TCT 通测检测
TESTING CENTRE TECHNOLOGY

SAR TEST REPORT

FCC ID. ..... :	SY4-B01015	
Test Report No..... :	TCT211008E036	
Date of issue..... :	Oct. 25, 2021	
Testing laboratory ..... :	SHENZHEN TONGCE TESTING LAB	
Testing location/ address:	TCT Testing Industrial Park Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District Shenzhen, Guangdong, 518103, People's Republic of China	
Applicant's name..... :	Shanghai Huace Navigation Technology Ltd.	
Address..... :	Building D, 599 Gaojing Road, Qingpu District, Shanghai, China	
Manufacturer's name ... :	Shanghai Huace Navigation Technology Ltd.	
Address..... :	Building D, 599 Gaojing Road, Qingpu District, Shanghai, China	
Test item description ..... :	Handheld GNSS Data Collector	
Trade Mark ..... :	CHCNAV	
Model/Type reference..... :	HCE600	
SAR Max. Values.....:	**0.53 W/Kg (1g) for head; 0.76 W/Kg (1g) for Body-worn; 0.77 W/Kg (1g) for Hotspot**	
Date of receipt of test item ..... :	Oct. 08, 2021	
Date (s) of performance of test..... :	Oct. 08, 2021 - Oct. 25, 2021	
Tested by (+signature) ... :	karl	Karl
Check by (+signature).... :	Beryl Zhao	Beryl zhao
Approved by (+signature):	Tomsin	Tomsin

SHENZHEN TONGCE TESTING LAB TCT

General disclaimer:

This report shall not be reproduced except in full, without the written approval of SHENZHEN TONGCE TESTING LAB. This document may be altered or revised by SHENZHEN TONGCE TESTING LAB personnel only, and shall be noted in the revision section of the document. The test results in the report only apply to the tested sample.

TABLE OF CONTENTS

1. General Product Information 3
1.1. EUT description 3
2. Test standard 5
3. Facilities and Accreditations 5
3.1. Facilities 5
3.2. Location 5
3.3. Environment Condition: 5
4. Test Result Summary 6
5. RF Exposure Limit 8
6. SAR Measurement System Configuration 9
6.1. SAR Measurement Set-up 9
6.2. E-field Probe 10
6.3. Phantom 10
6.4. Device Holder 11
6.5. Data Storage and Evaluation 12
6.6. Position of the wireless device in relation to the phantom 13
6.7. Tissue Dielectric Parameters 16
6.8. Tissue-equivalent Liquid Properties 17
6.9. System Check 19
7. Measurement Procedure 21
8. Conducted Output Power 24
9. Exposure Position Consideration 46
9.1. EUT Antenna Location 46
9.2. Test Position Consideration 46
10. SAR Test Results Summary 47
10.1. Head 1g SAR Data 47
10.2. Body-Worn 1g SAR Data 49
10.3. Hotspot 1g SAR Data 51
10.4. Simultaneous Transmission Conclusion 55
10.5. SAR Simultaneous Transmission Analysis 57
10.6. Measurement Uncertainty (450MHz-3GHz) 64
10.7. Test Equipment List 66
11. System Check Results 67
12. SAR Test Data 103
Appendix A: EUT Photos 203
Appendix B: Test Setup Photos 206
Appendix C: Probe Calibration Certificate 208
Appendix D: Dipole Calibration Report 225
Appendix E: SAR SYSTEM VALIDATION 304
Appendix F: The Check Data of Impedance and Return Loss 306

1. General Product Information

1.1. EUT description

Test item description.....:	Handheld GNSS Data Collector
Model/Type reference.....:	HCE600
Rating(s).....:	DC 3.85V from battery, DC 5V from adapter
2G	
Operation Band.....:	GSM850, GSM1900
Supported type.....:	GSM/GPRS/EGPRS
Power Class.....:	GSM850:Power Class 5; GSM1900:Power Class 0
Modulation Type.....:	GMSK for GSM/GPRS; 8QPSK for EGPRS
GSM Release Version.....:	R99
GPRS Multislot Class.....:	12
EGPRS Multislot Class.....:	12
3G	
Operation Band.....:	FDD Band II & FDD Band IV & FDD Band V
Power Class.....:	Power Class 3
Modulation Type.....:	QPSK for WCDMA/HSDPA/HSUPA
WCDMA Release Version.....:	R99
HSDPA Release Version.....:	Release 5
HSUPA Release Version.....:	Release 6
DC-HSUPA Release Version.....:	Not Supported
LTE	
Operation Band.....:	LTE Band 2 & LTE Band 4 & LTE Band 5 & LTE Band 7 & LTE Band 12 & LTE Band 17 & LTE Band 41
Power Class.....:	Power Class 3
Modulation Type.....:	QPSK &16-QAM for LTE
Wi-Fi 2.4G	
Supported type.....:	802.11b/802.11g/802.11n
Modulation Type.....:	802.11b: DSSS 802.11g/802.11n:OFDM
Operation Frequency.....:	802.11b/802.11g/802.11n(HT20):2412MHz~2462MHz; 802.11n(HT40):2422MHz~2452MHz
Channel number.....:	802.11b/802.11g/802.11n(HT20):11; 802.11n(HT40):7
Channel separation.....:	5MHz

Bluetooth	
Bluetooth Version.....:	Supported 5.0
Modulation.....:	GFSK(1Mbps) , π/4-DQPSK(2Mbps) , 8-DPSK(3Mbps)
Operation Frequency.....:	2402MHz~2480MHz
Channel number.....:	79/40
Channel separation.....:	1MHz/2MHz
Wi-Fi 5G	
Operation Frequency:	Band 1: 5180 MHz -5240 MHz Band 2A: 5260 MHz -5320 MHz Band 3: 5745 MHz -5825 MHz
Channel Bandwidth:	802.11a: 20MHz 802.11n: 20MHz, 40MHz 802.11ac: 20MHz, 40MHz, 80MHz
Modulation Technology:	Orthogonal Frequency Division Multiplexing(OFDM)
Modulation Type	256QAM, 64QAM, 16QAM, BPSK, QPSK

2. Test standard

The tests were performed according to following standards:
FCC 47 CFR §2.1093
IEEE1528-2013:Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB447498 D01:General RF Exposure Guidance v06
KDB865664 D01:SAR measurement 100MHz to 6GHz v01r04
KDB865664 D02:RF Exposure Reporting v01r02.
KDB941225 D01:3G SAR Procedures v03r01
KDB248227 D01:802.11 wi-fi SAR v02r02
KDB941225 D05:SAR for LTE devices v02r05
KDB941225 D06:Hotspot Mode v02r01
KDB941225 D07:UMPC Mini Tablet v01r02
KDB690783 D01:SAR Listings on Grant v01r03

3. Facilities and Accreditations

3.1. Facilities

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

- FCC - Registration No.: 645098
  SHENZHEN TONGCE TESTING LAB
  Designation Number: CN1205
  The testing lab has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.
- IC - Registration No.: 10668A-1
  SHENZHEN TONGCE TESTING LAB
  CAB identifier: CN0031
  The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

3.2. Location

SHENZHEN TONGCE TESTING LAB.
Address: TCT Testing Industrial Park, Fuqiao 5th Industrial Zone, Fuhai Street, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China

3.3. Environment Condition:

Temperature:	18°C ~25°C
Humidity:	35%~75% RH
Atmospheric Pressure:	1011 mbar

4. Test Result Summary

The maximum results of Specific Absorption Rate (SAR) found during test as bellows:
<Highest Reported standalone SAR Summary>

Exposure Position	Frequency Band	Reported SAR (W/kg)	Equipment Class	Highest Reported SAR (W/kg)
Head 1-g SAR	GSM 850	0.19	PCE	**0.53**
	GSM 1900	0.31		
	WCDMA Band II	0.42		
	WCDMA Band IV	**0.53**		
	WCDMA Band V	0.18		
	LTE Band 2	0.26		
	LTE Band 4	0.31		
	LTE Band 5	0.14		
	LTE Band 7	0.19		
	LTE Band 12	0.10		
	LTE Band 17	0.13		
	LTE Band 41	0.18		
	WLAN 2.4 GHz	0.17	DTS	
	WLAN 5.2 GHz	0.29	NII	
	WLAN 5.3 GHz	0.15		
	WLAN 5.8 GHz	0.11		
Body-worn 1-g SAR (10 mm Gap)	GSM 850	0.70	PCE	**0.76**
	GSM 1900	0.64		
	WCDMA Band II	0.73		
	WCDMA Band IV	**0.76**		
	WCDMA Band V	0.33		
	LTE Band 2	0.45		
	LTE Band 4	0.58		
	LTE Band 5	0.23		
	LTE Band 7	0.33		
	LTE Band 12	0.16		
	LTE Band 17	0.22		
	LTE Band 41	0.31		
	WLAN 2.4 GHz	0.18	DTS	
	WLAN 5.2 GHz	0.30	NII	
	WLAN 5.3 GHz	0.22		
	WLAN 5.8 GHz	0.19		

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

Hotspot 1-g SAR (10 mm Gap)	GSM 850	0.75	PCE	**0.77**
	GSM 1900	0.67		
	WCDMA Band II	0.74		
	WCDMA Band IV	**0.77**		
	WCDMA Band V	0.33		
	LTE Band 2	0.49		
	LTE Band 4	0.59		
	LTE Band 5	0.24		
	LTE Band 7	0.37		
	LTE Band 12	0.18		
	LTE Band 17	0.23		
	LTE Band 41	0.34		
	WLAN 2.4 GHz	0.20	DTS	
	WLAN 5.2 GHz	0.31	NII	
	WLAN 5.3 GHz	0.23		
	WLAN 5.8 GHz	0.20		

<Highest Reported simultaneous SAR Summary>

Exposure Position	Frequency Band	Highest Reported Simultaneous Transmission SAR (W/kg)
Head 1-g SAR	WCDMA Band IV + WIFI 5G	**0.82**
Body 1-g SAR (10 mm Gap)	WCDMA Band IV + WIFI 5G	**1.06**
Hotspot 1-g SAR (10 mm Gap)	WCDMA Band IV + WIFI 5G	**1.08**

Note:

1. The highest simultaneous transmission is scalar summation of Reported standalone SAR per FCC KDB 690783 D01 v01r03, and scalar SAR summation of all possible simultaneous transmission scenarios are < 1.6W/kg.
2. This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-2005, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.
3. This EUT owns four cards, after we perform the pretest for these two SIM card; we found the SIM 1 is the worst case, so its result is recorded in this report.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

5. RF Exposure Limit

Type Exposure	SAR (W/kg)
	Uncontrolled Exposure Limit
Spatial Peak SAR (averaged over any 1 g of tissue)	1.60
Spatial Peak SAR (hands/wrists/feet/ankles averaged over 10g)	4.00
Spatial Peak SAR (averaged over the whole body)	0.08

Note:

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

6. SAR Measurement System Configuration

6.1. SAR Measurement Set-up

The OPENSAR system for performing compliance tests consist of the following items:

A standard high precision 6-axis robot (KUKA) with controller and software.

KUKA Control Panel (KCP)

A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with a Video Positioning System (VPS).

The stress sensor is composed with mechanical and electronic when the electronic part detects a change on the electro-mechanical switch; it sends an “Emergency signal” to the robot controller that to stop robot’s moves A computer operating Windows XP.

