.05	2600	MSL	100	D2600V2-265	EP80	2.371	24.27	23.71	-2.31

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.

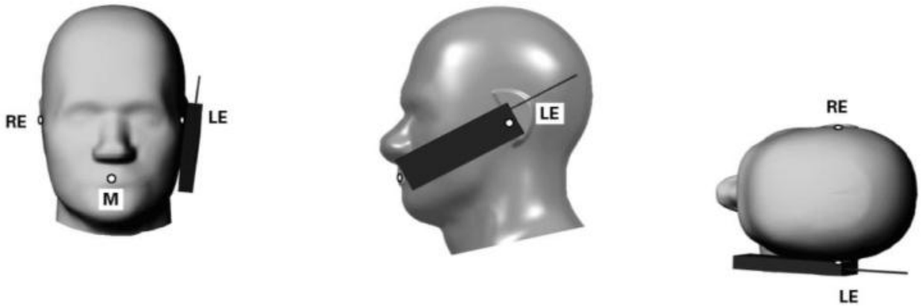


Fig 9.1 Illustration for Cheek Position

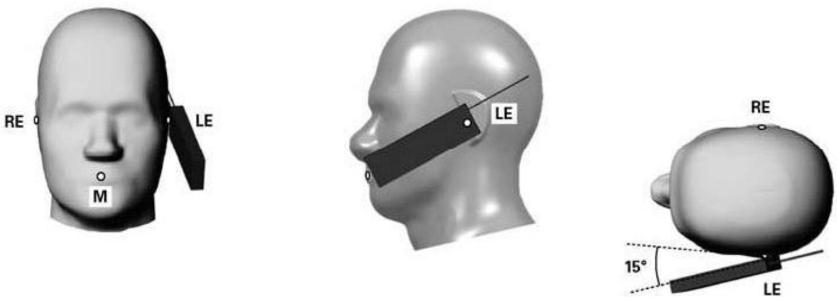
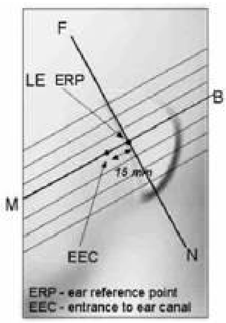


Fig 9.2 Illustration for Tilted Position



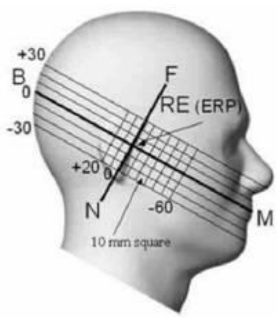


Fig 9.3 Close-up side view of phantom showing the ear region.

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.

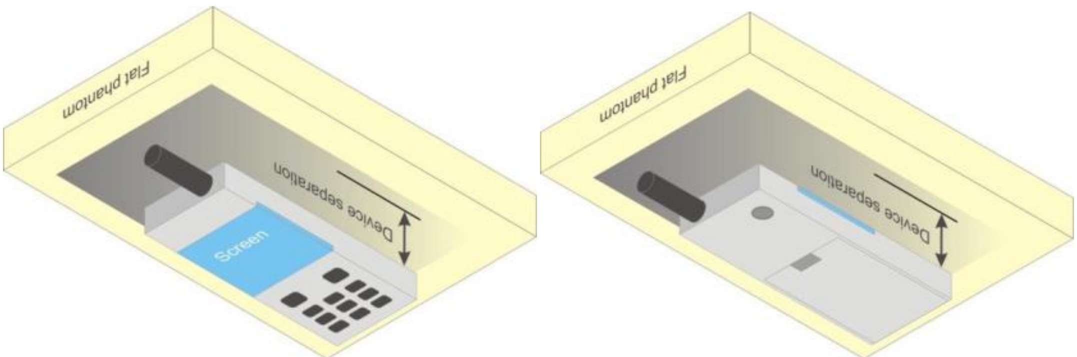


Fig 9.5 Illustration for Body-Worn Position

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).

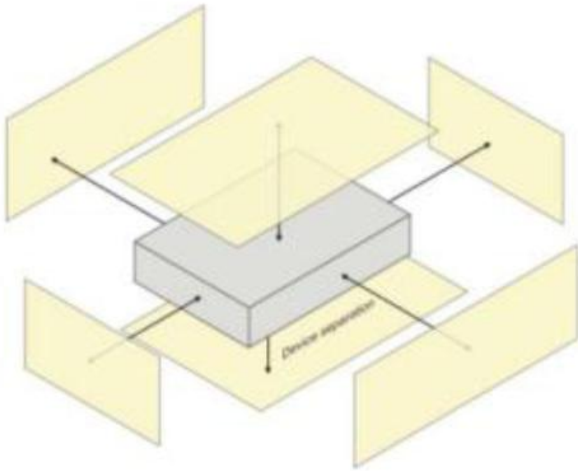


Fig 9.6 Illustration for Hotspot Position

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

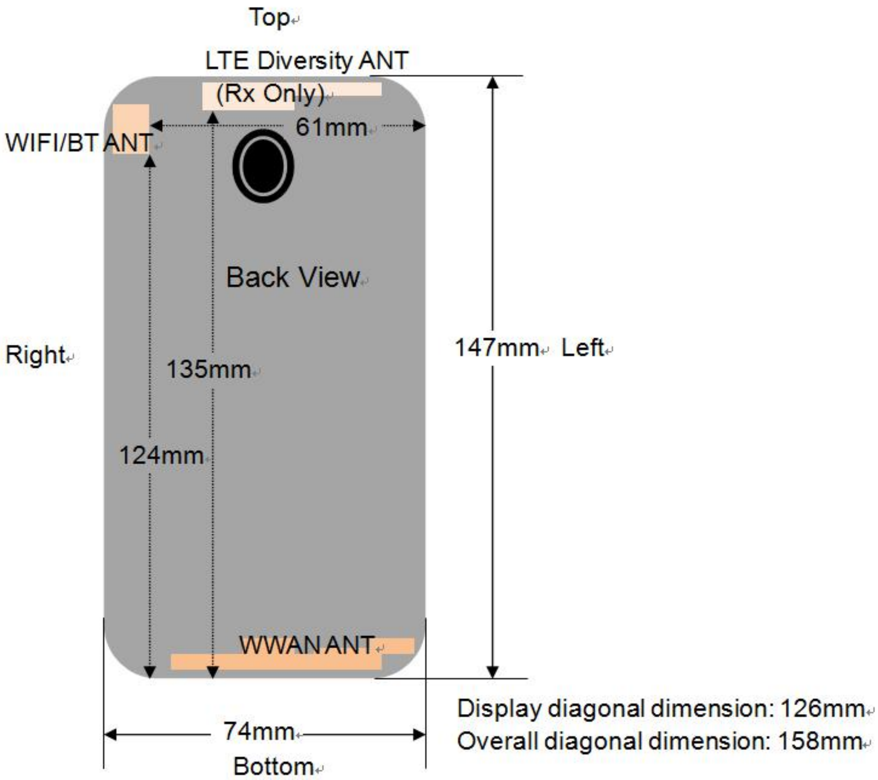
The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

