REPORT No. : SZ17020049S01

FCC SAR TEST REPORT

APPLICANT	**:**	Hoperun mMax Digital Inc.
PRODUCT NAME	**:**	CDMA 3G Mobile Phone
MODEL NAME	**:**	H460
TRADE NAME	**:**	Jabrbox
BRAND NAME	**:**	Jabrbox
FCC ID	**:**	2AKQN-H460
STANDARD(S)	**:**	47CFR 2.1093 IEEE 1528-2013
ISSUE DATE	**:**	2017-03-13

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

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DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	2017-03-13	First edition

TEST REPORT DECLARATION

Applicant	Hoperun mMax Digital Inc.		
Applicant Address	4790 Irvine Blvd., Ste. 105-431 Irvine, CA 92620		
Manufacturer	Hoperun mMax Digital Inc.		
Manufacturer Address	4790 Irvine Blvd., Ste. 105-431 Irvine, CA 92620		
Product Name	CDMA 3G Mobile Phone		
Model Name	H460		
Brand Name	Jabrbox		
HW Version	S408_MB_V3.0		
SW Version	HMD-H460JB		
Test Standards	47CFR 2.1093; IEEE 1528-2013		
Test Date	2017-03-09		
The Highest Reported 1g-SAR(W/kg)	Head	1.138W/kg	Limit(W/kg): 1.6W/kg
	Body-worn	1.129W/kg	
	Hotspot	1.109W/kg	
	Simultaneous	1.513W/kg	

Reviewed by : Liu Jun
Liu Jun

Approved by : Peng Huarui
Peng Huarui

1. SUMMARY OF MAXIMUM SAR VALUE

Mode/Band	Test Position	SAR-1g(W/kg)
CDMA BC 0	Head	0.917
	Body-worn (15mm Gap)	0.870
	Hotspot Mode (10mm Gap)	0.983
CDMA BC 1	Head	0.911
	Body-worn (15mm Gap)	0.822
	Hotspot Mode (10mm Gap)	1.068
CDMA BC 10	Head	1.138
	Body-worn (15mm Gap)	1.129
	Hotspot Mode (10mm Gap)	1.109
WLAN 2.4GHz	Head	0.375
	Body-worn (15mm Gap)	0.309
	Hotspot Mode (10mm Gap)	0.217
BT 2.4GHz	Head	0.100
	Body-worn (15mm Gap)	N/A
	Hotspot Mode (10mm Gap)	N/A

Note:

1. The SAR limit(1.6W/kg) for general population/uncontrolled exposure is specified in FCC 47 CFR part2(2.1093) and ANSI/IEEE C95.1-1991.

2.TECHNICAL INFORMATION

Note: the Following data is based on the information by the applicant.

2.1 Identification of Applicant

Company Name:	Hoperun mMax Digital Inc.
Address:	4790 Irvine Blvd., Ste. 105-431 Irvine, CA 92620

2.2 Identification of Manufacturer

Company Name:	Hoperun mMax Digital Inc.
Address:	4790 Irvine Blvd., Ste. 105-431 Irvine, CA 92620

2.3 EquipmentUnder Test (EUT)

Model Name:	H460
Trade Name:	Jabrbox
Brand Name:	Jabrbox
Hardware Version:	S408_MB_V3.0
Software Version:	HMD-H460JB
Tx Frequency Bands:	CDMA BC 0: 824-849MHz; CDMA BC 1:1850-1910MHz; CDMA BC 10:817-824MHz; Bluetooth;
Uplink Modulations:	CDMA: CDMA; BT: GFSK/π/4-DQPSK /8-DPSK
Hotspot function:	Support

2.3.1 Photographs of the EUT

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

2.3.2 Identification of all used EUT

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the Following two numerical characters indicate the software version of the test sample.

EUT Identity	Hardware Version	Software Version
1#	S408_MB_V3.0	HMD-H460JB

2.4 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 forDetermining the Peak Spatial-AverageSpecific Absorption Rate (SAR) in theHuman Head from WirelessCommunications Devices: Measurement Techniques
3	**KDB 447498 D01v06**	General RF Exposure Guidance
4	**KDB 248227 D01v02r02**	SAR Measurement Procedures for 802.11 Transmitters
5	**KDB 941225 D01v03r01**	3G SAR Procedures
6	**KDB 941225 D06v02r01**	Hotspot Mode SAR
7	**KDB 865664 D01v01r04**	SAR Measurement 100 MHz to 6 GHz
8	**KDB 865664 D02v01r02**	SAR Reporting

2.5 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, $\delta\mathrm{T}$ is the temperature rise and $\delta\mathrm{t}$ 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 $|\mathrm{E}|$ is the rms electrical field strength.

