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Shenzhen Branch

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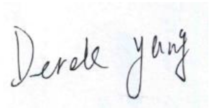
FCC SAR TEST REPORT

Application No:	HR/2018/A0009
Applicant:	UNIMAX Communications
Manufacturer:	UNIMAX Communications
Product Name:	UNIMAX Communications
Model No.(EUT):	U504TL
Trade Mark:	UMX
FCC ID:	P46-U504TL
Standards:	FCC 47CFR §2.1093
Date of Receipt:	2018-10-29
Date of Test:	2018-11-01 to 2018-11-05
Date of Issue:	2018-12-07
Test Result:	**PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:



Derek Yang

Wireless Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

REVISION HISTORY

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-12-07		Original

TEST SUMMARY

Frequency Band	Maximum Reported SAR(W/kg)		
	Head	Body-worn	Hotspot
WCDMA Band II	0.55	0.35	0.65
WCDMA Band IV	0.42	0.37	0.77
WCDMA Band V	0.36	0.44	0.50
LTE Band 2	0.65	0.43	0.74
LTE Band 4	0.38	0.40	0.76
LTE Band 12	0.42	0.42	0.54
LTE Band 66	0.43	0.39	0.80
LTE Band 71	0.29	0.20	0.36
WI-FI (2.4GHz)	0.42	<0.10	0.11
SAR Limited(W/kg)	1.6		
Maximum Simultaneous Transmission SAR (W/kg)			
Scenario	Head	Body-worn	Hotspot
Sum SAR	1.07	0.50	0.89
SPLSR	N/A	N/A	N/A
SPLSR Limited	0.04		

Approved & Released by

Simon Ling

SAR Manager

Tested by

Jackson Li

SAR Engineer

CONTENTS

1 General Information

1.1 Details of Client

Applicant:	UNIMAX Communications
Address:	18201 McDurmott St.West Suite E,Irvine,CA 92614
Manufacturer:	UNIMAX Communications
Address:	18201 McDurmott St.West Suite E,Irvine,CA 92614

1.2 Test Location

Company: SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab

Address: No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China

Post code: 518057

Telephone: +86 (0) 755 2601 2053

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E-mail: ee.shenzhen@sgs.com

1.3 Test Facility

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

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 3816.01.

• VCCI

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

1.4 General Description of EUT

Product Name:	Smartphone		
Model No.(EUT):	U504TL		
Trade Mark:	UMX		
Product Phase:	production unit		
Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
SN:	504TL11018000077/504TL11018000074		
FCC ID:	P46-U504TL		
Hardware Version:	Q5001_V1.0		
Software Version:	U452TL_01.01.02.112156		
Antenna Type:	Inner Antenna		
Device Operating Configurations :			
Modulation Mode:	**WCDMA**: QPSK, 16QAM; **LTE:** QPSK,16QAM; **WIFI:** DSSS; OFDM; **BT:** GFSK, π/4DQPSK,8DPSK		
HSDPA UE Category:	10	HSUPA UE Category	7
Power Class	3, tested with power control “all 1”(WCDMA Band II/IV/V)		
	3, tested with power control Max Power(LTE Band 2/4/12/66/71)		
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	WCDMA Band II	1850~1910	1930~1990
	WCDMA Band IV	1710~1755	2110~2155
	WCDMA Band V	824~849	869~894
	LTE Band 2	1850~1910	1930~1990
	LTE Band 4	1710~1755	2110~2155
	LTE Band 12	699~716	729~746
	LTE Band 66	1710~1780	2110~2180
	LTE Band 71	663~698	617~652
	WIFI(2.4GHz)	2412~2462	2412~2462
	BT	2402~2480	2402~2480
Battery Information:	Model:	U504TLBATT	
	Rated capacity:	2300mAh	

Remark:

In this report, all frequency bands for the SAR and conducted power are all test.

1.5 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
ANSI/IEEE Std C95.1 – 1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 941225 D01 3G SAR Procedures v03r01	3G SAR Measurement Procedures
KDB 941225 D05 SAR for LTE Devices v02r05	SAR EVALUATION CONSIDERATIONS FOR LTE DEVICES
KDB 248227 D01 802.11 Wi-Fi SAR v02r02	SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS
KDB 941225 D06 Hotspot Mode SAR v02r01	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
KDB447498 D01 General RF Exposure Guidance v06	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
KDB447498 D03 Supplement C Cross-Reference v01	OET Bulletin 65, Supplement C Cross-Reference
KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04	SAR Measurement Requirements for 100 MHz to 6 GHz
KDB 865664 D02 RF Exposure Reporting v01r02	RF Exposure Compliance Reporting and Documentation Considerations

1.6 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain*Trunk)	**1.60 mW/g**	8.00 mW/g
Spatial Average SAR** (Whole Body)	0.08 mW/g	0.40 mW/g
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	4.00 mW/g	20.00 mW/g

Notes:

* 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

** The Spatial Average value of the SAR averaged over the whole body.

*** 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.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

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.)