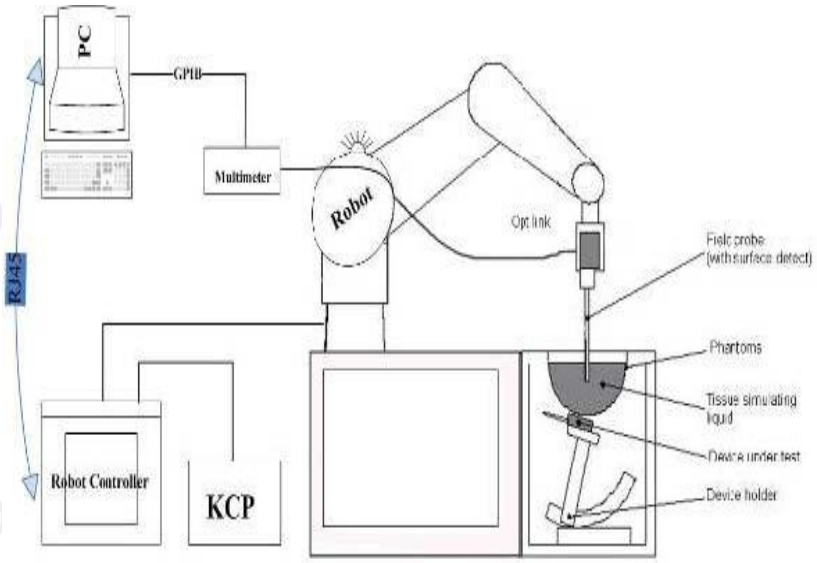
OPENSAR software Remote control with teaches pendant and additional circuitry for robot safety such as warning lamps, etc.

The SAM phantom enabling testing left-hand right-hand and body usage.

The Position device for handheld EUT

Tissue simulating liquid mixed according to the given recipes.

System validation dipoles to validate the proper functioning of the system.



KUKA SAR Test Sysytem Configuration

6.2. E-field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by MVG).
The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.
This probe has a built in optical surface detection system to prevent from collision with phantom.

Probe Specification
Construction Symmetrical design with triangular core
Interleaved sensors
Built-in shielding against static charges
PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration ISO/IEC 17025 calibration service available.

Device Type	COMOSAR DOSIMETRIC E FIELD PROBE
Manufacturer	MVG
Model	SSE2
Serial Number	SN 36/20 EPGO346
Frequency Range of Probe	0.15 GHz- 6GHz
Resistance of Three Dipoles at Connector	Dipole 1:R1=0.217MΩ Dipole 2:R3=0.245MΩ Dipole 3:R3=0.219MΩ

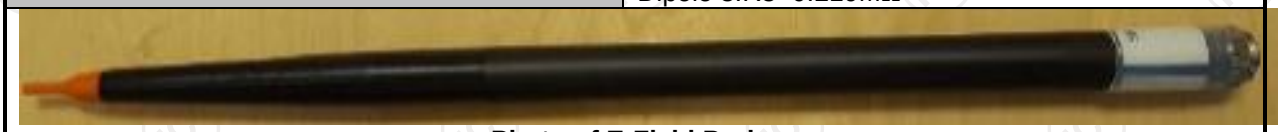
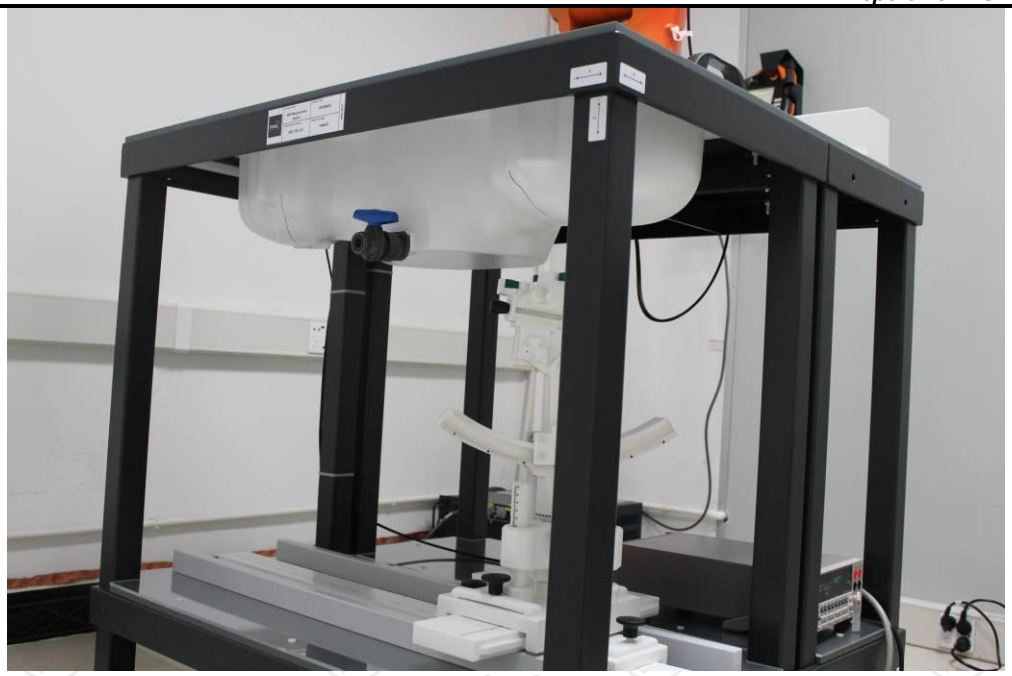


Photo of E-Field Probe

6.3. Phantom

The SAM Phantom SAM120 is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is in compliance with the specification set in IEEE P1528 and CENELEC IEC 62209-1, IEC 62209-2:2010.
The phantom enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region.
A cover prevents the evaporation of the liquid.
Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot
System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections.
Body SAR testing also used the flat section between the head profiles.

Name: COMOSAR IEEE SAM PHANTOM
S/N: SN 19/15 SAM 120
Manufacture: MVG

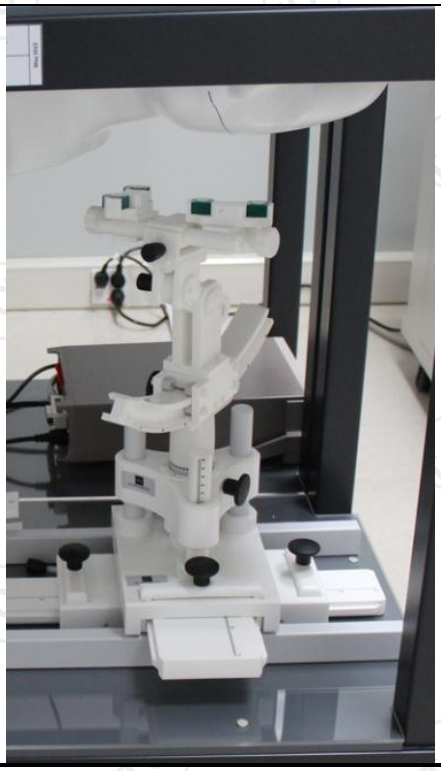


SAM Twin Phantom

6.4. Device Holder

In combination with the Generic Twin Phantom SAM120, the Mounting Device enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening.
The devices can be easily, accurately, and repeatedly positioned according to the FCC and CENELEC specifications.
The device holder can be locked at different phantom locations (left head, right head, flat phantom).

COMOSAR Mobile phone positioning system



6.5. Data Storage and Evaluation

Data Storage

The OPENSAR software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation

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

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

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

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$Vi = Ui + Ui2 \cdot c\,f / d\,c\,pi$$

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

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

E-field probes: $Ei = (Vi / Normi \cdot ConvF)1/2$

H-field probes: $Hi = (Vi)1/2 \cdot (ai0 + ai1\,f + ai2f2) / f$

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

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

Etot = (Ex2+ EY2+ Ez2)1/2

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

SAR = (Etot) 2 · σ / (ρ · 1000)

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

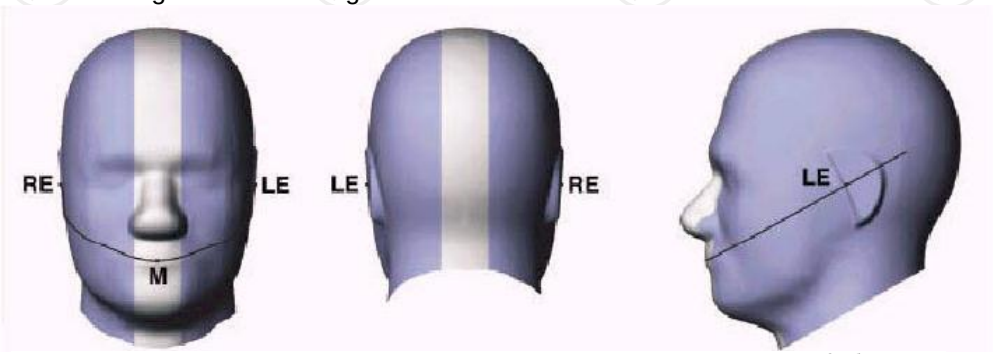
Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

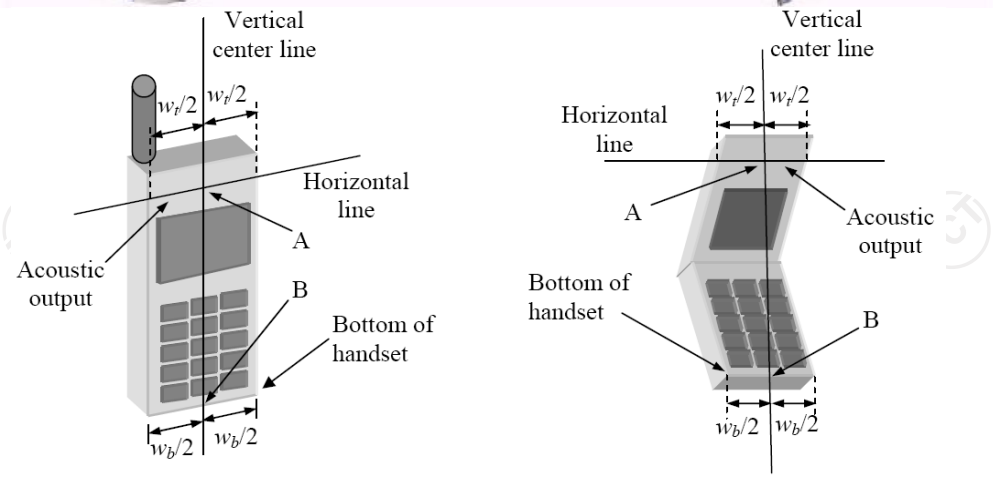
6.6. Position of the wireless device in relation to the phantom

Handset Reference Points

Ppwe = Etot2 / 3770 or Ppwe = Htot2 · 37.7

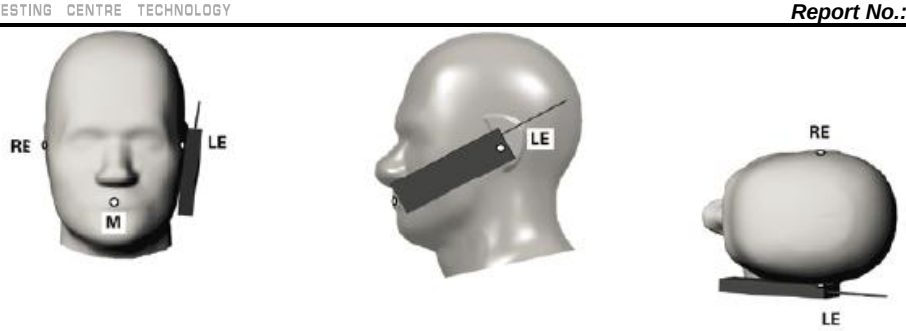
With Ppwe = equivalent power density of a plane wave in mW/cm2
Etot = total electric field strength in V/m
Htot = total magnetic field strength in A/m





Wt Width of the handset at the level of the acoustic
Wb Width of the bottom of the handset
A Midpoint of the width wt of the handset at the level of the acoustic output
B Midpoint of the width wb of the bottom of the handset

Positioning for Cheek / Touch



Positioning for Ear / 15º Tilt

Body Worn Accessory Configurations
To position the device parallel to the phantom surface with either keypad up or down.
To adjust the device parallel to the flat phantom.
To adjust the distance between the device surface and the flat phantom to 15mm or holster surface and the flat phantom to 0 mm.