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

4. SAR MEASUREMENT SETUP

4.1 The Measurement System

Comosar is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The Comosar 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

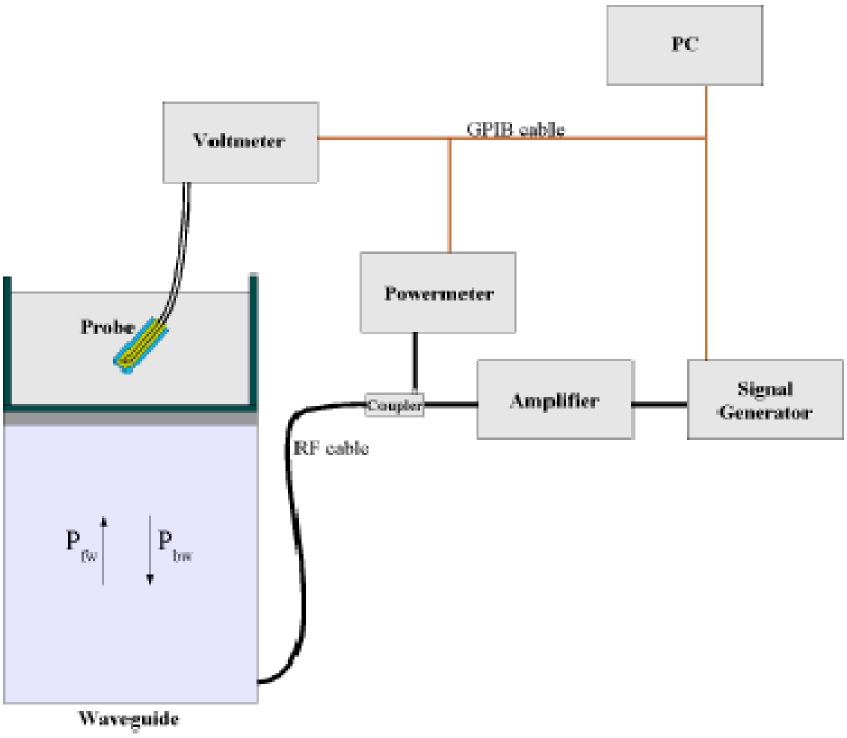
For the measurements the Specific Dosimetric E-Field Probe SN 37/08 EP80 with Following specifications is used

- 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:

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

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

4.3.1 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.

4.3.2 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.

4.3.3 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,

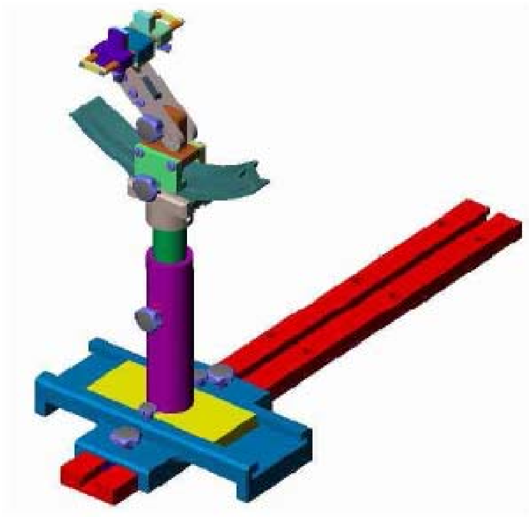
ρ = Tissue density (1.25 g/cm³ for brain tissue)

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. 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 15 cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in below table.