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. Hot-spot Mode Evaluation Procedure

Antenna position:



Distance of the antenna to the EUT surface/edge						
Antenna	Back	Front	Top	Left	Right	Bottom
WWAN	≤25mm	≤25mm	>25mm	≤25mm	≤25mm	≤25mm
WLAN&BT	≤25mm	≤25mm	≤25mm	>25mm	≤25mm	>25mm

Evaluation of Hotspot side for SAR						
Antenna	Back	Front	Top	Left	Right	Bottom
WWAN	Yes	Yes	No	Yes	Yes	Yes
WLAN&BT	Yes	Yes	Yes	No	Yes	No

Note:

The SAR evaluation procedures for Portable Devices with Wireless Router function is according to KDB 941225 D06 Hotspot SAR v02r01.

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

3. For Main antenna, SAR measurements at Top side and Right Side are not required since the distance between DUT and flat phantom > 25mm.
4. For WLAN&BT antenna, SAR measurements Top side and Right side are not required since the distance between DUT and flat phantom > 25mm.
5. For the Diversity antenna, it supports Rx only, SAR is not required.

11. Conducted RF Output Power

1. CDMA 2000 Conducted Power

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.

A summary of these settings are illustrated below:

CDMA2000 1XRTT Conducted Power:

Band	CDMA2000 BC0			Tune-up Limit (dBm)
TX Channel	1013	384	777	
Frequency (MHz)	824.7	836.52	848.31	
RC1 SO32	23.92	24.19	24.04	24.50
RC3 SO55	24.01	**24.22**	24.17	24.50
RC3 SO32 (F+SCH)	23.92	**24.13**	24.12	24.50
RC3 SO32 (+SCH)	23.98	24.19	24.06	24.50

Band	CDMA2000 BC1			Tune-up Limit (dBm)
TX Channel	25	600	1175	
Frequency (MHz)	1851.25	1880	1908.75	
RC1 SO32	23.35	23.26	23.23	23.50
RC3 SO55	**23.47**	23.27	23.29	23.50
RC3 SO32 (F+SCH)	**23.44**	23.31	23.23	23.50
RC3 SO32 (+SCH)	23.40	23.28	23.25	23.50

Band	CDMA2000 BC10			Tune-up Limit (dBm)
TX Channel	476	580	684	
Frequency (MHz)	817.9	820.5	823.1	
RC1 SO32	24.52	24.38	24.33	25.00
RC3 SO55	**24.68**	24.62	24.56	25.00
RC3 SO32 (F+SCH)	**24.62**	24.47	24.49	25.00
RC3 SO32 (+SCH)	24.58	24.50	24.45	25.00

Note:

1. According to KDB 941225 D01, Head SAR is measured on RC3+SO55. Head SAR for RC1-SO55 is not required because the maximum average output power of RC1 is less than 1/4 dB higher than RC3-SO55.
2. The power measurements are based on the power reduction implementation configuration. Use RF engineering tool, with the pre-defined setting command, to measure reduced power.

CDMA2000 1XEVDO Conducted Power:

Band	CDMA2000 BC0			Tune-up Limit (dBm)
TX Channel	1013	384	777	
Frequency (MHz)	824.7	836.52	848.31	
RTAP 153.6Kbps	23.18	23.21	**23.55**	24.00
RETAP 4096Bits	22.81	22.91	23.20	23.50

Band	CDMA2000 BC1			Tune-up Limit (dBm)
TX Channel	25	600	1175	
Frequency (MHz)	1851.25	1880	1908.75	
RTAP 153.6Kbps	22.79	**22.91**	22.81	23.00
RETAP 4096Bits	22.68	22.86	22.51	23.00

Band	CDMA2000 BC10			Tune-up Limit (dBm)
TX Channel	476	580	684	
Frequency (MHz)	817.9	820.5	823.1	
RTAP 153.6Kbps	23.23	**23.51**	23.01	24.00
RETAP 4096Bits	22.56	22.45	23.08	23.50

Note:

1. Referring to KDB 941225 D01, in Hotspot mode SAR is tested with RTAP 153.6kbps (Ev-Do). If RETAP (4096 bits) power is less than 1/4dB higher than RTAP 153.6kbps, SAR tests with RETAP setting are not necessary.
2. The power measurements are based on the power reduction implementation configuration. Use RF engineering tool, with the pre-defined setting command, to measure reduced power.

2. LTE Conducted Power

Largest channel bandwidth standalone SAR test requirements

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.8 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.

QPSK with 50% RB allocation

The procedures required for 1 RB allocation in section 4.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.9

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 sections 4.2.1 and 4.2.2 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.

Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 4.2.1, 5.2.2 and 4.2.3 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 for 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.

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 4.2 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 to 5 MHz channel bandwidth; therefore, this cannot be tested in the smaller channel bandwidth. However, 50% RB allocation in 10 MHz channel bandwidth is 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.