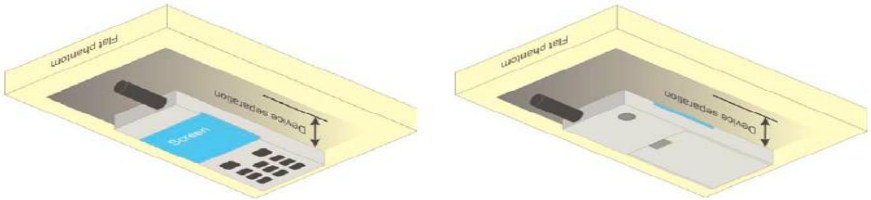


Illustration for Body Worn Position

Ireless Router（Hotspot）Configurations
Some battery-operated handsets have the capability to transmit and receive internet connectivity through simultaneous transmission of WIFI in conjunction with a separate licensed transmitter. The FCC has provided guidance in KDB Publication 941225 D06 where SAR test considerations for handsets (L x W ≥
9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device with antennas 2.5 cm or closer to the edge of the device, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. Therefore, SAR must be evaluated for each frequency transmission and mode separately and summed with the WIFI transmitter according to KDB 648474 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

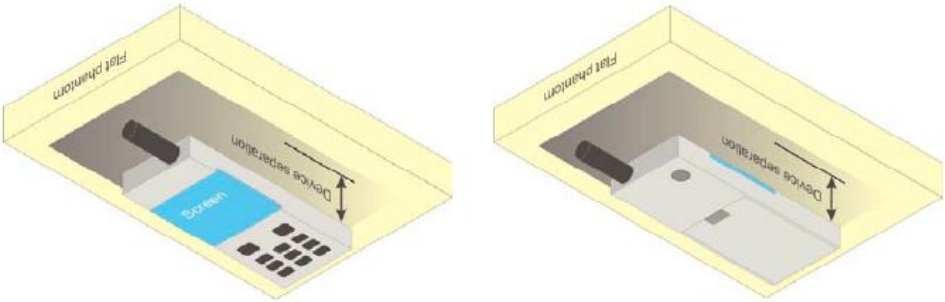
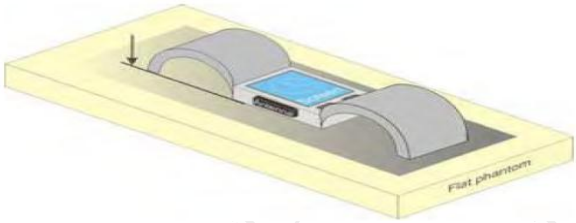


Illustration for Hotspot Position

Limb-worn device

A limb-worn device is a unit whose intended use includes being strapped to the arm or leg of the user while transmitting (except in idle mode). It is similar to a body-worn device. Therefore, the test positions of 6.1.4.4 also apply. The strap shall be opened so that it is divided into two parts as shown in Figure 9. The device shall be positioned directly against the phantom surface with the strap straightened as much as possible and the back of the device towards the phantom.

If the strap cannot normally be opened to allow placing in direct contact with the phantom surface, it may be necessary to break the strap of the device but ensuring to not damage the antenna.



Test position for limb-worn devices

6.7. Tissue Dielectric Parameters

The liquid used for the frequency range of 100MHz-6G consisted of water, sugar, salt and Cellulose. The liquid has been previously proven to be suited for worst-case. The following Table shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528 and IEC 62209.
The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the determine of the dielectric parameter are within the tolerances of the specified target values. The measured conductivity and relative permittivity should be within ±5% of the target values.
The following materials are used for producing the tissue-equivalent materials

Targets for tissue simulating liquid

Frequency (MHz)	Liquid Type	Liquid Type (σ)	± 5% Range	Permittivity (ε)	± 5% Range
300	Head	0.87	0.83~0.91	45.3	43.04~47.57
450	Head	0.87	0.83~0.91	43.5	41.33~45.68
835	Head	0.90	0.86~0.95	41.5	39.43~43.58
900	Head	0.97	0.92~1.02	41.5	39.43~43.58
1800-2000	Head	1.40	1.33~1.47	40.0	38.00~42.00
2450	Head	1.80	1.71~1.89	39.2	37.24~41.16
2600	Head	1.96	1.86~2.06	39.0	37.05~40.95
3000	Head	2.40	2.28~2.52	38.5	36.58~40.43
5800	Head	5.27	5.01~5.53	35.3	33.54~37.07
300	Body	0.92	0.87~0.97	58.2	55.29~61.11
450	Body	0.94	0.89~0.99	56.7	53.87~59.54
835	Body	0.97	0.92~1.02	55.2	52.44~57.96
900	Body	1.05	1.00~1.10	55.0	52.25~57.75
1800-2000	Body	1.52	1.44~1.60	53.3	50.64~55.97
2450	Body	1.95	1.85~2.05	52.7	50.07~55.34
2600	Body	2.16	2.05~2.27	52.5	49.88~55.13
3000	Body	2.73	2.60~2.87	52.0	49.40~54.60
5800	Body	6.00	5.70~6.30	48.2	45.79~50.61

(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m3)

6.8. Tissue-equivalent Liquid Properties

Test Date dd/mm/yy	Temp ℃	Tissue Type	Measured Frequency (MHz)	εr	σ(s/m)	Dev εr(%)	Dev σ(%)
10/09/2021	22℃	750H	750	41.90	0.89	2.63	-1.12
10/11/2021	22℃	835H	825	41.43	0.86	-0.17	-4.44
			835	41.42	0.87	-0.19	-3.33
			850	40.39	0.88	-2.67	-2.22
10/13/2021	22℃	1800H	1710	39.11	1.34	-2.23	-4.29
			1720	39.10	1.35	-2.25	-3.57
			1750	39.08	1.37	-2.30	-2.14
			1800	39.07	1.38	-2.33	-1.43
10/15/2021	22℃	1900H	1850	39.11	1.34	-2.23	-4.29
			1880	39.10	1.35	-2.25	-3.57
			1900	39.08	1.37	-2.30	-2.14
			1910	39.07	1.38	-2.33	-1.43
10/18/2021	22℃	2450H	2410	37.84	1.79	-3.47	-0.56
			2435	37.85	1.81	-3.44	0.56
			2450	37.82	1.83	-3.52	1.67
			2460	37.80	1.84	-3.57	2.22
10/19/2021	22℃	2600H	20850	38.86	1.93	-0.36	-1.53
			21100	38.85	1.92	-0.39	-2.04
			21350	38.89	1.90	-0.28	-3.06
10/20/2021	22℃	5200H	5200	36.68	4.45	-3.32	-4.04
10/21/2021	22℃	5300H	5300	36.08	4.69	2.16	-4.48
10/25/2021	22℃	5600H	5600	35.34	4.95	0.11	-1.21
10/09/2021	22℃	5800H	5800	34.81	5.08	-3.49	-4.14

10/09/2021	22℃	750B	750	55.50	0.96	1.62	-4.16
10/11/2021	22℃	835B	825	55.26	0.93	0.11	-4.12
			835	55.24	0.94	0.07	-3.09
			850	55.21	0.97	0.02	0.00
10/13/2021	22℃	1800B	1710	53.34	1.49	0.08	-1.97
			1720	53.32	1.50	0.04	-1.32
			1750	53.31	1.51	0.02	-0.66
			1800	53.29	1.53	-0.02	0.66
10/15/2021	22℃	1900B	1850	53.34	1.49	0.08	-1.97
			1880	53.32	1.50	0.04	-1.32
			1900	53.31	1.51	0.02	-0.66
			1910	53.29	1.53	-0.02	0.66
10/18/2021	22℃	2450B	2410	54.65	1.97	3.70	1.03
			2435	54.63	1.98	3.66	1.54
			2450	54.62	2.01	3.64	3.08
			2460	54.59	2.03	3.59	4.10
10/19/2021	22℃	2600B	20850	51.96	2.10	-1.02	-2.78
			21100	52.01	2.11	-0.93	-2.31
			21350	52.13	2.13	-0.70	-1.39
10/20/2021	22℃	5200B	5200	49.02	5.46	1.70	-4.21
10/21/2021	22℃	5300B	5300	49.55	5.53	2.80	-2.98
10/25/2021	22℃	5800B	5800	47.81	6.12	-0.81	2.00

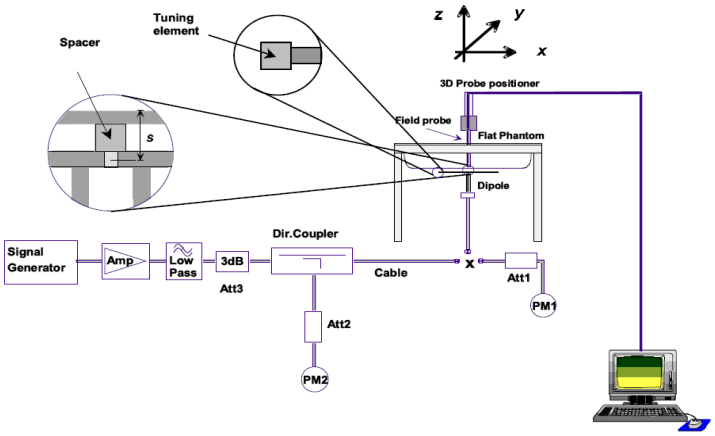
Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

6.9. System Check

The SAR system must be validated against its performance specifications before it is deployed. When SAR probe and system component or software are changed, upgraded or recalibrated, these must be validated with the SAR system(s) that operates with such component. Reference dipoles are used with the required tissue-equivalent media for system validation.

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %).

System check is performed regularly on all frequency bands where tests are performed with the OPENSAR system.