The following table gives the recipes for tissue simulating liquids

Frequency Band (MHz)	835		1800		2450	
Tissue Type	Head	Body	Head	Body	Head	Body
DeionisedWater	50.36	50.20	54.90	40.40	62.70	73.20
Salt(NaCl)	1.25	0.90	0.18	0.50	0.50	0.10
Sugar	0.00	48.50	0.00	58.00	0.00	0.00
Tween 20	48.39	0.00	0.00	0.00	0.00	0.00
HEC	0.00	0.20	0.00	1.00	0.00	0.00
Bactericide	0.00	0.20	0.00	0.10	0.00	0.00
Triton X-100	0.00	0.00	0.00	0.00	36.80	0.00
DGBE	0.00	0.00	44.92	0.00	0.00	26.70
Diethylenglycol monohexylether	0.00	0.00	0.00	0.00	0.00	0.00
Dielectric Constant	41.50	56.10	40.0	53.30	39.20	52.70
Conductivity (S/m)	0.90	0.95	1.40	1.52	1.80	1.95

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 1: Dielectric Performance of Tissue Simulating Liquid

Temperature: 22.0~23.8°C, humidity: 54~60%.						
Date	**Freq.(MHz)**	**Liquid Parameters**	**Meas.**	**Target**	**Delta(%)**	**Limit±(%)**
2017/03/09	Head 835	Relative Permittivity(εr):	41.36	41.5	-0.34	5
		Conductivity(σ):	0.91	0.90	1.11	5
2017/03/09	Body 835	Relative Permittivity(εr):	55.69	55.2	0.89	5
		Conductivity(σ):	0.97	0.97	0.00	5
2017/03/09	Head 1800	Relative Permittivity(εr):	39.98	40.0	-0.05	5
		Conductivity(σ):	1.41	1.40	0.71	5
2017/03/09	Body 1800	Relative Permittivity(εr):	53.10	53.3	-0.38	5
		Conductivity(σ):	1.53	1.52	0.66	5
2017/03/09	Head 2450	Relative Permittivity(εr):	39.11	39.20	-0.23	5
		Conductivity(σ):	1.79	1.80	-0.56	5
2017/03/09	Body 2450	Relative Permittivity(εr):	52.52	52.70	-0.34	5
		Conductivity(σ):	1.92	1.95	-1.54	5

6. UNCERTAINTY ASSESSMENT

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

6.1 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	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	1.1 5	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1	0.03	0.0 3	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	1	1	2.89	2.8 9	∞
Test sample Related									
Test sample positioning	E.4.2. 1	0.03	N	1	1	1	0.03	0.0 3	N- 1
Device Holder Uncertainty	E.4.1.	5.00	N	1	1	1	5.00	5.0	N-

	1							0	1
Output power Power drift - SAR drift measurement	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	1	0.64	0.43	3.20	2.15	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	1	0.6	0.49	6.00	4.90	M
Combined Standard Uncertainty			RSS				11.55	10.67	
Expanded Uncertainty (95% Confidence interval)			K=2				23.11	21.33	

6.2 UNCERTAINTY FOR SYSTEM PERFORMANCE CHECK

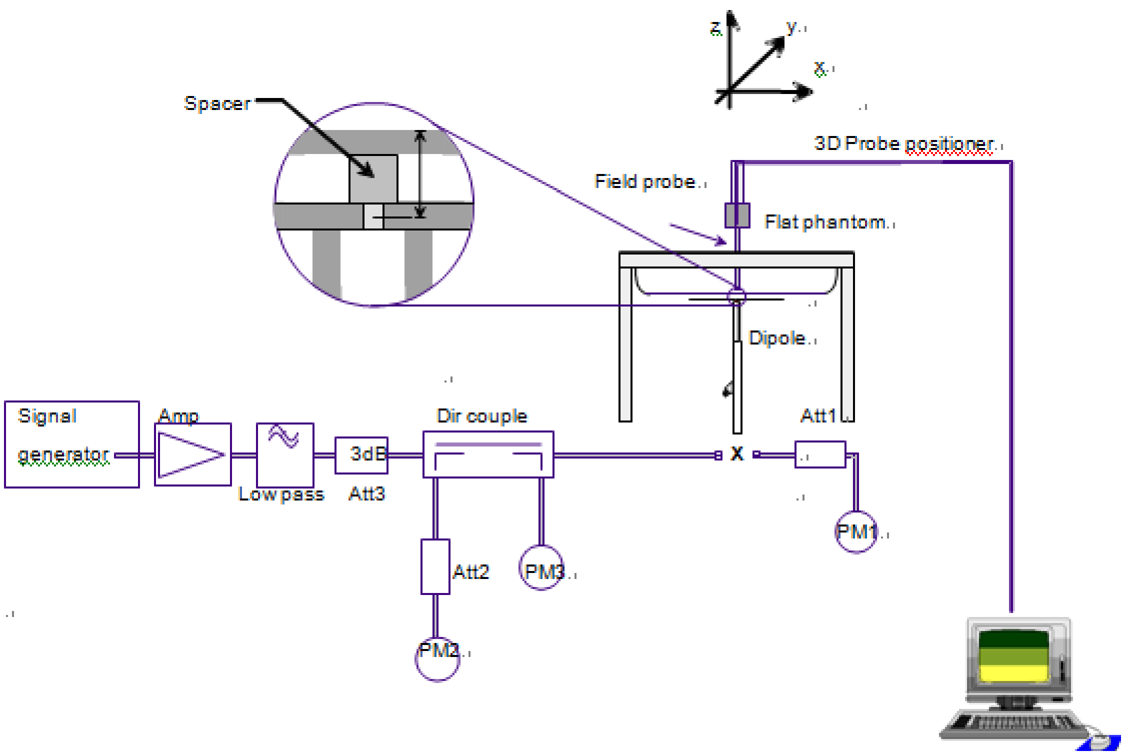
a	b	c	d	e= f(d,k)	f	g	h= c*f/e	i= c*g/e	k
Uncertainty Component	Sec.	Tol (+-%)	Prob. Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+-%)	Vi
Measurement System									
Probe calibration	E.2.1	4.76	N	1	1	1	4.76	4.7	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.0	∞
Hemispherical Isotropy	E.2.2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