2 SAR Measurements System Configuration

2.1 The SAR Measurement System

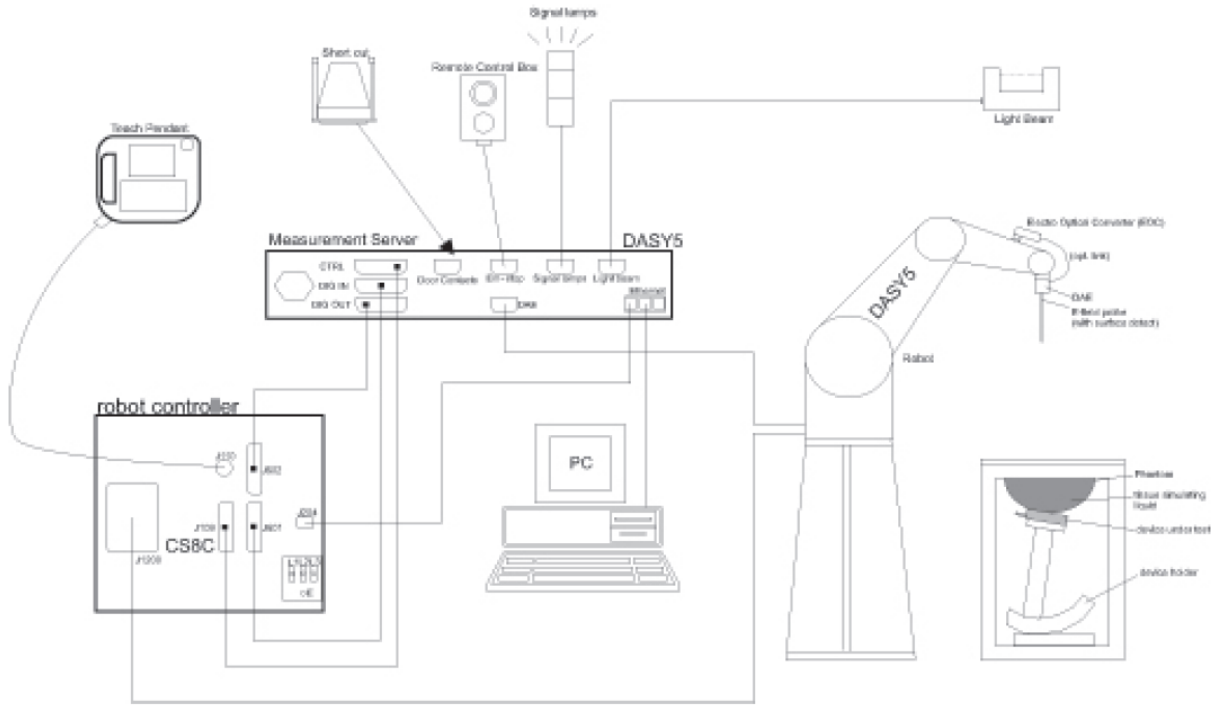
This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY5 professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-Simulate.

The DASY5 system for performing compliance tests consists of the following items:
A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software .An arm extension for accommodation the data acquisition electronics (DAE).

A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.



F-1. SAR Measurement System Configuration

- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand, right-hand and Body Worn usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validating the proper functioning of the system.

2.2 Isotropic E-field Probe EX3DV4

	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

2.3 Data Acquisition Electronics (DAE)

Model	DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY4/5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV,400mV)
Input Offset Voltage	< 5μV (with auto zero)
Input Bias Current	< 50 f A
Dimensions	60 x 60 x 68 mm

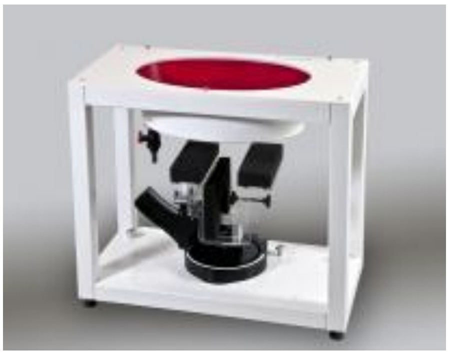
2.4 SAM Twin Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions (incl. Wooden Support)	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters
Wooden Support	SPEAG standard phantom table

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It 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 evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.