System Check Set-up

Verification Results

Frequency (MHz)	Liquid Type	Measured Value in 100mW (W/kg)		Normalized to 1W (W/kg)		Target Value (W/kg)		Deviation (%)	
		1 g Average	10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average	10 g Average
750	Head	0.80	0.56	8.00	5.60	8.31	5.71	-3.73	-1.93
835	Head	0.89	0.57	8.90	5.70	9.53	6.12	-6.61	-6.86
1800	Head	3.75	2.20	37.53	21.98	37.67	20.23	-0.37	8.65
1900	Head	3.58	1.90	35.80	19.00	39.26	20.49	-8.81	-7.27
2450	Head	4.99	2.36	49.90	23.60	53.26	24.15	-6.31	-2.28
2600	Head	5.41	2.43	54.14	24.30	54.31	24.14	-0.31	0.66
5200	Head	5.01	15.90	50.10	159.00	51.70	161.10	-3.09	-1.30
5300	Head	5.92	17.22	59.20	172.20	59.16	166.40	6.76	3.49
5600	Head	6.16	18.13	61.60	181.30	59.97	173.80	2.72	4.32
5800	Head	5.25	18.20	52.50	182.00	51.40	181.10	2.14	0.33

750	Body	0.83	0.56	8.30	5.60	8.46	5.81	-1.89	-3.61
835	Body	0.95	0.63	9.50	6.30	9.62	6.44	-1.25	-2.17
1800	Body	3.78	2.05	37.79	20.46	37.69	20.57	0.27	-0.54
1900	Body	3.77	1.99	37.70	19.90	38.71	20.53	-2.61	-3.07
2450	Body	5.07	2.42	50.70	24.16	50.63	23.40	0.14	3.25
2600	Body	5.37	2.38	53.65	23.81	53.26	23.89	0.73	-0.33
5200	Body	17.63	6.02	173.80	59.97	172.00	60.96	1.05	-1.62
5300	Body	16.78	5.69	167.80	56.90	167.20	57.39	0.36	-0.85
5800	Body	18.30	6.18	181.20	61.50	182.25	62.59	-0.58	-1.74

Comparing to the original SAR value provided by MVG, the verification data should be within its specification of 10%. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table as below indicates the system performance check can meet the variation criterion and the plots can be referred to Section 10 of this report.

7. Measurement Procedure

Conducted power measurement

For WWAN power measurement, use base station simulator to configure EUT WWAN transition in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
Read the WWAN RF power level from the base station simulator.
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 or spectrum analyser, and measure WLAN/BT output power.

Conducted power measurement

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.
Place the EUT in positions as Appendix B demonstrates.
Set scan area, grid size and other setting on the MVG software.
Measure SAR results for the highest power channel on each testing position.
Find out the largest SAR result on these testing positions of each band.
Measure SAR results for other channels in worst SAR testing position if the Reported SAR or 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:

Power reference measurement
Area scan
Zoom scan
Power drift measurement

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 MVG 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 10 g 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 (SEMCAD). The system always gives the maximum values for 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:
Extraction of the measured data (grid and values) from the Zoom Scan.

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

Generation of a high-resolution mesh within the measured volume.

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

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

Calculation of the averaged SAR within masses of 1g and 10g.

Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties

Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r03 quoted below.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm ± 1 mm	½·δ·ln(2) mm ± 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.	
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	≤ 1.5·$\Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB Publication 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.

Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD post-processor scan combine and subsequently superpose these measurement data to calculating the multiband SAR.

SAR Averaged Methods

In MVG, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1g and 10g cubes, the extrapolation distance should not be larger than 5 mm.

Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In MVG 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.

Power Drift measurement

The drift job measures the field at the same location as the most recent reference job within the same procedure, and with the same settings. The drift measurement gives the field difference in dB from the reading conducted within the last reference measurement. Several drift measurements are possible for

Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100KHz to 6GHz ,when the highest measurement 1-g SAR within a frequency band is <1.5W/kg, the extensive SAR measurement uncertainty analysis described IEEE Std 1528-2013 is not required in SAR report submitted for equipment approval.

8. Conducted Output Power

Band: GSM 850	Measured Power (dBm)			Calculation (dB)	Averaged Power (dBm)		
Channel	128	190	251		128	190	251
Frequency	824.2	836.6	848.8		824.2	836.6	848.8
GSM (GMSK, Voice)	32.17	31.28	32.66	-9.03	23.14	22.25	**23.63**
GPRS (GMSK, 1-slot)	31.46	30.47	32.60	-9.03	22.43	21.44	23.57
GPRS (GMSK, 2-slot)	30.55	30.72	30.24	-6.02	24.53	24.70	24.22
GPRS (GMSK, 3-slot)	28.50	30.75	28.69	-4.26	24.24	26.49	24.43
GPRS (GMSK, 4-slot)	28.55	30.17	28.27	-3.01	25.54	**27.16**	25.26
EGPRS (1-slot)	27.04	26.17	27.54	-9.03	18.01	17.14	18.51
EGPRS (2-slot)	24.19	23.45	23.94	-6.02	18.17	17.43	17.92
EGPRS (3-slot)	23.67	26.11	22.93	-4.26	19.41	21.85	18.67
EGPRS (4-slot)	23.26	23.25	23.54	-3.01	20.25	20.24	20.53

Note:
1. Division Factors
   To average the power, the division factor is as follows:
   1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB
   2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB
   3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB
   4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB
2. According to the conducted power as above, the body measurements are performed with 1Tx slots for 850MHz for GPRS.
3. The device do not support power reduction, so power of hotspot activated as the same as hotspot disabled

Band: GSM 1900	Measured Power (dBm)			Calculation (dB)	Averaged Power (dBm)		
Channel	512	661	810		512	661	810
Frequency	1850.2	1880.0	1909.8		1850.2	1880.0	1909.8
GSM (GMSK, Voice)	29.99	29.83	30.28	-9.03	20.96	20.80	**21.25**
GPRS (GMSK, 1-slot)	28.59	27.95	29.61	-9.03	19.56	18.92	20.58
GPRS (GMSK, 2-slot)	26.81	27.85	28.63	-6.02	20.79	21.83	22.61
GPRS (GMSK, 3-slot)	26.66	26.89	28.32	-4.26	22.40	22.63	**24.06**
GPRS (GMSK, 4-slot)	23.45	24.41	25.12	-3.01	20.44	21.40	22.11
EGPRS (1-slot)	27.06	27.11	27.01	-9.03	18.03	18.08	17.98
EGPRS (2-slot)	24.93	23.64	23.69	-6.02	18.91	17.62	17.67
EGPRS (3-slot)	24.00	23.49	23.22	-4.26	19.74	19.23	18.96
EGPRS (4-slot)	23.28	22.74	23.49	-3.01	20.27	19.73	20.48

Note:

1. Division Factors
   To average the power, the division factor is as follows:
   1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB
   2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB
   3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB
   4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB
2. According to the conducted power as above, the body measurements are performed with 1Tx slots for 1900MHz for GPRS.
3. The device do not support power reduction, so power of hotspot activated as the same as hotspot disabled

Band	WCDMA Band II			WCDMA Band V		
Channel	9262	9400	9538	4132	4182	4233
Frequency	1852.40	1880.00	1907.60	826.40	836.40	846.60
RMC 12.2Kbps	23.09	**23.20**	23.17	22.91	**24.91**	22.07
HSDPA Subtest-1	22.63	22.76	22.68	20.67	21.22	21.08
HSDPA Subtest-2	22.33	22.45	22.40	21.96	22.74	22.22
HSDPA Subtest-3	22.27	22.40	22.34	21.03	22.85	22.22
HSDPA Subtest-4	22.21	22.38	22.33	21.78	21.59	20.94
HSUPA Subtest-1	21.97	22.10	22.00	21.08	21.45	22.34
HSUPA Subtest-2	21.87	22.00	21.92	20.78	24.34	22.35
HSUPA Subtest-3	21.82	21.63	21.60	22.29	23.39	22.45
HSUPA Subtest-4	21.43	21.57	21.48	23.26	22.74	21.52
HSUPA Subtest-5	21.34	21.41	21.39	22.19	21.73	22.96
Band	WCDMA Band IV					
Channel	1312	1450	1513			
Frequency	1712.4	1740.0	1752.6			
RMC 12.2Kbps	23.45	**23.56**	23.53			
HSDPA Subtest-1	22.99	23.12	23.04			
HSDPA Subtest-2	22.69	22.81	22.76			
HSDPA Subtest-3	22.63	22.76	22.70			
HSDPA Subtest-4	22.57	22.74	22.69			
HSUPA Subtest-1	22.33	22.46	22.36			
HSUPA Subtest-2	22.23	22.36	22.28			
HSUPA Subtest-3	22.18	21.99	21.96			
HSUPA Subtest-4	21.79	21.93	21.84			
HSUPA Subtest-5	21.70	21.77	21.75			

Note:

1. According to the power listed above, the HSDPA and HSUPA were not determined for SAR testing.
2. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2kbps RMC(reference measurement channel) configuration in test loop mode
3. The device do not support power reduction, so power of hotspot activated as the same as hotspot disabled

WLAN 2.4G						
Mode	802.11b			802.11g		
Channel	1	6	11	1	6	11
Frequency	2412	2437	2462	2412	2437	2462
Average Power (dBm)	**16.806**	16.417	16.588	14.866	14.987	15.040
Mode	802.11n(HT20)			802.11n(HT40)		
Channel	1	6	11	3	6	9
Frequency	2412	2437	2462	2422	2437	2452
Average Power (dBm)	14.855	14.725	15.018	14.164	14.488	14.535

WLAN 5.2G						
Mode	IEEE 802.11a			IEEE 802.11n HT20		
Channel	36	40	48	36	40	48
Frequency	5180	5200	5240	5180	5200	5240
Average Power (dBm)	12.568	13.143	13.666	12.837	12.771	**13.908**
Mode	IEEE 802.11n HT40			IEEE 802.11ac VHT20		
Channel	38	46		36	40	48
Frequency	5190	5230		5180	5200	5240
Average Power (dBm)	13.111	13.710		12.828	13.201	13.736
Mode	EEE 802.11ac VHT40			IEEE 802.11ac VHT80		
Channel	38	46		42		
Frequency	5190	5230		5210		
Average Power (dBm)	13.400	13.737		12.940		
WLAN 5.3G						
Mode	IEEE 802.11a			IEEE 802.11n HT20		
Channel	52	56	64	52	56	64
Frequency	5260	5280	5320	5260	5280	5320
Average Power (dBm)	14.393	14.722	14.139	14.331	15.202	14.549
Mode	IEEE 802.11n HT40			IEEE 802.11ac VHT20		
Channel	54	62		52	56	64
Frequency	5270	5310		5260	5280	5320
Average Power (dBm)	15.177	14.805		14.326	14.852	14.358
Mode	EEE 802.11ac VHT40			IEEE 802.11ac VHT80		
Channel	54	62		58		
Frequency	5270	5310		5290		
Average Power (dBm)	15.153	14.960		**15.241**		

WLAN 5.8G						
Mode	IEEE 802.11a			IEEE 802.11n HT20		
Channel	149	157	165	149	157	165
Frequency	5745	5785	5825	5745	5785	5825
Average Power (dBm)	14.358	13.281	13.828	14.278	13.325	13.82
Mode	IEEE 802.11n HT40			IEEE 802.11ac VHT20		
Channel	151	159		149	157	165
Frequency	5755	5795		5745	5785	5825
Average Power (dBm)	14.217	13.982		**14.437**	13.957	13.927
Mode	EEE 802.11ac VHT40			IEEE 802.11ac VHT80		
Channel	151	159		155		
Frequency	5755	5795		5775		
Average Power (dBm)	14.351	13.537		13.522		

Note

1. Per KDB 248227 D01 v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
2. The output power of all data rate were prescan , just the worst case (the lowest data rate) of all mode were shown in report

Bluetooth						
Mode	GFSK			Pi/4DQPSK		
Channel	0	39	78	0	39	78
Frequency	2402	2441	2480	2402	2441	2480
Average Power (dBm)	7.101	6.154	7.285	7.628	6.261	7.426
Mode	8DPSK			BLE(1M)		
Channel	0	39	78	0	20	39
Frequency	2402	2441	2480	2402	2440	2480
Average Power (dBm)	**8.100**	7.279	8.054	-4.196	-2.897	-3.828
Mode	BLE(2M)					
Channel	0	20	39			
Frequency	2402	2440	2480			
Average Power (dBm)	-3.864	-2.749	-4.223			

Channel	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	Exclusion thresholds for 1-g SAR	Exclusion thresholds for 10-g SAR
0	2.402	8.50	7.08	5	2.19	3.0	7.5

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
2. Base on the result of note1, RF exposure evaluation of BLE is not required.
3. Per KDB 248227 D01 v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
4. The output power of all data rate were prescan, just the worst case (the lowest data rate) of all mode were shown in report.