7. SAR MEASUREMENT EVALUATION

7.1 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 specific spacer in place. The distance spacer is touch the phantom surface with a light 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 (250 mW is used for 700 MHz to 3 GHz,100 mW is used for 3.5 GHz to 6 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

7.2 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 %.

Frequency	835MHz (Head) W/Kg	835MHz (Body) W/Kg	1800MHz (Head) W/Kg	1800MHz (Body) W/Kg	2450MHz (Head) W/Kg	2450MHz (Body) W/Kg
Target value 1W (1g)	9.61	9.88	37.05	37.78	53.34	50.93
Test value 1g (100 mW input power)	0.952	0.991	3.808	3.753	5.255	5.042
Normalized to 1W value(1g)	9.52	9.91	38.08	37.53	52.55	50.42
Deviation	0.94%	0.30%	2.78%	0.66%	1.48%	1.00%

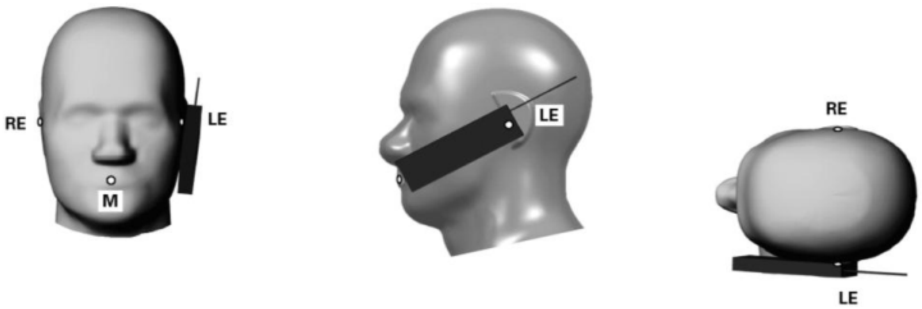
Note: System checks the specific test data please see Annex D

8. OPERATIONAL CONDITIONS DURING TEST

8.1 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.



IllustrationforCheekPosition

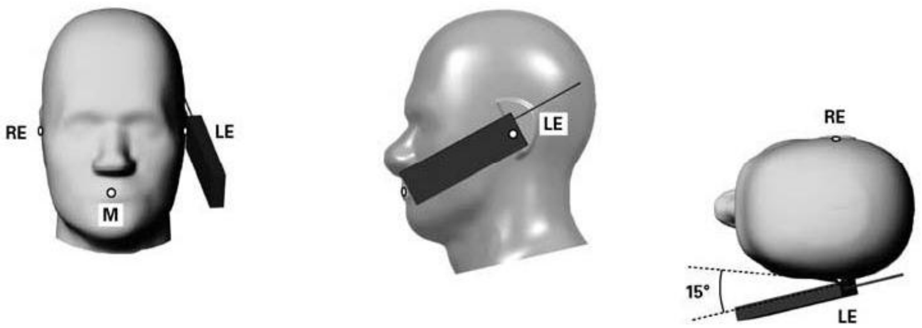


Illustration for Tilted Position

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:

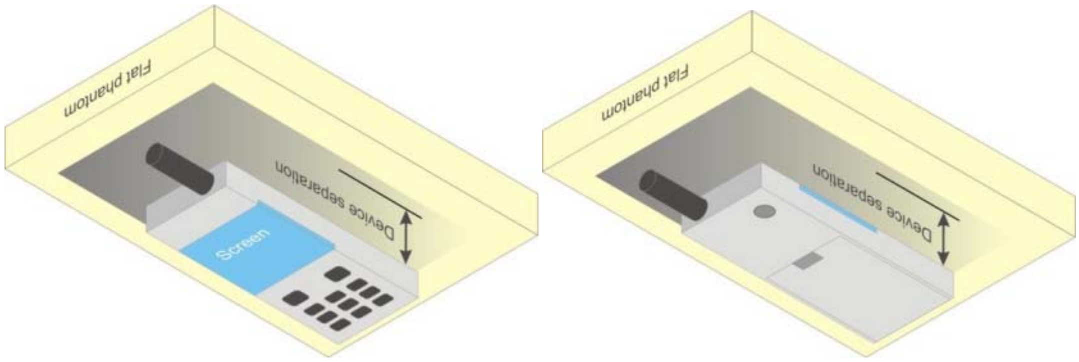
The mobile phone is well placed in the “cheek” position as described above. Then the mobile phone is moved outward away from the month by an angle of 15 degrees or until contact with the ear lost.

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

8.2 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.



IllustrationforBodyWornPosition

8.3 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.

8.4 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.

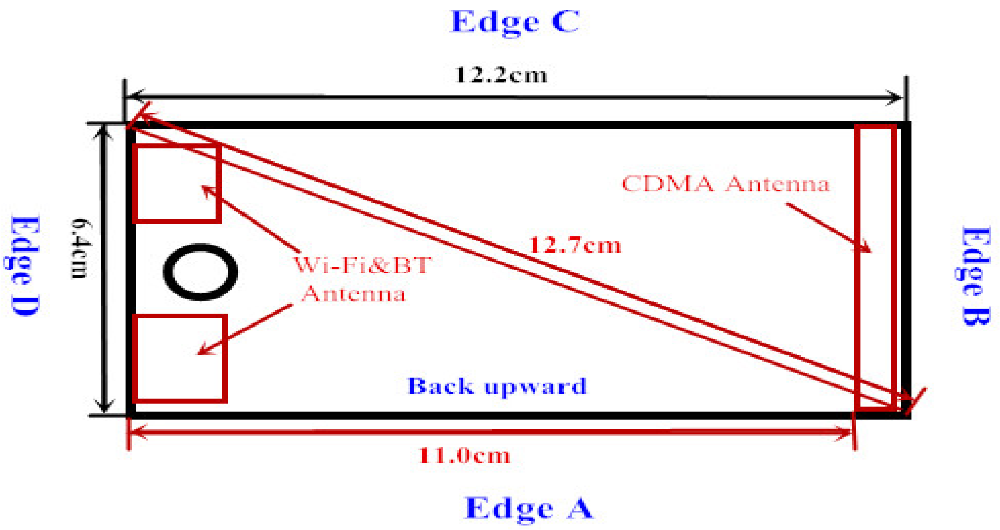
The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional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

9. HOTSPOT MODE EVALUATION PROCEDURE

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

SAR must be tested for all surfaces and edges (side) with a transmitting antenna with in 2.5 cm from that surface or edge, at a test separation distance of 10 mm, in the wireless mode that support wireless routing.

Edge configurations:



Assessment	Hotspot side for SAR Test distance: 10mm					
Antennas	**Back**	**Front**	**Edge A**	**Edge B**	**Edge C**	**Edge D**
CDMA	**Yes**	**Yes**	**Yes**	**Yes**	No	**Yes**
WLAN&BT	**Yes**	**Yes**	No	**Yes**	**Yes**	No

10. MEASUREMENT OF CONDUCTED OUTPUT POWER

1. CDMA 1xRTT power

Band	Channel	Frequency (MHz)	CDMA	EVDO Rev.A	EVDO Rev.B	EVDO Rev.0
BC 0	1013	824.7	25.29	24.59	24.91	25.06
	384	836.52	25.05	24.70	24.97	24.44
	777	848.31	25.04	24.41	24.39	24.14
BC 1	25	1851.25	23.67	23.00	23.13	23.21
	600	1880.0	23.85	23.56	23.69	23.56
	1175	1908.75	23.91	23.28	23.95	23.29
BC 10	450	817.25	23.49	23.54	22.68	23.30
	560	820.0	24.41	23.78	24.34	23.57
	670	822.75	24.10	24.30	23.97	23.90
	Note: Maximum average output power is verified on the Low, Middle and High channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E for 1xRTT.					