2.5 ELI Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	
Wooden Support	SPEAG standard phantom table	

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure.

2.6 Device Holder for Transmitters

F-2. **Device Holder for Transmitters**

- The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centres for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.
- The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity ε=3 and loss tangent δ=0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

2.7 Measurement procedure

2.7.1 Scanning procedure

Step 1: Power reference measurement

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure.

Step 2: *Area scan*

The SAR distribution at the exposed side of the head was measured at a distance of 4mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm*15mm or 12mm*12mm or 10mm*10mm.Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: *Zoom scan*

Around this point, a volume of 30mm*30mm*30mm (fine resolution volume scan, zoom scan) was assessed by measuring 5x5x7 points (≤2GHz) and 7x7x7 points (≥2GHz). On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the centre of the dipoles is 2.0mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. Refer to the probe specification).The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points were interpolated to calculate the average. All neighbouring volumes were evaluated until no neighboring volume with a higher average value was found.

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std. 1528-2013.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\le 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power reference measurement (drift)

The Power Drift Measurement job measures the field at the same location as the most recent power reference measurement job within the same procedure, and with the same settings. The indicated drift is mainly the variation of the DUT's output power and should vary max. ± 5 %

2.7.2 Data Storage

The DASY 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 with the extension "DAE". 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], [m W/g], [m W/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.

2.7.3 Data Evaluation by SEMCAD

The SEMCAD 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 ε
- 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 DASY components. In the direct measuring mode of the multimeter 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:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

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 (DASY parameter)

dcp i = diode compression point (DASY parameter)

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

E-field probes:

$$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$

H-field probes:

$$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$$

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):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

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

$$SAR = (Etot^2 \cdot \sigma) / (\varepsilon \cdot 1000)$$

with SAR = local specific absorption rate in mW/g

Etot = total field strength in V/m

σ= conductivity in [mho/m] or [Siemens/m]

ε= 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.

$$P_{pwe} = E_{tot}{}^2{}_2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}{}^2 \cdot 37.7$$

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

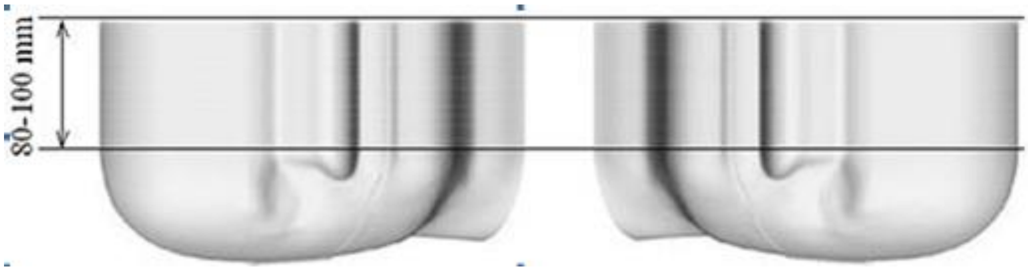
3 Description of Test Position

3.1 Head Exposure Condition

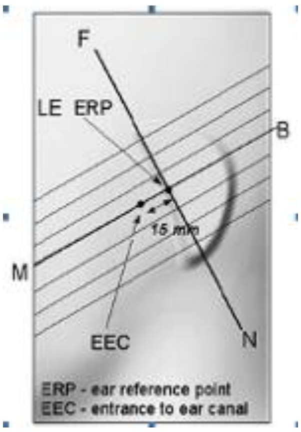
3.1.1 SAM Phantom Shape

F-3. Front, back, and side views of SAM (model for the phantom shell). Full-head model is for illustration purposes only-procedures in this recommended practice are intended primarily for the phantom setup.

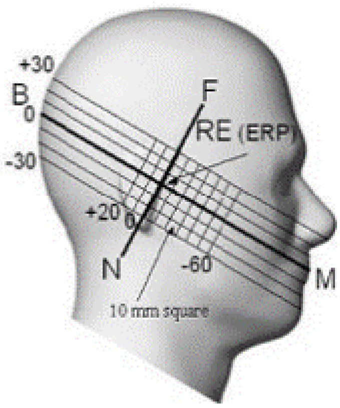
Note: The centre strip including the nose region has a different thickness tolerance.