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

LTE Band 2

Conducted Power of LTE Band 2						
Bandwidth	Modulation	RB size	RB offset	Channel 18607	Channel 18900	Channel 19193
1.4MHz	QPSK	1	0.00	24.39	23.34	22.15
			3.00	23.31	23.71	22.26
			5.00	23.50	22.02	21.95
		3	0.00	24.00	21.98	22.01
			2.00	22.34	21.12	22.36
			3.00	22.88	22.87	22.43
		6	0.00	22.86	21.93	23.00
	16QAM	1	0.00	23.13	22.66	20.98
			3.00	23.49	22.63	22.29
			5.00	22.87	22.53	22.23
		3	0.00	23.66	21.78	22.17
			2.00	22.50	21.99	21.63
			3.00	22.60	20.71	22.71
		6	0.00	22.26	22.22	21.00
Bandwidth	Modulation	RB size	RB offset	Channel 18615	Channel 18900	Channel 19185
3MHz	QPSK	1	0.00	23.55	22.67	22.66
			7.00	22.91	23.23	21.83
			14.00	24.25	23.04	22.44
		8	0.00	22.04	20.63	22.99
			4.00	22.24	21.20	22.87
			7.00	22.48	21.27	22.33
		15	0.00	21.97	21.91	21.14
	16QAM	1	0.00	22.76	22.39	22.19
			7.00	23.48	22.66	21.38
			14.00	23.61	21.34	21.66
		8	0.00	21.52	21.92	21.50
			4.00	22.68	19.47	22.37
			7.00	21.25	20.33	22.38
		15	0.00	21.43	21.05	22.95

Conducted Power of LTE Band 2						
Bandwidth	Modulation	RB size	RB offset	Channel 18625	Channel 18900	Channel 19175
5MHz	QPSK	1	0.00	22.66	24.35	22.70
			12.00	22.75	22.11	22.64
			24.00	22.13	21.68	21.95
		12	0.00	22.56	21.72	22.39
			6.00	22.48	20.81	21.04
			13.00	22.57	21.31	21.72
		25	0.00	21.75	22.02	22.39
	16QAM	1	0.00	22.41	24.19	21.61
			12.00	21.60	23.59	21.80
			24.00	21.49	21.64	21.27
		12	0.00	20.98	20.46	21.93
			6.00	22.26	21.58	22.88
			13.00	21.60	21.69	21.13
		25	0.00	22.74	20.37	22.17
Bandwidth	Modulation	RB size	RB offset	Channel 18650	Channel 18900	Channel 19150
10MHz	QPSK	1	0.00	23.89	22.75	23.67
			24.00	23.02	23.88	22.36
			49.00	22.56	21.96	22.60
		25	0.00	22.32	21.79	22.88
			12.00	21.76	22.12	21.87
			25.00	22.75	20.26	23.07
		50	0.00	23.28	21.41	22.27
	16QAM	1	0.00	22.92	23.46	22.17
			2400	22.93	23.61	22.72
			49.00	23.16	21.92	22.21
		25	0.00	21.85	21.40	22.46
			2400	21.70	21.47	22.04
			49.00	22.90	21.35	22.09
		50	0.00	21.64	20.68	22.18

Conducted Power of LTE Band 2						
Bandwidth	Modulation	RB size	RB offset	Channel 18675	Channel 18900	Channel 19125
15MHz	QPSK	1	0.00	23.20	23.28	22.21
			37.00	22.97	24.02	22.73
			74.00	21.98	22.66	22.74
		37	0.00	23.30	21.27	21.18
			18.00	21.30	22.81	22.20
			38.00	21.45	22.38	22.73
		75	0.00	23.43	22.53	20.55
	16QAM	1	0.00	23.07	23.05	22.07
			38.00	23.63	22.13	21.06
			74.00	21.79	21.22	22.20
		38	0.00	22.05	21.15	19.98
			18.00	22.47	22.50	21.21
			37.00	21.94	22.51	21.29
		75	0.00	22.02	21.28	21.98
Bandwidth	Modulation	RB size	RB offset	Channel 18700	Channel 18900	Channel 19100
20MHz	QPSK	1	0.00	23.32	**24.60**	22.17
			49.00	23.15	24.22	22.47
			99.00	22.53	24.33	21.72
		50	0.00	22.67	24.25	22.29
			25.00	22.89	**24.53**	21.64
			50.00	20.94	24.21	21.63
		100	0.00	22.56	24.25	21.63
	16QAM	1	0.00	22.94	24.20	21.82
			49.00	23.56	22.60	22.60
			99.00	23.23	21.72	22.22
		50	0.00	21.79	21.53	22.03
			25.00	22.60	22.51	20.91
			50.00	20.78	22.62	19.50
		100	0.00	21.29	22.10	21.30

LTE Band 4

Conducted Power of LTE Band 4						
Bandwidth	Modulation	RB size	RB offset	Channel 19957	Channel 20175	Channel 20393
1.4MHz	QPSK	1	0.00	24.31	24.06	22.48
			3.00	24.08	24.15	22.55
			5.00	24.01	21.96	23.14
		3	0.00	24.22	22.54	23.23
			2.00	23.82	22.34	22.50
			3.00	23.72	22.28	21.10
		6	0.00	22.04	21.99	21.16
	16QAM	1	0.00	24.52	24.22	22.11
			2.00	22.64	23.02	22.20
			5.00	23.95	22.27	22.05
		3	0.00	22.97	22.06	22.32
			1.00	22.70	22.85	22.69
			3.00	23.56	23.11	23.06
		6	0.00	23.19	21.58	21.82
Bandwidth	Modulation	RB size	RB offset	Channel 19965	Channel 20175	Channel 20385
3MHz	QPSK	1	0.00	24.48	23.03	22.42
			7.00	23.56	24.31	23.04
			14.00	23.18	23.07	23.52
		8	0.00	23.78	21.58	21.77
			4.00	22.38	21.48	21.85
			7.00	22.69	22.00	21.87
		15	0.00	23.56	22.32	20.69
	16QAM	1	0.00	23.29	23.68	22.41
			7.00	23.87	23.00	22.52
			14.00	23.79	22.59	21.17
		8	0.00	22.31	21.72	21.83
			4.00	22.12	21.30	20.38
			7.00	22.03	20.13	21.87
		15	0.00	22.74	19.82	22.35

Conducted Power of LTE Band 4						
Bandwidth	Modulation	RB size	RB offset	Channel 19975	Channel 20175	Channel 20375
5MHz	QPSK	1	0.00	23.49	22.66	22.31
			12.00	23.55	23.49	22.98
			24.00	24.15	22.45	22.64
		12	0.00	23.65	21.23	22.25
			6.00	23.00	22.05	22.17
			13.00	24.33	22.93	21.41
		25	0.00	23.44	22.70	21.80
	16QAM	1	0.00	23.77	22.56	22.08
			12.00	23.41	23.66	22.50
			24.00	22.29	21.05	21.81
		12	0.00	24.13	21.21	21.05
			6.00	22.62	21.20	21.00
			13.00	22.80	21.13	21.98
		25	0.00	23.20	22.17	20.93
Bandwidth	Modulation	RB size	RB offset	Channel 20000	Channel 20175	Channel 20350
10MHz	QPSK	1	0.00	23.39	23.70	22.95
			24.00	24.09	23.72	22.19
			49.00	24.30	21.45	23.30
		25	0.00	22.41	22.03	21.18
			12.00	22.15	22.03	22.32
			25.00	22.96	22.41	22.06
		50	0.00	23.23	22.56	20.72
	16QAM	1	0.00	22.59	23.90	21.59
			24.00	23.91	23.43	22.51
			49.00	23.22	22.25	23.26
		25	0.00	21.70	21.93	21.47
			12.00	22.44	22.23	22.05
			25.00	23.08	22.11	20.57
		50	0.00	22.23	21.23	20.34

Conducted Power of LTE Band 4						
Bandwidth	Modulation	RB size	RB offset	Channel 20025	Channel 20175	Channel 20325
15MHz	QPSK	1	0.00	24.49	24.50	22.45
			37.00	24.53	23.92	23.20
			74.00	23.23	23.16	22.78
		37	0.00	23.49	22.38	20.94
			18.00	22.89	21.41	21.02
			38.00	23.01	21.84	21.35
		75	0.00	22.44	21.97	22.08
	16QAM	1	0.00	23.96	24.27	23.47
			37.00	23.77	22.81	22.29
			74.00	24.40	21.92	23.33
		37	0.00	22.82	22.25	21.92
			18.00	23.25	21.96	21.14
			38.00	22.48	20.60	20.41
		75	0.00	21.39	20.21	21.26
Bandwidth	Modulation	RB size	RB offset	Channel 20050	Channel 20175	Channel 20300
20MHz	QPSK	1	0.00	**24.88**	23.54	22.80
			49.00	24.60	24.43	24.09
			99.00	24.45	21.62	22.16
		50	0.00	24.47	22.71	22.05
			25.00	**24.66**	21.52	22.20
			50.00	24.55	21.12	21.65
		100	0.00	24.54	22.36	22.13
	16QAM	1	0.00	24.42	23.92	21.43
			49.00	24.00	24.26	22.38
			99.00	22.79	21.14	22.51
		50	0.00	23.11	21.19	21.72
			25.00	22.49	21.58	20.95
			50.00	22.85	22.21	20.74
		100	0.00	21.76	21.76	22.01

LTE Band 5

Conducted Power of LTE Band 5						
Bandwidth	Modulation	RB size	RB offset	Channel 20407	Channel 20525	Channel 20643
1.4MHz	QPSK	1	0.00	23.30	23.69	21.77
			3.00	22.82	23.93	22.09
			5.00	22.02	21.98	22.31
		3	0.00	23.63	23.60	22.19
			2.00	22.79	22.11	21.76
			3.00	22.74	20.68	22.25
		6	0.00	22.81	22.37	21.82
	16QAM	1	0.00	23.87	24.07	21.00
			2.00	21.83	22.03	20.39
			5.00	22.54	22.42	22.48
		3	0.00	22.65	22.58	21.58
			1.00	21.71	22.63	22.52
			3.00	22.79	22.18	21.14
		6	0.00	22.70	22.16	20.00
Bandwidth	Modulation	RB size	RB offset	Channel 20415	Channel 20525	Channel 20635
3MHz	QPSK	1	0.00	22.84	22.91	22.50
			7.00	23.68	22.83	21.46
			14.00	23.00	21.47	21.47
		8	0.00	21.97	22.65	22.54
			4.00	23.87	21.15	22.05
			7.00	22.58	22.07	21.33
		15	0.00	22.48	21.71	21.94
	16QAM	1	0.00	22.24	21.85	22.45
			8.00	22.81	22.06	22.41
			14.00	22.01	20.49	21.05
		8	0.00	21.76	22.25	21.91
			4.00	22.20	20.45	22.50
			7.00	22.21	20.82	22.16
		15	0.00	22.37	21.54	21.29