<LTE Band 25>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				26140	26365	26590	
Frequency (MHz)				1860	1882.5	1905	
20	QPSK	1	0	23.31	**23.59**	23.48	24
20	QPSK	1	49	23.39	23.17	23.43	
20	QPSK	1	99	23.15	23.53	23.45	
20	QPSK	50	0	22.35	**22.39**	22.34	23
20	QPSK	50	24	22.34	22.41	22.35	
20	QPSK	50	50	22.17	22.35	22.33	
20	QPSK	100	0	22.28	**22.34**	22.28	
20	16QAM	1	0	21.34	21.64	22.75	23
20	16QAM	1	49	21.89	22.42	21.80	
20	16QAM	1	99	21.49	21.22	21.89	
20	16QAM	50	0	21.44	21.63	21.36	22
20	16QAM	50	24	21.23	21.40	21.39	
20	16QAM	50	50	21.53	21.47	21.33	
20	16QAM	100	0	21.40	21.44	21.37	
Channel				26115	26365	26615	Tune-up limit (dBm)
Frequency (MHz)				1857.5	1882.5	1907.5	
15	QPSK	1	0	23.43	23.45	23.22	23.5
15	QPSK	1	37	23.39	23.40	23.41	
15	QPSK	1	74	23.26	23.36	23.23	
15	QPSK	36	0	22.30	22.28	22.36	22.5
15	QPSK	36	20	22.30	22.43	22.31	
15	QPSK	36	39	22.33	22.35	22.34	
15	QPSK	75	0	22.31	22.34	22.36	
15	16QAM	1	0	21.52	22.44	22.38	22.5
15	16QAM	1	37	21.84	22.78	21.80	
15	16QAM	1	74	21.64	21.25	22.11	
15	16QAM	36	0	21.45	21.49	21.41	21.5
15	16QAM	36	20	21.39	21.62	21.49	
15	16QAM	36	39	21.46	21.34	21.29	
15	16QAM	75	0	21.39	21.39	21.39	
Channel				26090	26365	26640	Tune-up

Frequency (MHz)				1855	1882.5	1910	limit (dBm)
10	QPSK	1	0	23.48	23.37	23.43	23.5
10	QPSK	1	25	23.34	23.48	23.41	
10	QPSK	1	49	23.13	23.27	23.37	
10	QPSK	25	0	22.36	22.36	22.29	22.5
10	QPSK	25	12	22.31	22.43	22.29	
10	QPSK	25	25	22.23	22.36	22.22	
10	QPSK	50	0	22.34	22.38	22.26	
10	16QAM	1	0	22.05	21.92	22.09	22.5
10	16QAM	1	25	22.16	22.10	22.39	
10	16QAM	1	49	21.44	21.43	21.22	
10	16QAM	25	0	21.49	21.58	21.56	21.5
10	16QAM	25	12	21.51	21.55	21.48	
10	16QAM	25	25	21.36	21.32	21.44	
10	16QAM	50	0	21.49	21.44	21.57	
Channel				26065	26365	26665	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1882.5	1912.5	
5	QPSK	1	0	23.22	23.17	23.06	23.5
5	QPSK	1	12	23.32	23.12	23.11	
5	QPSK	1	24	23.23	23.06	23.22	
5	QPSK	12	0	22.21	22.37	22.11	22.5
5	QPSK	12	7	22.28	22.27	22.03	
5	QPSK	12	13	22.21	22.36	22.13	
5	QPSK	25	0	22.24	22.33	22.18	
5	16QAM	1	0	22.23	22.04	21.80	22.5
5	16QAM	1	12	21.75	21.99	21.37	
5	16QAM	1	24	21.77	22.27	21.51	
5	16QAM	12	0	21.12	21.22	21.05	21.5
5	16QAM	12	7	21.13	21.31	21.03	
5	16QAM	12	13	21.13	21.19	20.93	
5	16QAM	25	0	21.28	21.27	21.24	
Channel				26055	26365	26675	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1882.5	1913.5	
3	QPSK	1	0	23.25	23.37	23.41	23.5
3	QPSK	1	8	23.26	23.30	23.35	

3	QPSK	1	14	23.28	23.22	23.25	
3	QPSK	8	0	22.42	22.32	22.32	22.5
3	QPSK	8	4	22.27	22.24	22.34	
3	QPSK	8	7	22.37	22.25	22.32	
3	QPSK	15	0	22.26	22.33	22.34	
3	16QAM	1	0	22.06	21.68	21.99	22.5
3	16QAM	1	8	21.39	21.97	21.37	
3	16QAM	1	14	21.56	21.94	21.57	
3	16QAM	8	0	21.38	21.32	21.31	21.5
3	16QAM	8	4	21.35	21.52	21.32	
3	16QAM	8	7	21.24	21.01	21.31	
3	16QAM	15	0	21.39	21.32	21.41	
Channel				26047	26365	26683	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1882.5	1914.3	
1.4	QPSK	1	0	22.53	22.57	22.22	23
1.4	QPSK	1	3	22.66	22.48	22.48	
1.4	QPSK	1	5	22.38	22.68	22.23	
1.4	QPSK	3	0	22.64	22.77	22.46	
1.4	QPSK	3	1	22.70	22.73	22.44	
1.4	QPSK	3	3	22.65	22.69	22.51	
1.4	QPSK	6	0	21.45	21.56	21.45	22
1.4	16QAM	1	0	21.06	21.57	21.43	22
1.4	16QAM	1	3	21.66	21.54	21.21	
1.4	16QAM	1	5	21.13	21.23	21.23	
1.4	16QAM	3	0	21.65	21.77	21.34	
1.4	16QAM	3	1	21.63	21.65	21.54	
1.4	16QAM	3	3	21.67	21.67	21.44	
1.4	16QAM	6	0	20.81	20.67	20.62	21

<LTE Band 26>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				26765	26865	26965	
Frequency (MHz)				821.5	831.5	841.5	
15	QPSK	1	0	23.44	**23.54**	23.19	24
15	QPSK	1	37	23.47	23.27	23.26	
15	QPSK	1	74	23.25	22.95	23.20	
15	QPSK	36	0	23.24	**23.51**	22.13	24
15	QPSK	36	20	23.50	22.11	22.15	
15	QPSK	36	39	23.33	22.36	22.13	
15	QPSK	75	0	22.40	**22.94**	22.18	
15	16QAM	1	0	21.82	21.97	21.89	23
15	16QAM	1	37	22.00	21.41	21.42	
15	16QAM	1	74	22.87	21.76	22.18	
15	16QAM	36	0	21.05	21.05	21.14	22
15	16QAM	36	20	21.11	21.38	21.27	
15	16QAM	36	39	21.23	21.26	21.22	
15	16QAM	75	0	21.44	21.08	21.07	
Channel				26750	26865	26990	Tune-up limit (dBm)
Frequency (MHz)				820	831.5	844	
10	QPSK	1	0	23.17	23.40	23.06	23.5
10	QPSK	1	25	23.38	23.28	23.22	
10	QPSK	1	49	23.37	23.30	22.94	
10	QPSK	25	0	22.35	22.26	22.17	22.5
10	QPSK	25	12	22.27	22.30	22.26	
10	QPSK	25	25	22.14	22.15	22.32	
10	QPSK	50	0	22.31	22.13	22.03	
10	16QAM	1	0	22.32	21.50	21.93	22.5
10	16QAM	1	25	22.19	22.18	21.96	
10	16QAM	1	49	21.56	21.87	21.45	
10	16QAM	25	0	21.47	21.25	21.18	21.5
10	16QAM	25	12	21.42	21.39	21.22	
10	16QAM	25	25	21.26	21.25	21.23	
10	16QAM	50	0	21.39	21.22	21.13	
Channel				26715	26865	27015	Tune-up