F-4. Sagittally bisected phantom with extended perimeter (shown placed on its side as used for SAR measurements)

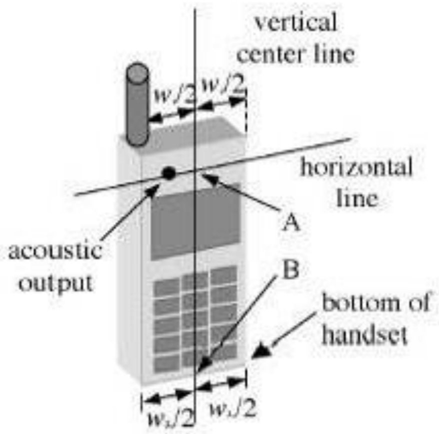


F-5. Close-up side view of phantom, showing the ear region, N-F and B-M lines, and seven cross-sectional plane locations

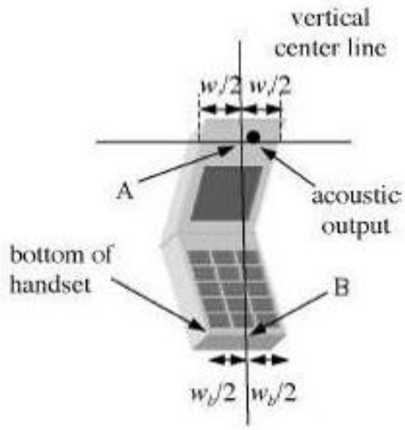


F-6. Side view of the phantom showing relevant markings and seven cross-sectional plane locations

3.1.2 EUT constructions



F-7. Handset vertical and horizontal reference lines-“fixed case”



F-8. Handset vertical and horizontal reference lines-“clam-shell case”

3.1.3 Definition of the “cheek” position

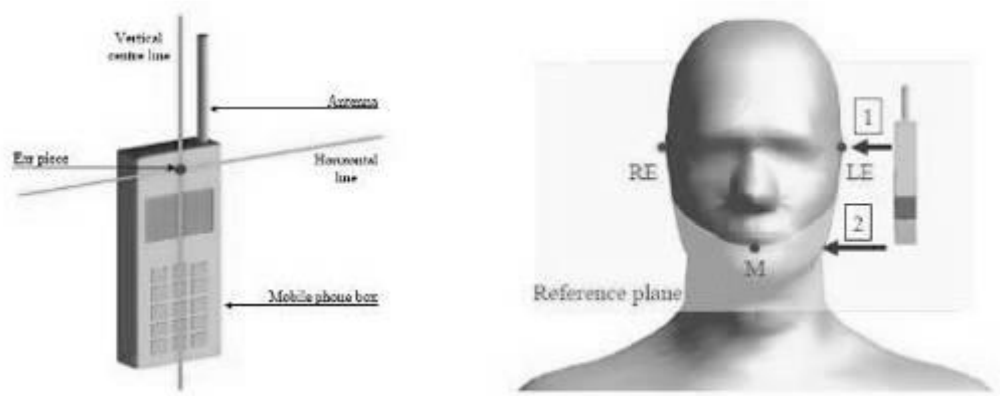
a) Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom ("initial position"). While maintaining the device in this plane, align the vertical centre line with the reference plane containing the three ear and mouth reference points (M, RE and LE) and align the centre of the ear piece with the line RE-LE.

b) Translate the mobile phone box towards the phantom with the ear piece aligned with the line LE-RE until telephone touches the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the box until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.