Conducted Power of LTE Band 5						
Bandwidth	Modulation	RB size	RB offset	Channel 20425	Channel 20525	Channel 20625
5MHz	QPSK	1	0.00	23.60	22.75	21.12
			12.00	23.23	21.57	21.52
			24.00	23.49	22.96	22.17
		12	0.00	22.94	21.43	21.59
			6.00	22.68	22.83	22.39
			13.00	21.96	22.76	20.86
		25	0.00	24.13	21.59	21.89
	16QAM	1	0.00	22.70	22.87	21.88
			12.00	22.69	22.57	22.02
			24.00	22.00	22.49	22.36
		12	0.00	22.72	21.83	22.51
			6.00	21.94	21.93	21.84
			13.00	22.20	21.51	21.03
		25	0.00	23.62	22.40	20.13
Bandwidth	Modulation	RB size	RB offset	Channel 20450	Channel 20525	Channel 20600
10MHz	QPSK	1	0.00	**24.85**	24.09	22.56
			24.00	24.34	23.10	22.34
			49.00	24.47	21.49	22.40
		25	0.00	**24.55**	23.16	21.29
			12.00	24.28	21.98	22.41
			25.00	24.45	23.21	22.69
		50	0.00	24.42	21.53	21.18
	16QAM	1	0.00	23.05	23.50	22.72
			24.00	22.99	21.66	22.57
			49.00	23.53	21.48	22.38
		25	0.00	23.05	21.88	21.13
			12.00	22.06	22.60	21.83
			25.00	23.00	21.67	21.88
		50	0.00	24.40	21.23	21.64

LTE Band 7

Conducted Power of LTE Band 7						
Bandwidth	Modulation	RB size	RB offset	Channel 20775	Channel 21100	Channel 21425
5MHz	QPSK	1	0.00	24.43	23.15	22.01
			12.00	22.51	23.81	21.60
			24.00	22.21	22.35	21.54
		12	0.00	23.10	22.68	21.74
			6.00	23.12	22.03	22.06
			13.00	22.79	21.27	22.42
		25	0.00	22.72	22.75	21.86
	16QAM	1	0.00	22.29	23.67	20.55
			12.00	21.12	22.15	20.63
			24.00	22.10	22.21	22.66
		12	0.00	22.46	21.94	21.67
			6.00	21.63	22.05	22.77
			13.00	22.49	22.16	20.97
		25	0.00	22.89	21.81	20.48
Bandwidth	Modulation	RB size	RB offset	Channel 20800	Channel 21100	Channel 21400
10MHz	QPSK	1	0.00	22.72	22.96	22.28
			24.00	22.87	22.41	21.57
			49.00	23.00	21.70	21.25
		25	0.00	22.00	21.76	22.49
			12.00	23.31	21.53	21.50
			25.00	23.48	21.97	21.28
		50	0.00	22.76	21.31	21.40
	16QAM	1	0.00	21.95	21.25	21.98
			24.00	23.12	22.54	22.68
			49.00	22.84	21.19	20.18
		25	0.00	22.13	22.70	22.12
			12.00	21.58	20.34	23.23
			25.00	22.62	21.33	22.03
		50	0.00	22.76	21.49	21.93

Conducted Power of LTE Band 7						
Bandwidth	Modulation	RB size	RB offset	Channel 20825	Channel 21100	Channel 21375
15MHz	QPSK	1	0.00	23.19	23.50	20.94
			37.00	23.67	22.22	21.04
			74.00	23.21	22.53	22.38
		37	0.00	22.80	21.32	21.30
			18.00	22.77	22.63	22.41
			38.00	22.88	22.45	20.63
		75	0.00	23.45	22.05	22.40
	16QAM	1	0.00	22.88	22.75	21.58
			38.00	23.24	23.14	22.39
			74.00	22.08	23.02	22.22
		36	0.00	22.64	22.30	21.75
			18.00	22.44	22.18	20.90
			37.00	21.97	21.51	20.26
		75	0.00	23.74	22.70	20.77
Bandwidth	Modulation	RB size	RB offset	Channel 20850	Channel 21100	Channel 21350
20MHz	QPSK	1	0.00	**24.76**	24.17	22.58
			49.00	24.11	23.05	22.94
			99.00	24.21	21.97	21.73
		50	0.00	24.11	23.77	20.75
			25.00	**24.62**	21.95	22.83
			50.00	24.14	23.16	22.77
		100	0.00	24.50	21.71	21.72
	16QAM	1	0.00	23.00	23.72	22.36
			49.00	22.31	22.57	23.11
			99.00	23.98	20.99	22.39
		50	0.00	23.20	22.25	21.30
			25.00	22.35	22.60	21.94
			50.00	23.56	21.91	21.38
		100	0.00	23.35	20.94	21.50

LTE Band 12

Conducted Power of LTE Band 12						
Bandwidth	Modulation	RB size	RB offset	Channel 23017	Channel 23095	Channel 23173
1.4MHz	QPSK	1	0.00	24.48	23.53	22.16
			3.00	23.65	22.87	22.23
			5.00	22.76	22.01	20.73
		3	0.00	23.85	23.59	21.65
			2.00	24.39	21.97	22.99
			3.00	23.11	22.79	21.43
		6	0.00	23.35	22.28	22.28
	16QAM	1	0.00	23.74	22.80	21.00
			2.00	23.00	22.56	22.33
			5.00	22.06	21.15	19.76
		3	0.00	23.62	21.37	20.99
			2.00	23.02	21.80	20.88
			3.00	20.92	20.59	20.02
		6	0.00	22.43	20.41	20.38
Bandwidth	Modulation	RB size	RB offset	Channel 23025	Channel 23095	Channel 23165
3MHz	QPSK	1	0.00	23.22	23.48	22.35
			7.00	22.66	23.72	23.15
			14.00	23.30	22.80	21.64
		8	0.00	24.48	23.37	22.10
			4.00	24.23	21.69	22.63
			7.00	23.25	21.67	22.90
		15	0.00	23.71	23.12	21.81
	16QAM	1	0.00	24.01	23.04	22.87
			7.00	22.19	22.77	22.35
			14.00	23.38	23.37	22.30
		8	0.00	22.79	22.11	21.54
			4.00	22.91	21.94	22.18
			7.00	22.70	20.65	22.76
		15	0.00	22.64	22.50	20.67

Conducted Power of LTE Band 12						
Bandwidth	Modulation	RB size	RB offset	Channel 23035	Channel 23095	Channel 23155
5MHz	QPSK	1	0.00	22.27	22.82	23.04
			12.00	23.40	22.98	21.70
			24.00	22.70	20.48	21.86
		12	0.00	23.36	22.82	21.09
			6.00	22.53	21.69	22.59
			13.00	22.98	22.50	21.54
		25	0.00	22.38	21.39	21.50
	16QAM	1	0.00	23.59	22.28	21.92
			12.00	23.78	22.33	20.89
			24.00	22.81	21.70	20.18
		12	0.00	21.57	22.51	20.48
			6.00	22.54	22.29	20.05
			13.00	22.13	21.97	21.41
		25	0.00	23.37	22.35	20.49
Bandwidth	Modulation	RB size	RB offset	Channel 23060	Channel 23095	Channel 23130
10MHz	QPSK	1	0.00	23.01	**24.68**	22.06
			24.00	23.60	24.20	21.12
			49.00	23.26	24.32	22.55
		25	0.00	23.21	**24.56**	21.13
			12.00	23.32	24.28	21.19
			25.00	22.42	24.25	20.61
		50	0.00	22.73	24.33	22.59
	16QAM	1	0.00	23.52	24.15	21.60
			24.00	21.86	23.20	20.94
			49.00	22.00	21.05	21.09
		25	0.00	21.06	21.12	21.36
			12.00	21.21	21.00	20.17
			25.00	21.36	21.05	21.04
		50	0.00	21.96	21.36	20.34

LTE Band 17

Conducted Power of LTE Band 17						
Bandwidth	Modulation	RB size	RB offset	Channel 23755	Channel 23790	Channel 23825
5MHz	QPSK	1	0.00	24.15	24.05	21.58
			12.00	23.02	22.79	21.67
			24.00	23.01	21.68	20.86
		12	0.00	23.29	23.04	21.61
			6.00	24.00	21.84	22.99
			13.00	23.11	22.16	21.52
		25	0.00	24.14	22.37	22.39
	16QAM	1	0.00	23.52	23.47	21.02
			12.00	22.35	21.78	22.91
			24.00	22.03	21.36	19.81
		12	0.00	22.90	20.61	20.86
			6.00	23.40	22.23	21.08
			13.00	21.17	20.67	20.12
		25	0.00	21.87	20.40	20.55
Bandwidth	Modulation	RB size	RB offset	Channel 23780	Channel 23790	Channel 23800
10MHz	QPSK	1	0.00	23.56	**24.88**	22.82
			24.00	23.00	24.68	22.52
			49.00	23.26	24.58	21.64
		25	0.00	23.87	24.57	21.74
			12.00	24.07	**24.62**	22.72
			25.00	23.50	23.83	22.87
		50	0.00	23.54	23.98	22.45
	16QAM	1	0.00	23.38	23.52	23.03
			24.00	22.07	22.49	22.52
			49.00	23.37	23.00	22.21
		25	0.00	22.52	21.59	21.59
			12.00	22.23	22.22	22.67
			25.00	22.77	21.02	22.78
		50	0.00	23.16	22.43	20.92

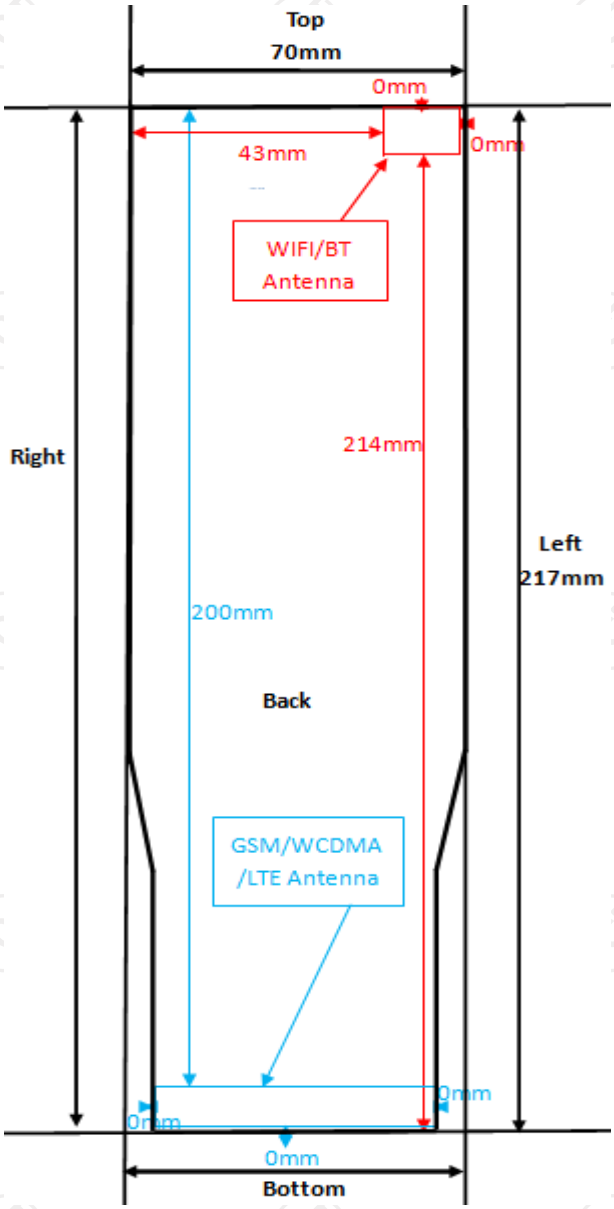
LTE Band 41

Conducted Power of LTE Band 41						
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				39675	40620	41565
5MHz	QPSK	1	0.00	24.09	23.71	22.39
			12.00	23.06	22.91	22.37
			24.00	22.98	21.25	21.14
		12	0.00	23.44	23.21	21.99
			6.00	23.51	21.69	22.31
			13.00	22.94	22.98	21.65
		25	0.00	24.02	21.89	22.52
	16QAM	1	0.00	23.67	22.85	21.00
			12.00	23.01	21.78	22.68
			24.00	21.93	21.64	20.48
		12	0.00	22.79	21.15	21.21
			6.00	23.00	21.53	21.14
			13.00	21.79	20.81	19.82
		25	0.00	21.55	20.30	20.82
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				39700	40620	41540
10MHz	QPSK	1	0.00	23.12	22.56	23.03
			24.00	22.93	23.43	23.15
			49.00	22.60	22.69	22.23
		25	0.00	24.13	22.84	21.65
			12.00	23.89	22.10	21.87
			25.00	23.32	21.48	23.17
		50	0.00	24.14	22.76	22.16
	16QAM	1	0.00	23.44	23.81	23.06
			24.00	22.21	22.74	21.90
			49.00	22.97	22.89	22.51
		25	0.00	22.87	21.71	21.50
			12.00	22.05	22.10	22.56
			25.00	22.66	20.86	22.41
		50	0.00	22.56	22.22	21.08