1. WiFi Average output power

Band	Channel	Frequency (MHz)	Output Power(dBm)		
			802.11b (DSSS)	802.11g (OFDM)	802.11n20 (OFDM)
WiFi	1	2412	15.26	14.42	14.40
	6	2437	14.74	14.51	14.33
	11	2462	15.23	14.58	14.52

Band	Channel	Frequency (MHz)	Output Power(dBm)
			802.11n40 (OFDM)
WiFi	3	2422	12.03
	6	2437	11.84
	9	2452	11.62

5. BT+EDR 2.1 peak output power

Band	Channel	Frequency (MHz)	Output Power(dBm)		
			GFSK	π/4-DQPSK	8-DPSK
BT+EDR 2.1	0	2402	10.23	10.76	10.85
	39	2441	10.35	10.79	10.86
	78	2480	10.49	10.83	10.98

6. BT 4.0 peak output power

Band	Channel	Frequency (MHz)	Output Power(dBm)
			GFSK
BT 4.0	0	2402	1.45
	19	2441	1.36
	39	2480	1.55

11. TEST RESULTS LIST

Summary of Measurement Results (CDMA BC0)

Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g
Right Side Of Head	Cheek/Touch	384	0.896	1.023	0.917
	Ear/Tilt	384	0.591	1.023	0.605
Left Side Of Head	Cheek/Touch	384	0.861	1.023	0.881
	Ear/Tilt	384	0.364	1.023	0.372
Body-worn (15mm Separation)	Back upward	384	0.850	1.023	0.870
	Front upward	384	0.761	1.023	0.779
Hotspot Mode (10mm Separation)	Back upward	384	0.459	1.023	0.470
	Front upward	384	0.342	1.023	0.350
	Edge A	384	0.622	1.023	0.636
	Edge B	384	0.157	1.023	0.161
	Edge C	384	0.961	1.023	0.983

Summary of Measurement Results (CDMA BC1)

Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g
Right Side Of Head	Cheek/Touch	600	0.874	1.042	0.911
	Ear/Tilt	600	0.434	1.042	0.452
Left Side Of Head	Cheek/Touch	600	0.409	1.042	0.426
	Ear/Tilt	600	0.201	1.042	0.209
Body-worn (15mm Separation)	Back upward	600	0.789	1.042	0.822
	Front upward	600	0.672	1.042	0.700
Hotspot Mode (10mm Separation)	Back upward	600	0.564	1.042	0.588
	Front upward	600	0.517	1.042	0.539
	Edge A	600	0.647	1.042	0.674
	Edge B	600	1.025	1.042	1.068
	Edge C	600	0.249	1.042	0.259

Summary of Measurement Results (CDMA BC10)

Temperature: 21.0~23.8°C, humidity: 54~60%.					
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g
Right Side Of Head	Cheek/Touch	560	0.954	1.106	1.055
	Ear/Tilt	560	0.501	1.106	0.554
Left Side Of Head	Cheek/Touch	560	1.029	1.106	1.138
	Ear/Tilt	560	0.540	1.106	0.597
Body-worn (15mm Separation)	Back upward	560	1.021	1.106	1.129
	Front upward	560	0.843	1.106	0.932
Hotspot Mode (10mm Separation)	Back upward	560	0.638	1.106	0.706
	Front upward	560	0.516	1.106	0.571
	Edge A	560	0.979	1.106	1.083
	Edge B	560	0.195	1.106	0.216
	Edge C	560	1.003	1.106	1.109

Note:

1. When the 1-g SAR for the mid-band channel or the channel with the highest output power satisfy the following conditions, testing of the other channels in the band is not required. (Per KDB 447498 D01 General RF Exposure Guidance v06)
   ≤ 0.8 W/kg and transmission band ≤ 100 MHz
   ≤ 0.6 W/kg and, 100 MHz < transmission bandwidth ≤ 200 MHz
   ≤ 0.4 W/kg and transmission band > 200 MHz
2. BT & WiFi SAR test is conducted according to section 12 stand-alone SAR evaluation of this report.
3. During 802.11 testing, engineering testing software installed on the EUT can provide continuous transmitting RF signal. The RF signal utilized in SAR measurement has almost 100% duty cycle, and its crest factor is 1.
4. IEEE Std 1528-2013 require the middle channel to be tested first. This generally applies to wireless devices that are designed to operate in technologies with tight tolerances for maximum output power variations across channels in the band. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

5. Per KDB 447498, when the SAR procedures require multiple channels to be tested and the 1-g SAR for the highest output channel is less than 0.8 W/kg and peak SAR is less than

1.6W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.

6. Scaling Factor calculation

Band	Tune-up power tolerance(dBm)	SAR test channel Power (dBm)	Scaling Factor	Max Tune-up power(dBm)
CDMA BC0	Max output power =24.5(+1/-2)	25.40	1.023	25.98
CDMA BC1	Max output power =23.5(+1/-2)	24.32	1.042	25.34
CDMA BC10	Max output power =24.5(+1/-2)	25.06	1.106	27.72
BT	Max output power =10.5(±0.5)	10.98	1.005	11.03
Wi-Fi	Max output power =15.0(±0.5)	15.26	1.057	16.13

Summary of Measurement Results (WLAN 802.11b Band)

Temperature: 21.0~23.8°C, humidity: 54~60%.							
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Duty Cycle	Scaling Factor (Duty Cycle)	Scaling Factor (Power)	Scaled SAR (W/Kg), 1g
Right Side Of Head	Cheek/Touch	1	0.205	99%	1.010	1.057	0.218
	Ear/Tilt		0.311				0.332
Left Side Of Head	Cheek/Touch		0.351				0.375
	Ear/Tilt		0.250				0.267
Body (15mm Separation)	Back upward		0.132				0.141
	Front upward		0.266				0.284
	Edge C		0.289				0.309
	Edge D		0.205				0.219
Hotspot Mode (10mm Separation)	Back upward		0.203				0.217
	Front upward		0.189				0.202

Summary of Measurement Results (BT+EDR 2.1 Band)

Temperature: 21.0~23.8°C, humidity: 54~60%.							
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Duty Cycle	Scaling Factor (Duty Cycle)	Scaling Factor (Power)	Scaled SAR (W/Kg), 1g
Right Side Of Head	Cheek/Touch	78	0.062	70.5%	1.418	1.005	0.088
	Ear/Tilt		0.064				0.091
Left Side Of Head	Cheek/Touch		0.070				0.100
	Ear/Tilt		0.068				0.097

Notes:

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 inthat 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 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 Proceduresshould be followed.

3. For held-to-ear and hotspot operations, the initial test position procedures were applied. The testposition with the highest extrapolated peak SAR will be used as the initial test position. Whenreported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining testpositions was required. Otherwise, SAR is evaluated at the subsequent highest peak SARpositions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.

4. Justification for test configurations for WLAN per KDB Publication 248227 D02DR02-41929 for 2.4 GHz WIFI 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 DSSSSAR.

12. 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 samehead or body tissue-equivalent medium in a frequency band. The test device should be returned to ambientconditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder forthe 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% fromthe 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kgand the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Band	Test Position	Test Channel	Meas.SAR(W/kg)		Largest to Smallest SAR Ratio
			Original	Repeated	
CDMA BC0	Right Cheek	384	0.917	0.905	1.013
	Left Cheek		0.881	0.864	1.020
	Back upward		0.870	0.876	1.007
	Edge A		0.983	0.985	1.002
CDMA BC1	Right Cheek	600	0.911	0.964	1.058
	Back upward		0.822	0.875	1.064
	Edge B		1.068	1.116	1.045
CDMA BC10	Right Cheek	560	1.055	1.098	1.041
	Left Cheek		1.138	1.186	1.042
	Back upward		1.129	1.178	1.043
	Front upward		0.932	0.995	1.068
	Edge A		1.083	1.123	1.037
	Edge C		1.109	1.159	1.045

13. MULTIPLE TRANSMITTERS EVALUATION

Stand-alone SAR

Test distance: 5mm			
Band	**Highest power(mW) per tune up**	**1-g SAR test threshold**	**Test required?**
WIFI(2.4G)	41.02	[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤ 3.0 for 1-g SAR	Yes
BT	12.68		Yes