Frequency (MHz)				816.5	831.5	846.5	limit (dBm)
5	QPSK	1	0	23.29	23.24	23.03	23.5
5	QPSK	1	12	23.39	23.45	23.15	
5	QPSK	1	24	23.14	23.27	23.00	
5	QPSK	12	0	22.35	22.27	22.26	22.5
5	QPSK	12	7	22.30	22.43	22.15	
5	QPSK	12	13	22.14	22.25	22.18	
5	QPSK	25	0	22.25	22.33	22.14	
5	16QAM	1	0	22.18	22.05	22.18	22.5
5	16QAM	1	12	22.25	22.09	21.90	
5	16QAM	1	24	22.81	21.98	21.34	
5	16QAM	12	0	21.31	21.25	21.01	21.5
5	16QAM	12	7	21.28	21.14	21.18	
5	16QAM	12	13	21.14	21.09	21.13	
5	16QAM	25	0	21.18	21.47	21.03	
Channel				26705	26865	27025	Tune-up limit (dBm)
Frequency (MHz)				815.5	831.5	847.5	
3	QPSK	1	0	23.16	23.06	23.35	23.5
3	QPSK	1	8	23.36	23.22	23.21	
3	QPSK	1	14	23.00	23.27	23.08	
3	QPSK	8	0	22.27	22.32	23.32	22.5
3	QPSK	8	4	22.34	22.37	22.24	
3	QPSK	8	7	22.27	22.19	22.17	
3	QPSK	15	0	22.30	22.28	22.13	
3	16QAM	1	0	22.22	22.01	21.98	22.5
3	16QAM	1	8	21.97	21.67	21.57	
3	16QAM	1	14	21.92	21.89	21.53	
3	16QAM	8	0	20.89	21.15	21.16	21.5
3	16QAM	8	4	21.18	21.26	21.16	
3	16QAM	8	7	20.89	21.28	21.10	
3	16QAM	15	0	21.21	21.38	21.14	
Channel				26697	26865	27033	Tune-up limit (dBm)
Frequency (MHz)				814.7	831.5	848.3	
1.4	QPSK	1	0	22.93	23.22	23.18	23.5
1.4	QPSK	1	3	23.06	23.28	23.19	

1.4	QPSK	1	5	22.99	23.21	23.22	
1.4	QPSK	3	0	23.12	23.43	23.17	
1.4	QPSK	3	1	23.19	23.34	23.13	
1.4	QPSK	3	3	23.09	23.26	23.34	
1.4	QPSK	6	0	22.08	22.19	22.18	22.5
1.4	16QAM	1	0	22.24	22.29	22.45	22.5
1.4	16QAM	1	3	22.40	22.01	22.07	
1.4	16QAM	1	5	22.02	22.22	22.01	
1.4	16QAM	3	0	22.12	22.27	22.01	
1.4	16QAM	3	1	22.36	22.36	22.31	
1.4	16QAM	3	3	22.02	22.43	22.43	
1.4	16QAM	6	0	21.12	21.11	21.44	21.5

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				39750	40185	40620	41055	41490	
Frequency (MHz)				2506	2549.5	2593	2636.5	2680	
20	QPSK	1	0	25.54	25.45	**25.69**	25.41	25.51	26
20	QPSK	1	49	25.37	25.35	25.52	25.28	25.66	
20	QPSK	1	99	25.10	25.16	25.24	25.12	25.20	
20	QPSK	50	0	25.29	25.24	**25.37**	25.23	24.46	25.5
20	QPSK	50	24	25.24	24.98	24.62	24.85	24.49	
20	QPSK	50	50	25.01	24.86	24.58	24.87	24.57	
20	QPSK	100	0	24.75	24.23	24.46	24.56	24.43	
20	16QAM	1	0	24.78	24.53	24.22	24.67	24.22	25
20	16QAM	1	49	24.91	24.62	24.52	24.72	24.39	
20	16QAM	1	99	24.58	24.02	23.99	24.36	23.92	
20	16QAM	50	0	23.61	23.56	23.65	23.50	23.40	24
20	16QAM	50	24	23.83	23.72	23.76	23.45	23.53	
20	16QAM	50	50	23.57	23.12	23.41	23.45	23.31	
20	16QAM	100	0	23.61	23.46	23.53	23.49	23.40	
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5	