Conducted Power of LTE Band 41						
Bandwidth	Modulation	RB size	RB offset	Channel 39725	Channel 40620	Channel 41515
15MHz	QPSK	1	0.00	22.27	22.82	23.20
			37.00	23.72	23.64	21.93
			74.00	23.05	20.49	21.84
		37	0.00	23.13	22.50	21.20
			18.00	23.16	21.51	23.09
			38.00	22.79	22.49	22.27
		75	0.00	22.57	21.88	21.46
	16QAM	1	0.00	23.21	22.20	21.73
			37.00	23.45	21.89	20.92
			74.00	22.42	21.02	20.48
		37	0.00	22.03	22.03	20.05
			18.00	22.27	21.78	19.74
			38.00	22.91	21.39	21.09
		75	0.00	22.91	21.90	20.67
Bandwidth	Modulation	RB size	RB offset	Channel 39750	Channel 40620	Channel 41490
20MHz	QPSK	1	0.00	24.20	22.89	22.25
			49.00	**24.80**	23.19	21.97
			99.00	24.34	22.37	22.53
		50	0.00	**24.51**	20.92	21.89
			25.00	24.23	22.05	21.64
			50.00	24.22	22.77	20.55
		100	0.00	24.28	22.60	21.95
	16QAM	1	0.00	24.08	22.64	21.37
			49.00	21.75	23.55	21.28
			99.00	22.44	20.86	21.22
		50	0.00	21.47	21.05	21.47
			25.00	21.91	21.67	20.06
			50.00	21.65	20.93	20.48
		100	0.00	22.17	21.22	20.73

9. Exposure Position Consideration

9.1. EUT Antenna Location



9.2. Test Position Consideration

Test Positions						
Mode	**Back**	**Front**	**Top Side**	**Bottom Side**	**Right Side**	**Left Side**
GSM/WCDMA/CDMA /LTE	Yes	Yes	**No**	Yes	Yes	Yes
WIFI/BT	Yes	Yes	Yes	**No**	**No**	Yes

Note:

1. KDB 447498 D01v06, particular DUT edges were not required to be evaluated for SAR if the antenna-to-edge distance is greater than 2.5cm.

10. SAR Test Results Summary

10.1. Head 1g SAR Data

Band	Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)	Limit (W/Kg)
GSM850	voice	Front	251	848.8	32.66	33.00	2.40	0.18	1.081	**0.19**	1.60
		Bottom	251	848.8	32.66	33.00	-1.22	0.02	1.081	0.02	
GSM1900	voice	Front	810	1909.8	30.28	30.50	-0.73	0.29	1.052	**0.31**	
		Bottom	810	1909.8	30.28	30.50	-0.31	0.01	1.052	0.01	
WCDMA Band II	RMC	Front	9400	1880	23.20	23.50	-0.17	0.39	1.072	**0.42**	
		Bottom	9400	1880	23.20	23.50	-0.39	0.02	1.072	0.02	
WCDMA Band IV	RMC	Front	1450	1740	23.56	24.00	-0.23	0.48	1.107	**0.53**	
		Bottom	1450	1740	23.56	24.00	2.02	0.01	1.107	0.01	
WCDMA Band V	RMC	Front	4182	836.4	24.91	25.00	-1.16	0.18	1.021	**0.18**	
		Bottom	4182	836.4	24.91	25.00	1.37	0.02	1.021	0.02	
2.4G	802.11b	Front	1	2412	16.806	17.00	-3.04	0.16	1.046	**0.17**	
		Bottom	1	2412	16.806	17.00	-0.34	0.01	1.046	0.01	
5.2G	802.11n	Front	48	5240	13.908	14.00	-2.06	0.28	1.021	**0.29**	
		Bottom	48	5240	13.908	14.00	2.24	0.02	1.021	0.02	
5.3G	802.11ac	Front	58	5290	15.241	15.50	-0.36	0.14	1.061	**0.15**	
		Bottom	58	5290	15.241	15.50	2.01	0.01	1.061	0.01	
5.8G	802.11ac	Front	149	5745	14.437	14.50	-2.55	0.11	1.015	**0.11**	
		Bottom	149	5745	14.437	14.50	2.99	0.01	1.015	0.01	

Band	Mode	Test Position	CH.	Freq. (MHz)	RB allocation	RB offset	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)
LTE Band 2	QPSK (20MHz)	Front	18900	1880	1	0	24.60	25.00	1.12	0.25	1.023	**0.26**
					50	25	24.53	25.00	-0.21	0.20	1.040	0.21
		Bottom	18900	1880	1	0	24.60	25.00	-0.10	0.02	1.023	0.02
					50	25	24.53	25.00	1.27	0.01	1.040	0.01
LTE Band 4	QPSK (20MHz)	Front	20050	1720	1	0	24.88	25.00	-1.12	0.30	1.028	**0.31**
					50	25	24.66	25.00	0.05	0.27	1.119	0.30
		Bottom	20050	1720	1	0	24.88	25.00	0.11	0.03	1.028	0.03
					50	25	24.66	25.00	-3.02	0.02	1.119	0.02
LTE Band 5	QPSK (10MHz)	Front	20450	829	1	0	24.85	25.00	0.17	0.14	1.033	**0.14**
					25	0	24.55	25.00	-1.07	0.10	1.109	0.11
		Bottom	20450	829	1	0	24.85	25.00	1.34	0.02	1.033	0.02
					25	0	24.55	25.00	0.65	0.01	1.109	0.01
LTE Band 7	QPSK (20MHz)	Front	20850	2510	1	0	24.76	25.00	-0.23	0.17	1.114	**0.19**
					50	25	24.62	25.00	2.60	0.15	1.042	0.16
		Bottom	20850	2510	1	0	24.76	25.00	2.65	0.02	1.114	0.02
					50	25	24.62	25.00	-3.54	0.01	1.042	0.01
LTE Band 12	QPSK (10MHz)	Front	23095	707.5	1	0	24.68	25.00	1.22	0.10	1.005	**0.10**
					25	0	24.56	25.00	-2.36	0.07	1.040	0.07
		Bottom	23095	707.5	1	0	24.68	25.00	0.63	0.02	1.005	0.02
					25	0	24.56	25.00	-4.21	0.01	1.040	0.01
LTE Band 17	QPSK (10MHz)	Front	23790	710	1	0	24.88	25.00	-3.10	0.12	1.084	**0.13**
					25	12	24.62	25.00	3.30	0.10	1.005	0.10
		Bottom	23790	710	1	0	24.88	25.00	-1.84	0.03	1.084	0.03
					25	12	24.62	25.00	-3.55	0.01	1.005	0.01
LTE Band 41	QPSK (20MHz)	Front	39750	2506	1	49	24.80	25.00	-2.47	0.17	1.035	**0.18**
					50	0	24.51	25.00	0.79	0.14	1.045	0.15
		Bottom	39750	2506	1	49	24.80	25.00	1.11	0.02	1.035	0.02
					50	0	24.51	25.00	-1.36	0.01	1.045	0.01

10.2. Body-Worn 1g SAR Data

Band	Mode	Test Position with 10mm	CH.	Freq. (MHz)	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)	Limit (W/Kg)
GSM850	voice	Front	251	848.8	32.66	33.00	0.34	0.17	1.081	0.18	1.60
		Back	251	848.8	32.66	33.00	-4.60	0.34	1.081	0.37	
	GPRS 4 slots	Front	190	836.6	30.17	30.50	-2.07	0.33	1.059	0.35	
		Back	190	836.6	30.17	30.50	0.20	0.66	1.059	**0.70**	
GSM1900	voice	Front	810	1909.8	30.28	30.50	-2.61	0.27	1.052	0.28	
		Back	810	1909.8	30.28	30.50	-1.68	0.54	1.052	0.57	
	GPRS 3 slots	Front	810	1909.8	28.32	28.50	0.64	0.31	1.042	0.32	
		Back	810	1909.8	28.32	28.50	-0.93	0.61	1.042	**0.64**	
WCDMA Band II	RMC	Front	9400	1880	23.20	23.50	2.12	0.34	1.072	0.36	
		Back	9400	1880	23.20	23.50	-1.73	0.68	1.072	**0.73**	
WCDMA Band IV	RMC	Front	1450	1740	23.56	24.00	2.14	0.41	1.107	0.45	
		Back	1450	1740	23.56	24.00	-1.30	0.69	1.107	**0.76**	
WCDMA Band V	RMC	Front	4182	836.4	24.91	25.00	-1.26	0.16	1.021	0.16	
		Back	4182	836.4	24.91	25.00	1.11	0.32	1.021	**0.33**	
2.4G	802.11b	Front	1	2412	16.806	17.00	-0.31	0.08	1.046	0.08	
		Back	1	2412	16.806	17.00	4.01	0.17	1.046	**0.18**	
5.2G	802.11n	Front	48	5240	13.908	14.00	0.20	0.13	1.021	0.13	
		Back	48	5240	13.908	14.00	1.01	0.29	1.021	**0.30**	
5.3G	802.11ac	Front	58	5290	15.241	15.50	0.10	0.11	1.061	0.12	
		Back	58	5290	15.241	15.50	-1.71	0.21	1.061	**0.22**	
5.8G	802.11ac	Front	149	5745	14.437	14.50	0.15	0.09	1.015	0.09	
		Back	149	5745	14.437	14.50	-0.92	0.19	1.015	**0.19**	