Test distance: 10mm			
Band	**Highest power(mW) per tune up**	**1-g SAR test threshold**	**Test required?**
WIFI(2.4G)	41.02	[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤ 3.0 for 1-g SAR	Yes
BT	12.68		No

The SAR test for BT is not required.
The SAR test for 802.11b(2.4GHz) is required, 802.11g/HT20 is not required, for the maximum average output power is less than 1/4 dB Higher than measured on the corresponding 802.11b channels. As per KDB 248227

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 of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm;
where *x* = 7.5 for 1-g SAR, and *x* = 18.75 for 10-g SAR.
(Max power=12.68 mW; *min. test separation distance*= 10mm for Body; *f*=2.4GHz)
BT estimated Body SAR =0.262W/Kg (1g)

Simultaneous SAR

	Simultaneous transmission conditions			
	WWAN	WLAN		Sum of WWAN& WLAN
	CDMA Data	802.11b/g/n	BT	
CDMA BC0	√	√		√
	√		√	√
CDMA BC1	√	√		√
	√		√	√
CDMA BC10	√	√		√
	√		√	√

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 WiFi, 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)

6. Applicable Multiple Scenario Evaluation

Test Position	Main Ant. SARMax (W/Kg)	Bluetooth SAR(W/Kg)	WiFi SARMax(W/Kg)	∑1-g SARMax(W/Kg)	
				BT&Main Ant	WiFi&Main Ant
Head SAR	1.138	0.262	0.375	1.400	1.513
Body SAR	1.129	0.100	0.309	1.229	1.438

Simultaneous Transmission SAR evaluation is not required for WiFi and CDMA, because the sum of 1g SARMax is **1.513**W/Kg < 1.6W/Kg for Wifi and CDMA.
Simultaneous Transmission SAR evaluation is not required for BT and CDMA, because the sum of 1g SARMax is **1.400**W/Kg < 1.6W/Kg for BT and CDMA.
(According to KDB 447498D01v06, the sum of the Highest *reported*SAR of each antenna does not exceed thelimit, simultaneous transmission SAR evaluation is not required.)

14. ANNEX A GENERAL INFORMATION

15. ANNEX B PHOTOGRAPHS OF THE EUT

16. ANNEX C PLOTS OF HIGH SAR TEST RESULTS

17. ANNEX D SYSTEM PERFORMANCE CHECK DATA

ANNEX A GENERAL INFORMATION

1. Identification of the Responsible Testing Laboratory

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

2. Identification of the Responsible Testing Location

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

3. List of Test Equipments

No.	Instrument	Type	Cal. Date	Cal. Due
1	PC	Dell (Pentium IV 2.4GHz, SN:X10-23533)	(n.a)	(n.a)
2	Network Emulator	Agilent(8960, SN:10752)	2016-6-03	1year
3	Network Emulator	Rohde&Schwarz (CMW500,SN:124534)	2016-6-03	1year
4	Voltmeter	Keithley (2000, SN:1000572)	2016-8-21	1year
5	Synthetizer	Rohde&Schwarz (SML_03, SN:101868)	2016-8-24	1year
6	Amplifier	Nucl udes (ALB216, SN:10800)	2016-8-24	1year
7	Power Meter	Rohde&Schwarz (NRVD, SN:101066)	2016-8-24	1year
8	Power Meter	Rohde&Schwarz (NRVD, SN:102055)	2016-7-21	1year
9	Power Sensor	MA2411B	2016-8-24	1year
10	Power Sensor	N1921A	2016-7-21	1year
11	Probe	Satimo (SN:SN 37/08 EP80)	2016-7-05	1year
12	Phantom	Satimo (SN:SN_36_08_SAM62)	N/A	N/A
13	Liquid	Satimo (Last Calibration:2017-03-10)	N/A	N/A
14	Dipole 835MHz	Satimo (SN 20/08 DIPC99)	2016-7-05	3year
15	Dipole 1900MHz	Satimo (SN 30/13 DIP1G900-261)	2016-7-05	3year
16	Dipole 2450MHz	Satimo (SN 30/13 DIP2G450-263)	2016-7-05	3year
17	Thermo meter	KTJ(mode-01)	2016-7-05	1year

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

FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China
Tel: 86-755-36698555 Fax: 86-755-36698525
Http://www.morlab.com E-mail: service@morlab.cn