15	QPSK	1	0	25.14	25.16	25.20	25.26	25.31	25.5
15	QPSK	1	37	25.06	25.34	25.47	25.26	25.24	
15	QPSK	1	74	25.14	25.21	25.28	25.20	25.26	
15	QPSK	36	0	24.74	24.45	24.42	24.25	24.27	25
15	QPSK	36	20	24.76	24.61	24.51	24.54	24.48	
15	QPSK	36	39	24.59	24.51	24.42	24.51	24.40	
15	QPSK	75	0	24.53	24.40	24.48	24.43	24.45	
15	16QAM	1	0	24.57	24.41	24.30	24.24	24.25	25
15	16QAM	1	37	24.42	24.32	24.26	24.36	24.14	
15	16QAM	1	74	24.14	24.05	24.04	24.11	23.89	
15	16QAM	36	0	23.72	23.58	23.56	23.53	23.42	24
15	16QAM	36	20	23.75	23.56	23.55	23.54	23.53	
15	16QAM	36	39	23.58	23.45	23.46	23.35	23.46	
15	16QAM	75	0	23.53	23.49	23.52	23.48	23.40	
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)
Frequency (MHz)				2501	2547	2593	2639	2685	
10	QPSK	1	0	25.12	25.05	24.38	24.52	24.99	25.5
10	QPSK	1	25	25.29	25.17	24.38	24.36	25.12	
10	QPSK	1	49	25.10	25.05	24.50	24.78	25.06	
10	QPSK	25	0	24.41	24.35	24.49	24.25	24.08	24.5
10	QPSK	25	12	24.36	24.25	24.39	24.31	24.18	
10	QPSK	25	25	24.13	24.20	24.33	23.24	23.92	
10	QPSK	50	0	24.26	24.42	24.60	24.52	24.10	
10	16QAM	1	0	24.06	24.02	23.96	23.98	23.65	24.5
10	16QAM	1	25	24.14	24.12	24.10	24.21	23.90	
10	16QAM	1	49	23.73	23.56	23.93	23.88	23.54	
10	16QAM	25	0	23.30	23.29	23.50	23.41	23.09	24
10	16QAM	25	12	23.50	23.15	23.61	23.52	23.42	
10	16QAM	25	25	23.43	23.42	23.56	23.58	23.15	
10	16QAM	50	0	23.31	23.26	23.62	23.58	23.09	
Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)
Frequency (MHz)				2498.5	2545.8	2593	2640.3	2678.5	
5	QPSK	1	0	25.23	25.20	24.91	25.10	24.89	25.5
5	QPSK	1	12	25.31	25.16	25.26	25.22	25.12	
5	QPSK	1	24	25.12	25.08	25.10	25.10	24.89	
5	QPSK	12	0	24.34	24.23	24.27	24.26	24.16	24.5

5	QPSK	12	7	24.43	24.35	24.35	24.36	24.24	
5	QPSK	12	13	24.33	24.26	24.24	24.15	24.13	
5	QPSK	25	0	24.33	24.30	24.25	24.26	24.15	
5	16QAM	1	0	24.07	24.05	24.01	24.00	23.75	24.5
5	16QAM	1	12	23.89	24.18	24.28	24.05	23.91	
5	16QAM	1	24	23.78	24.03	24.05	24.01	23.69	
5	16QAM	12	0	23.26	23.12	23.16	23.15	23.10	24
5	16QAM	12	7	23.22	23.19	23.24	23.20	23.08	
5	16QAM	12	13	23.05	23.15	23.10	23.05	22.96	
5	16QAM	25	0	23.46	23.35	23.03	23.17	23.26	

3. 2.4GHzWi-Fi Conducted Average output power

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty cycle %
2.4GHz WLAN	802.11b 1Mbps	CH 01	2412	17.63	18.00	100
		CH 06	2437	**17.78**	18.00	100
		CH 11	2462	17.60	18.00	100
	802.11g 6Mbps	CH 01	2412	**12.48**	12.50	100
		CH 6	2437	12.38	12.50	100
		CH 11	2462	12.05	12.50	100
	802.11n-HT20 MCS0	CH 01	2412	8.47	8.50	100
		CH 06	2437	8.11	8.50	100
		CH 11	2462	7.96	8.00	100
	802.11n-HT40 MCS0	CH 03	2422	7.66	8.00	100
		CH 06	2437	7.36	8.00	100
		CH 09	2452	6.84	7.00	100

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
b/CH 11	2.462	18.00	63.10	5	19.81	3.0
g/CH 01	2.412	12.50	17.78	5	5.51	3.0

2. Base on the result of note1, RF exposure evaluation of 802.11 b mode is required.
3. Per KDB 248227 D01v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
4. Per KDB 248227 D01v02r02, In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. SAR is not required for the following 2.4 GHz OFDM conditions:
   1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.

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

5. The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.

4. BT Conducted Average output power

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	10.45	10.64	10.75
	CH 39	2441	11.49	11.61	**11.71**
	CH 78	2480	9.59	9.75	9.92
Tune-up Limit (dBm)			11.50	12.00	12.00

Mode	Channel	Frequency (MHz)	Peak power (dBm)
			GFSK
LE	CH 00	2402	3.43
	CH 19	2440	4.75
	CH 39	2480	3.27
Tune-up Limit (dBm)			5.00

Note:

1. Per KDB 447498 D01v05r02, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
2. [(*max. power of channel,* including *tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
CH 39	2.441	12.0	15.85	10	2.47	3.0

3. The max. tune-up power was provided by manufacturer, base on the result of note 1, RF exposure evaluation is not required.
4. The output power of all data rate were pre-scan, just the worst case of all mode were shown in report.
5. The BT stand-alone SAR is not required.

12. SAR Test Results Summary

11.1Standalone Head SAR Data

<CDMA 2000 Head SAR>

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	BC0/ RC3 SO55	Right Cheek	384	24.22	24.50	1.067	0.009	0.010
	BC0/ RC3 SO55	Right Tilt	384	24.22	24.50	1.067	0.003	0.003
1#	BC0/ RC3 SO55	Left Cheek	384	24.22	24.50	1.067	0.017	**0.018**
	BC0/ RC3 SO55	Left Tilt	384	24.22	24.50	1.067	0.007	0.007
	BC1/ RC3 SO55	Right Cheek	25	23.47	23.50	1.007	0.026	0.026
	BC1/ RC3 SO55	Right Tilt	25	23.47	23.50	1.007	0.012	0.012
2#	BC1/ RC3 SO55	Left Cheek	25	23.47	23.50	1.007	0.045	**0.045**
	BC1/ RC3 SO55	Left Tilt	25	23.47	23.50	1.007	0.015	0.015
	BC10/ RC3 SO55	Right Cheek	476	24.68	25.00	1.076	0.007	0.008
	BC10/ RC3 SO55	Right Tilt	476	24.68	25.00	1.076	0.002	0.002
3#	BC10/ RC3 SO55	Left Cheek	476	24.68	25.00	1.076	0.016	**0.017**
	BC10/ RC3 SO55	Left Tilt	476	24.68	25.00	1.076	0.007	0.008