Band	Mode	Test Position with 10mm	CH.	Freq. (MHz)	RB allocation	RB offset	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)
LTE Band 2	QPSK (20MHz)	Front	18900	1880	1	0	24.60	25.00	-1.33	0.22	1.023	0.23
					50	25	24.53	25.00	1.04	0.20	1.040	0.21
		Back	18900	1880	1	0	24.60	25.00	0.17	0.44	1.023	**0.45**
					50	25	24.53	25.00	-0.16	0.40	1.040	0.42
LTE Band 4	QPSK (20MHz)	Front	20050	1720	1	0	24.88	25.00	1.54	0.29	1.028	0.30
					50	25	24.66	25.00	-0.24	0.25	1.119	0.28
		Back	20050	1720	1	0	24.88	25.00	0.21	0.56	1.028	**0.58**
					50	25	24.66	25.00	-1.67	0.50	1.119	0.56
LTE Band 5	QPSK (10MHz)	Front	20450	829	1	0	24.85	25.00	1.61	0.11	1.033	0.11
					25	0	24.55	25.00	0.67	0.09	1.109	0.10
		Back	20450	829	1	0	24.85	25.00	-0.16	0.22	1.033	**0.23**
					25	0	24.55	25.00	-3.30	0.19	1.109	0.21
LTE Band 7	QPSK (20MHz)	Front	20850	2510	1	0	24.76	25.00	2.34	0.15	1.114	0.17
					50	25	24.62	25.00	1.59	0.13	1.042	0.14
		Back	20850	2510	1	0	24.76	25.00	-3.69	0.30	1.114	**0.33**
					50	25	24.62	25.00	-2.16	0.26	1.042	0.27
LTE Band 12	QPSK (10MHz)	Front	23095	707.5	1	0	24.68	25.00	0.17	0.08	1.005	0.08
					25	0	24.56	25.00	0.21	0.05	1.040	0.05
		Back	23095	707.5	1	0	24.68	25.00	-1.82	0.16	1.005	**0.16**
					25	0	24.56	25.00	-3.12	0.10	1.040	0.10
LTE Band 17	QPSK (10MHz)	Front	23790	710	1	0	24.88	25.00	0.40	0.10	1.084	0.11
					25	12	24.62	25.00	-2.48	0.08	1.005	0.08
		Back	23790	710	1	0	24.88	25.00	1.29	0.20	1.084	**0.22**
					25	12	24.62	25.00	-1.24	0.16	1.005	0.16
LTE Band 41	QPSK (20MHz)	Front	39750	2506	1	49	24.80	25.00	2.04	0.15	1.035	0.16
					50	0	24.51	25.00	0.67	0.12	1.045	0.13
		Back	39750	2506	1	49	24.80	25.00	-3.69	0.30	1.035	**0.31**
					50	0	24.51	25.00	2.04	0.24	1.045	0.25

Note:

1. Per KDB 447498 D01 v06, 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 447498 D01 v06, body-worn use is evaluated with the device positioned at 10 mm from a flat phantom filled with head tissue-equivalent medium.
3. Per KDB 447498 D01 v06, the report SAR is measured SAR value adjusted for maximum tune-up tolerance. Scaling Factor=10^[(tune-up limit power(dBm) - Ave.power power (dBm))/10], where tune-up limit is the maximum rated power among all production units.
   Reported SAR(W/kg)=Measured SAR (W/kg)*Scaling Factor.
4. Per KDB865664D01 v01r04 perform a second repeated measurement only the ratio of largest to smallest SAR for the original and first repeated measurement is >1.20 or when the original or repeated measurement is ⩾ 1.45W/kg.
5. Perform a second measurement only if the original, first and second repeated measurement is ⩾1.5w/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurement is >1.20.

10.3. Hotspot 1g SAR Data

Band	Mode	Test Position with10mm	CH.	Freq. (MHz)	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)	Limit (W/Kg)
GSM850	GPRS 4 slots	Front	190	836.6	30.17	30.50	-1.33	0.41	1.059	0.43	
		Back	190	836.6	30.17	30.50	-0.37	0.71	1.059	**0.75**	
		Right	190	836.6	30.17	30.50	2.12	0.03	1.059	0.03	
		Left	190	836.6	30.17	30.50	0.07	0.02	1.059	0.02	
		Bottom	190	836.6	30.17	30.50	-3.49	0.01	1.059	0.01	
GSM1900	GPRS 3 slots	Front	810	1909.8	28.32	28.50	2.01	0.31	1.042	0.32	
		Back	810	1909.8	28.32	28.50	1.84	0.64	1.042	**0.67**	
		Right	810	1909.8	28.32	28.50	1.39	0.02	1.042	0.02	
		Left	810	1909.8	28.32	28.50	-2.46	0.02	1.042	0.02	
		Bottom	810	1909.8	28.32	28.50	-0.57	0.01	1.042	0.01	
WCDMA Band II	RMC	Front	9400	1880	23.20	23.50	1.14	0.34	1.072	0.36	
		Back	9400	1880	23.20	23.50	0.24	0.69	1.072	**0.74**	
		Right	9400	1880	23.20	23.50	0.67	0.03	1.072	0.03	
		Left	9400	1880	23.20	23.50	-0.47	0.02	1.072	0.02	
		Bottom	9400	1880	23.20	23.50	0.14	0.01	1.072	0.01	**1.60**
WCDMA Band IV	RMC	Front	1450	1740	23.56	24.00	-1.01	0.43	1.107	0.48	
		Back	1450	1740	23.56	24.00	0.66	0.70	1.107	**0.77**	
		Right	1450	1740	23.56	24.00	1.29	0.02	1.107	0.02	
		Left	1450	1740	23.56	24.00	-1.67	0.01	1.107	0.01	
		Bottom	1450	1740	23.56	24.00	-1.21	0.01	1.107	0.01	
WCDMA Band V	RMC	Front	4182	836.4	24.91	25.00	-1.24	0.16	1.021	0.16	
		Back	4182	836.4	24.91	25.00	0.01	0.32	1.021	**0.33**	
		Right	4182	836.4	24.91	25.00	-2.31	0.02	1.021	0.02	
		Left	4182	836.4	24.91	25.00	0.47	0.01	1.021	0.01	
		Bottom	4182	836.4	24.91	25.00	-1.24	0.01	1.021	0.01	
2.4G	802.11b	Front	1	2412	16.806	17.00	-1.21	0.08	1.046	0.08	
		Back	1	2412	16.806	17.00	-4.11	0.19	1.046	**0.20**	
		Left	1	2412	16.806	17.00	0.41	0.02	1.046	0.02	
		Top	1	2412	16.806	17.00	0.36	0.01	1.046	0.01	

5.2G	802.11n	Front	48	5240	13.908	14.00	1.94	0.14	1.021	0.14	
		Back	48	5240	13.908	14.00	-2.11	0.30	1.021	**0.31**	
		Left	48	5240	13.908	14.00	-1.46	0.03	1.021	0.03	
		Top	48	5240	13.908	14.00	-3.16	0.02	1.021	0.02	
5.3G	802.11ac	Front	58	5290	15.241	15.50	-3.01	0.11	1.061	0.12	
		Back	58	5290	15.241	15.50	-0.97	0.22	1.061	**0.23**	**1.60**
		Left	58	5290	15.241	15.50	0.38	0.02	1.061	0.02	
		Top	58	5290	15.241	15.50	-1.42	0.01	1.061	0.01	
5.8G	802.11ac	Front	149	5745	14.437	14.50	-0.21	0.18	1.015	0.18	
		Back	149	5745	14.437	14.50	0.78	0.20	1.015	**0.20**	
		Left	149	5745	14.437	14.50	0.39	0.03	1.015	0.03	
		Top	149	5745	14.437	14.50	-0.16	0.02	1.015	0.02	

Band	Mode	Test Position with 10mm	CH.	Freq. (MHz)	RB allocation	RB offset	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)
LTE Band 2	QPSK (20MHz)	Front	18900	1880	1	0	24.60	25.00	0.45	0.24	1.023	0.25
					50	25	24.53	25.00	0.16	0.20	1.040	0.21
		Back	18900	1880	1	0	24.60	25.00	-2.55	0.48	1.023	**0.49**
					50	25	24.53	25.00	-2.22	0.40	1.040	0.42
		Right	18900	1880	1	0	24.60	25.00	-3.48	0.03	1.023	0.03
					50	25	24.53	25.00	-0.03	0.03	1.040	0.03
		Left	18900	1880	1	0	24.60	25.00	0.60	0.02	1.023	0.02
					50	25	24.53	25.00	-2.34	0.02	1.040	0.02
		Bottom	18900	1880	1	0	24.60	25.00	0.20	0.01	1.023	0.01
					50	25	24.53	25.00	-2.61	0.01	1.040	0.01
LTE Band 4	QPSK (20MHz)	Front	20050	1720	1	0	24.88	25.00	0.12	0.29	1.028	0.30
					50	25	24.66	25.00	1.14	0.25	1.119	0.28
		Back	20050	1720	1	0	24.88	25.00	0.91	0.57	1.028	**0.59**
					50	25	24.66	25.00	-2.11	0.50	1.119	0.56
		Right	20050	1720	1	0	24.88	25.00	-2.17	0.03	1.028	0.03
					50	25	24.66	25.00	0.61	0.02	1.119	0.02
		Left	20050	1720	1	0	24.88	25.00	-3.16	0.01	1.028	0.01
					50	25	24.66	25.00	2.10	0.01	1.119	0.01
		Bottom	20050	1720	1	0	24.88	25.00	-0.34	0.02	1.028	0.02
					50	25	24.66	25.00	-2.49	0.02	1.119	0.02

LTE Band 5	QPSK (10MHz)	Front	20450	829	1	0	24.85	25.00	-2.50	0.11	1.033	0.11
					25	0	24.55	25.00	-1.31	0.09	1.109	0.10
		Back	20450	829	1	0	24.85	25.00	-1.19	0.23	1.033	**0.24**
					25	0	24.55	25.00	1.44	0.19	1.109	0.21
		Right	20450	829	1	0	24.85	25.00	3.46	0.03	1.033	0.03
					25	0	24.55	25.00	0.47	0.03	1.109	0.03
		Left	20450	829	1	0	24.85	25.00	3.31	0.02	1.033	0.02
					25	0	24.55	25.00	-0.68	0.02	1.109	0.02
		Bottom	20450	829	1	0	24.85	25.00	-2.35	0.01	1.033	0.01
					25	0	24.55	25.00	-3.39	0.01	1.109	0.01
LTE Band 7	QPSK (20MHz)	Front	20850	2510	1	0	24.76	25.00	2.14	0.18	1.114	0.20
					50	25	24.62	25.00	-1.11	0.14	1.042	0.15
		Back	20850	2510	1	0	24.76	25.00	-2.81	0.33	1.114	**0.37**
					50	25	24.62	25.00	-2.34	0.29	1.042	0.30
		Right	20850	2510	1	0	24.76	25.00	1.04	0.03	1.114	0.03
					50	25	24.62	25.00	2.14	0.02	1.042	0.02
		Left	20850	2510	1	0	24.76	25.00	-0.31	0.02	1.114	0.02
					50	25	24.62	25.00	-2.11	0.01	1.042	0.01
		Bottom	20850	2510	1	0	24.76	25.00	-0.15	0.02	1.114	0.02
					50	25	24.62	25.00	-0.02	0.01	1.042	0.01
LTE Band 12	QPSK (10MHz)	Front	23095	707.5	1	0	24.68	25.00	-0.14	0.09	1.005	0.09
					25	0	24.56	25.00	0.20	0.05	1.040	0.05
		Back	23095	707.5	1	0	24.68	25.00	0.06	0.18	1.005	**0.18**
					25	0	24.56	25.00	1.34	0.10	1.040	0.10
		Right	23095	707.5	1	0	24.68	25.00	0.07	0.03	1.005	0.03
					25	0	24.56	25.00	-0.30	0.02	1.040	0.02
		Left	23095	707.5	1	0	24.68	25.00	-2.55	0.02	1.005	0.02
					25	0	24.56	25.00	-1.39	0.01	1.040	0.01
		Bottom	23095	707.5	1	0	24.68	25.00	2.47	0.02	1.005	0.02
					25	0	24.56	25.00	-1.69	0.01	1.040	0.01