<FDD-LTE QPSK Head SAR>

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	LTE Band 25/1RB#0 20M	Right Cheek	26365	23.59	24.00	1.099	0.587	0.645
	LTE Band 25/1RB#0 20M	Right Tilt	26365	23.59	24.00	1.099	0.169	0.186
	LTE Band 25/1RB#0 20M	Left Cheek	26365	23.59	24.00	1.099	0.949	1.043
	LTE Band 25/1RB#0 20M	Left Tilt	26365	23.59	24.00	1.099	0.222	0.244
	LTE Band 25/1RB#0 20M	Left Cheek	26140	23.31	24.00	1.172	0.921	1.080
4#	LTE Band 25/1RB#0 20M	Left Cheek	26590	23.48	24.00	1.127	0.968	**1.091**
	LTE Band 25/1RB#0 20M	**Left Cheek**	**26590**	**23.48**	**24.00**	**1.127**	**0.937**	**1.056**
	LTE Band 25/50RB#0 20M	Right Cheek	26365	22.39	22.50	1.026	0.595	0.610
	LTE Band 25/50RB#0 20M	Right Tilt	26365	22.39	22.50	1.026	0.167	0.171

	LTE Band 25/50RB#0 20M	Left Cheek	26365	22.39	22.50	1.026	0.916	0.939
	LTE Band 25/50RB#0 20M	Left Tilt	26365	22.39	22.50	1.026	0.299	0.307
	LTE Band 25/50RB#0 20M	Left Cheek	26365	22.35	22.50	1.035	0.811	0.840
	LTE Band 25/50RB#0 20M	Left Cheek	26140	22.34	22.50	1.038	0.897	0.931
	LTE Band 25/100RB#0 20M	Left Cheek	26365	22.34	23.00	1.164	0.874	1.017
5#	LTE Band 26/1RB#0 15M	Right Cheek	26865	23.54	24.00	1.112	0.618	**0.687**
	LTE Band 26/1RB#0 15M	Right Tilt	26865	23.54	24.00	1.112	0.137	0.152
	LTE Band 26/1RB#0 15M	Left Cheek	26865	23.54	24.00	1.112	0.525	0.584
	LTE Band 26/1RB#0 15M	Left Tilt	26865	23.54	24.00	1.112	0.116	0.129
	LTE Band 26/50RB#0 15M	Right Cheek	26865	23.51	24.00	1.119	0.608	0.681
	LTE Band 26/50RB#0 15M	Right Tilt	26865	23.51	24.00	1.119	0.143	0.160
	LTE Band 26/50RB#0 15M	Left Cheek	26865	23.51	24.00	1.119	0.537	0.601
	LTE Band 26/50RB#0 15M	Left Tilt	26865	23.51	24.00	1.119	0.128	0.143

<TDD-LTE 20MHz 1RB0&50RB0 >

Plot No.	Band	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Meas. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	LTE Band 41	Right Cheek	40620	25.69	26.00	1.074	62.9	1.006	0.430	0.465
	LTE Band 41	Right Tilt	40620	25.69	26.00	1.074	62.9	1.006	0.297	0.321
6#	LTE Band 41	Left Cheek	40620	25.69	26.00	1.074	62.9	1.006	0.598	**0.646**
	LTE Band 41	Left Tilt	40620	25.69	26.00	1.074	62.9	1.006	0.298	0.322
	LTE Band 41	Right Cheek	40620	25.37	25.50	1.030	62.9	1.006	0.291	0.302
	LTE Band 41	Right Tilt	40620	25.37	25.50	1.030	62.9	1.006	0.158	0.164
	LTE Band 41	Left Cheek	40620	25.37	25.50	1.030	62.9	1.006	0.600	0.622
	LTE Band 41	Left Tilt	40620	25.37	25.50	1.030	62.9	1.006	0.345	0.358

Note: 1.Highlight part of test data means repeated test.

<WLAN Head SAR>

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
7#	WLAN2.4GHz/802.11b	Right Cheek	6	17.78	18.00	1.052	0.186	**0.196**
	WLAN2.4GHz/802.11b	Right Tilt	6	17.78	18.00	1.052	0.112	0.118
	WLAN2.4GHz/802.11b	Left Cheek	6	17.78	18.00	1.052	0.162	0.170
	WLAN2.4GHz/802.11b	Left Tilt	6	17.78	18.00	1.052	0.119	0.125

Note:

1. Per KDB 447498 D01v05r02, for each exposure position, if the highest output power channel Reported SAR ≤ 0.8W/kg, other channels SAR testing is not necessary.
2. Per KDB 865664 D01v01r03, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8W/kg.
3. Per KDB 248227 D01v02r02, for 802.11b DSSS , when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required in that exposure configuration.
4. Per KDB 248227 D01v02r02, OFDM SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg. Cuz the maximum output power specified for OFDM and DSSS are 17.70mW(12.48dBm) and 59.98mW(17.78dBm), the scaled SAR would be 0.196×(17.70/59.98)=0.058W/Kg ﹤1.2 W/kg, therefore, SAR is not required for OFDM.
5. According to KDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.

11.2 Standalone Body SAR Data

< CDMA2000 Body SAR>

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	BC0/RC3 SO32(F+SCH)	Front Side	384	24.13	24.50	1.089	0.319	0.347
8#	BC0/RC3 SO32(F+SCH)	Back Side	384	24.13	24.50	1.089	0.355	**0.387**
	BC0/RTAP 153.6kbps	Front Side	777	23.55	24.00	1.109	0.189	0.210
	BC0/RTAP 153.6kbps	Back Side	777	23.55	24.00	1.109	0.137	0.152
	BC0/RTAP 153.6kbps	Left Side	777	23.55	24.00	1.109	0.075	0.083
	BC0/RTAP 153.6kbps	Right Side	777	23.55	24.00	1.109	0.186	0.206
	BC0/RTAP 153.6kbps	Bottom Side	777	23.55	24.00	1.109	0.009	0.010
	BC1/RC3 SO32(F+SCH)	Front Side	25	23.44	23.50	1.014	0.141	0.143
	BC1/RC3 SO32(F+SCH)	Back Side	25	23.44	23.50	1.014	0.265	0.269
	BC1/RTAP 153.6kbps	Front Side	600	22.91	23.00	1.021	0.687	0.701
9#	BC1/RTAP 153.6kbps	Back Side	600	22.91	23.00	1.021	0.712	**0.727**
	BC1/RTAP 153.6kbps	Left Side	600	22.91	23.00	1.021	0.243	0.248
	BC1/RTAP 153.6kbps	Right Side	600	22.91	23.00	1.021	0.065	0.066
	BC1/RTAP 153.6kbps	Bottom Side	600	22.91	23.00	1.021	0.003	0.003
	BC10/RC3 SO32(F+SCH)	Front Side	476	24.62	25.00	1.091	0.248	0.271
	BC10/RC3 SO32(F+SCH)	Back Side	476	24.62	25.00	1.091	0.262	0.286
	BC10/RTAP 153.6kbps	Front Side	580	23.51	24.00	1.119	0.222	0.249
10#	BC10/RTAP 153.6kbps	Back Side	580	23.51	24.00	1.119	0.342	**0.383**
	BC10/RTAP 153.6kbps	Left Side	580	23.51	24.00	1.119	0.097	0.109
	BC10/RTAP 153.6kbps	Right Side	580	23.51	24.00	1.119	0.179	0.200
	BC10/RTAP 153.6kbps	Bottom Side	580	23.51	24.00	1.119	0.012	0.013

< LTE QPSK Body SAR>

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	LTE Band 25/1RB#0 20M	Front Side	26365	23.59	24.00	1.099	0.504	0.554
11#	LTE Band 25/1RB#0 20M	Back Side	26365	23.59	24.00	1.099	0.649	**0.713**
	LTE Band 25/1RB#0 20M	Left Side	26365	23.59	24.00	1.099	0.397	0.436
	LTE Band 25/1RB#0 20M	Right Side	26365	23.59	24.00	1.099	0.146	0.160
	LTE Band 25/1RB#0 20M	Bottom Side	26365	23.59	24.00	1.099	0.252	0.277
	LTE Band 25/50RB#0 20M	Front Side	26365	22.39	23.00	1.151	0.508	0.585
	LTE Band 25/50RB#0 20M	Back Side	26365	22.39	23.00	1.151	0.643	0.740
	LTE Band 25/50RB#0 20M	Left Side	26365	22.39	23.00	1.151	0.393	0.452
	LTE Band 25/50RB#0 20M	Right Side	26365	22.39	23.00	1.151	0.140	0.161
	LTE Band 25/50RB#0 20M	Bottom Side	26365	22.39	23.00	1.151	0.245	0.282
	LTE Band 26/1RB#0 15M	Front Side	26865	23.54	24.00	1.112	0.551	0.613
12#	LTE Band 26/1RB#0 15M	Back Side	26865	23.54	24.00	1.112	0.747	**0.830**
	LTE Band 26/1RB#0 15M	Left Side	26865	23.54	24.00	1.112	0.327	0.364
	LTE Band 26/1RB#0 15M	Right Side	26865	23.54	24.00	1.112	0.488	0.543
	LTE Band 26/1RB#0 15M	Bottom Side	26865	23.54	24.00	1.112	0.132	0.147
	LTE Band 26/1RB#0 15M	Back Side	26750	23.44	24.00	1.138	0.698	0.794
	LTE Band 26/1RB#0 15M	Back Side	26990	23.19	24.00	1.205	0.679	0.818
	LTE Band 26/1RB#0 15M	**Back Side**	**26865**	**23.54**	**24.00**	**1.112**	**0.739**	**0.822**
	LTE Band 26/50RB#0 15M	Front Side	26865	23.51	24.00	1.119	0.462	0.517
	LTE Band 26/50RB#0 15M	Back Side	26865	23.51	24.00	1.119	0.632	0.707
	LTE Band 26/50RB#0 15M	Left Side	26865	23.51	24.00	1.119	0.246	0.275
	LTE Band 26/50RB#0 15M	Right Side	26865	23.51	24.00	1.119	0.389	0.435
	LTE Band 26/50RB#0 15M	Bottom Side	26865	23.51	24.00	1.119	0.108	0.121
	LTE Band 26/75RB#0 15M	Back Side	26865	22.94	24.00	1.276	0.605	0.772

<TDD-LTE 20MHz 1RB0&50RB0&100RB0 >

Plot No.	Band	Test Position	Ch.	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Meas. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	LTE Band 41	Front Side	40620	25.69	26.00	1.074	62.9	1.006	0.317	0.343
	LTE Band 41	Back Side	40620	25.69	26.00	1.074	62.9	1.006	0.762	0.824
	LTE Band 41	Left Side	40620	25.69	26.00	1.074	62.9	1.006	0.257	0.278
	LTE Band 41	Right Side	40620	25.69	26.00	1.074	62.9	1.006	0.030	0.032
	LTE Band 41	Bottom Side	40620	25.69	26.00	1.074	62.9	1.006	0.840	0.908
13#	LTE Band 41	Bottom Side	39750	25.54	26.00	1.112	62.9	1.006	1.001	**1.120**
	LTE Band 41	**Bottom Side**	**39750**	**25.54**	**26.00**	**1.112**	**62.9**	**1.006**	**0.995**	**1.113**
	LTE Band 41	Bottom Side	40185	25.45	26.00	1.135	62.9	1.006	0.875	0.999
	LTE Band 41	Bottom Side	41055	25.41	26.00	1.146	62.9	1.006	0.776	0.895
	LTE Band 41	Bottom Side	41490	25.51	26.00	1.119	62.9	1.006	0.658	0.741
	LTE Band 41	Front Side	40620	25.37	25.50	1.030	62.9	1.006	0.409	0.424
	LTE Band 41	Back Side	40620	25.37	25.50	1.030	62.9	1.006	0.782	0.811
	LTE Band 41	Left Side	40620	25.37	25.50	1.030	62.9	1.006	0.264	0.274
	LTE Band 41	Right Side	40620	25.37	25.50	1.030	62.9	1.006	0.024	0.025
	LTE Band 41	Bottom Side	40620	25.37	25.50	1.030	62.9	1.006	0.677	0.702
	LTE Band 41	Back Side	39750	25.29	25.50	1.050	62.9	1.006	0.758	0.801
	LTE Band 41	Back Side	40185	25.24	25.50	1.062	62.9	1.006	0.749	0.800
	LTE Band 41	Back Side	41055	25.23	25.50	1.064	62.9	1.006	0.741	0.794
	LTE Band 41	Back Side	41490	24.46	25.50	1.271	62.9	1.006	0.706	0.903
	LTE Band 41	Bottom Side	39750	24.75	25.50	1.189	62.9	1.006	0.852	1.019

Note: 1.Highlight part of test data means repeated test.

<WLAN Body SAR>

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Meas. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
14#	WLAN2.4GHz/802.11b	Front Side	6	17.78	18.00	1.052	0.030	**0.032**
	WLAN2.4GHz/802.11b	Back Side	6	17.78	18.00	1.052	0.018	0.019
	WLAN2.4GHz/802.11b	Right Side	6	17.78	18.00	1.052	0.018	0.019
	WLAN2.4GHz/802.11b	Top Side	6	17.78	18.00	1.052	0.005	0.005

<Bluetooth Body Estimated SAR>

Plot No.	Band/Mode	Test Position	CH.	Ave. Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Est. SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
	Bluetooth/3Mbps	Front Side	39	11.71	12.00	1.069	0.33	0.353
	Bluetooth/3Mbps	Back Side	39	11.71	12.00	1.069	0.33	0.353

Note:

1. Body-worn SAR testing was performed at 10mm separation, and this distance is determined by the handset manufacturer that there will be body-worn accessories that users may acquire at the time of equipment certification, to enable users to purchase aftermarket body-worn accessories with the required minimum separation.
2. Per KDB 648474 D04v01r02, 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.
3. The WLAN SAR perform the front and back position, due considered the simultaneous SAR for body-worn.
4. Per KDB 447498 D01v05r02, for each exposure position, if the highest output channel Reported SAR ≤0.8W/kg, other channels SAR testing is not necessary.
5. Per KDB 865664 D01v01r03, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥0.8W/kg.

13. 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.

Band/ Mode	Test Position	CH.	Measured SAR (W/kg)				
			Original	1st Repeated		2nd Repeated	
				Value	Ratio	Value	Ratio
LTE Band 25/1RB#0 20M	Left Cheek	26590	0.968	0.937	1.03	/	/
LTE Band 26/1RB#0 15M	Back Side	26990	0.747	0.739	1.01	/	/
LTE Band 41/1RB#0 20M	Bottom Side	39750	1.001	0.995	1.01	/	/

14. Simultaneous Transmission Evaluation

No.	Simultaneous transmission Condition	Head	Hotspot	Body-worn
1	CDMA2000+ WLAN 2.4GHz	Yes	Yes	Yes
2	LTE + WLAN 2.4GHz	Yes	Yes	Yes
3	CDMA2000 + Bluetooth	Yes	Yes	Yes
4	LTE + Bluetooth	Yes	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 tests.
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: $(SAR1 + SAR2)^{1.5}/Ri \le 0.04$,

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

< Head Exposure>

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)
CDMA	CDMA2000 BC0	Right Cheek	0.010	0.196	0.206
		Right Tilt	0.003	0.118	0.121
		Left Cheek	0.018	0.170	0.188
		Left Tilt	0.007	0.125	0.132
	CDMA2000 BC1	Right Cheek	0.026	0.196	0.222
		Right Tilt	0.012	0.118	0.130
		Left Cheek	0.045	0.170	0.215
		Left Tilt	0.015	0.125	0.140
	CDMA2000 BC10	Right Cheek	0.008	0.196	0.204
		Right Tilt	0.002	0.118	0.120
		Left Cheek	0.017	0.170	0.187
		Left Tilt	0.008	0.125	0.133
LTE	LTE Band 25	Right Cheek	1.017	0.196	1.213
		Right Tilt	0.186	0.118	0.304
		Left Cheek	1.091	0.170	**1.261**
		Left Tilt	0.307	0.125	0.432
	LTE Band 26	Right Cheek	0.687	0.196	0.883
		Right Tilt	0.160	0.118	0.278
		Left Cheek	0.601	0.170	0.771
		Left Tilt	0.143	0.125	0.268
	LTE Band 41	Right Cheek	0.465	0.196	0.661
		Right Tilt	0.321	0.118	0.439
		Left Cheek	0.600	0.170	0.770
		Left Tilt	0.358	0.125	0.483

<Hotspot Exposure>

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)
CDMA	CDMA2000 BC0	Front	0.347	0.032	0.379
		Back	0.387	0.019	0.406
		Left side	0.083	0.000	0.083
		Right side	0.206	0.019	0.225
		Top side	0.000	0.005	0.005
		Bottom side	0.010	0.000	0.010
	CDMA2000 BC1	Front	0.701	0.032	0.733
		Back	0.727	0.019	0.746
		Left side	0.248	0.000	0.248
		Right side	0.066	0.019	0.085
		Top side	0.000	0.005	0.005
		Bottom side	0.003	0.000	0.003
	CDMA2000 BC10	Front	0.271	0.032	0.303
		Back	0.383	0.019	0.402
		Left side	0.109	0.000	0.109
		Right side	0.200	0.019	0.219
		Top side	0.000	0.005	0.005
		Bottom side	0.013	0.000	0.013
LTE	LTE Band 25	Front	0.585	0.032	0.617
		Back	0.740	0.019	0.759
		Left side	0.452	0.000	0.452
		Right side	0.161	0.019	0.180
		Top side	0.000	0.005	0.005
		Bottom side	0.282	0.000	0.282
	LTE Band 26	Front	0.613	0.032	0.645
		Back	0.830	0.019	0.849
		Left side	0.364	0.000	0.364
		Right side	0.543	0.019	0.562

		Bottom side	0.147	0.000	0.147
	LTE Band 41	Front	0.424	0.032	0.456
		Back	0.824	0.019	0.843
		Left side	0.278	0.000	0.278
		Right side	0.274	0.019	0.293
		Top side	0.000	0.005	0.005
		Bottom side	1.120	0.000	**1.120**

<Body-worn Exposure>

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	Bluetooth		
			1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)		
CDMA	CDMA2000 BC0	Front	0.347	0.032	0.353	0.379	0.700
		Back	0.387	0.019	0.353	0.406	0.740
	CDMA2000 BC1	Front	0.701	0.032	0.353	0.733	1.054
		Back	0.727	0.019	0.353	0.746	1.080
	CDMA2000 BC10	Front	0.271	0.032	0.353	0.303	0.624
		Back	0.383	0.019	0.353	0.402	0.736
LTE	LTE Band 25	Front	0.585	0.032	0.353	0.617	0.938
		Back	0.740	0.019	0.353	0.759	1.093
	LTE Band 26	Front	0.613	0.032	0.353	0.645	0.966
		Back	0.830	0.019	0.353	0.849	1.183
	LTE Band 41	Front	0.424	0.032	0.353	0.456	0.777
		Back	0.903	0.019	0.353	**0.922**	**1.256**

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.