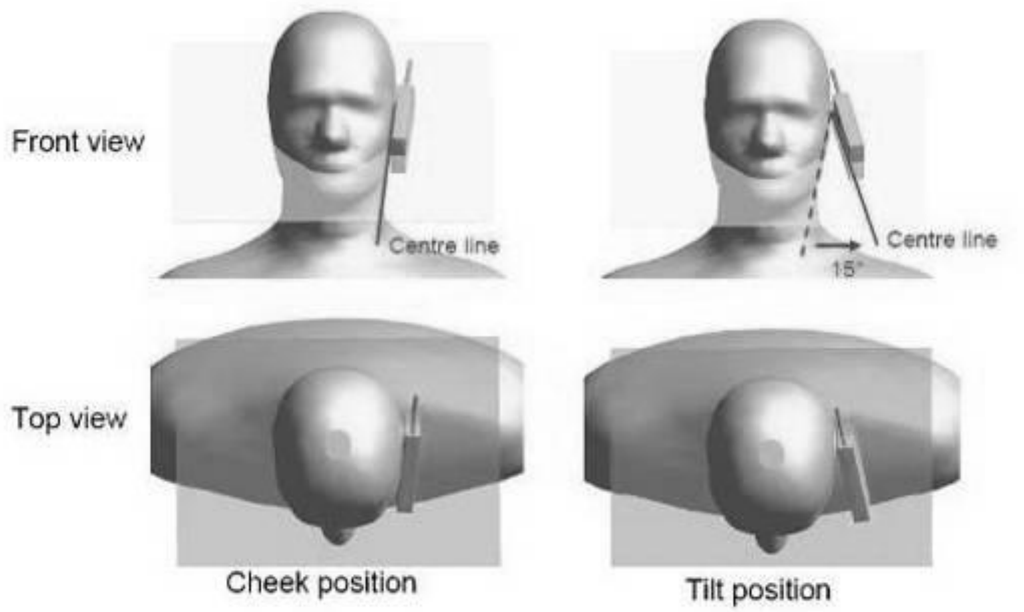
3.1.4 Definition of the "tilted" position

a) Position the device in the "cheek" position described above;

b) While maintaining the device in the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.



F-9. **Definition of the reference lines and points, on the phone and on the phantom and initial position**



F-10. **"Cheek" and "tilt" positions of the mobile phone on the left side**

3.2 Body Exposure Condition

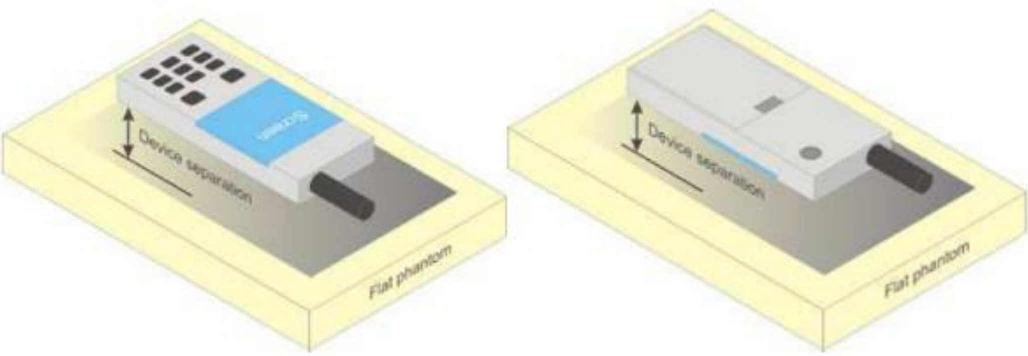
3.2.1 Body-worn accessory exposure conditions

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations.

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person’s face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.



F-11. **Test positions for body-worn devices**

3.2.2 Wireless Router exposure conditions

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC 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 containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. For devices with form factors smaller than 9 cm x 5 cm, a test separation distance of 5 mm is required.

4 SAR System Verification Procedure

4.1 Tissue Simulate Liquid

4.1.1 Recipes for Tissue Simulate Liquid

The bellowing tables give the recipes for tissue simulating liquids to be used in different frequency bands：

Ingredients (% by weight)	Frequency (MHz)							
	450		700-950		1700-2000		2300-2700	
Tissue Type	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**
Water	38.56	51.16	40.30	50.75	55.24	70.17	55.00	68.53
Salt (NaCl)	3.95	1.49	1.38	0.94	0.31	0.39	0.2	0.1
Sucrose	56.32	46.78	57.90	48.21	0	0	0	0
HEC	0.98	0.52	0.24	0	0	0	0	0
Bactericide	0.19	0.05	0.18	0.10	0	0	0	0
Tween	0	0	0	0	44.45	29.44	44.80	31.37

Salt: 99^+% Pure Sodium Chloride
Sucrose: 98^+% Pure Sucrose
Water: De-ionized, 16 $M\Omega^+$ resistivity
HEC: Hydroxyethyl Cellulose
Tween: Polyoxyethylene (20) sorbitan monolaurate

HSL5GHz is composed of the following ingredients:
Water: 50-65%
Mineral oil: 10-30%
Emulsifiers: 8-25%
Sodium salt: 0-1.5%

MSL5GHz is composed of the following ingredients:
Water: 64-78%
Mineral oil: 11-18%
Emulsifiers: 9-15%
Sodium salt: 2-3%

Table 1： Recipe of Tissue Simulate Liquid

4.1.2 Measurement for Tissue Simulate Liquid

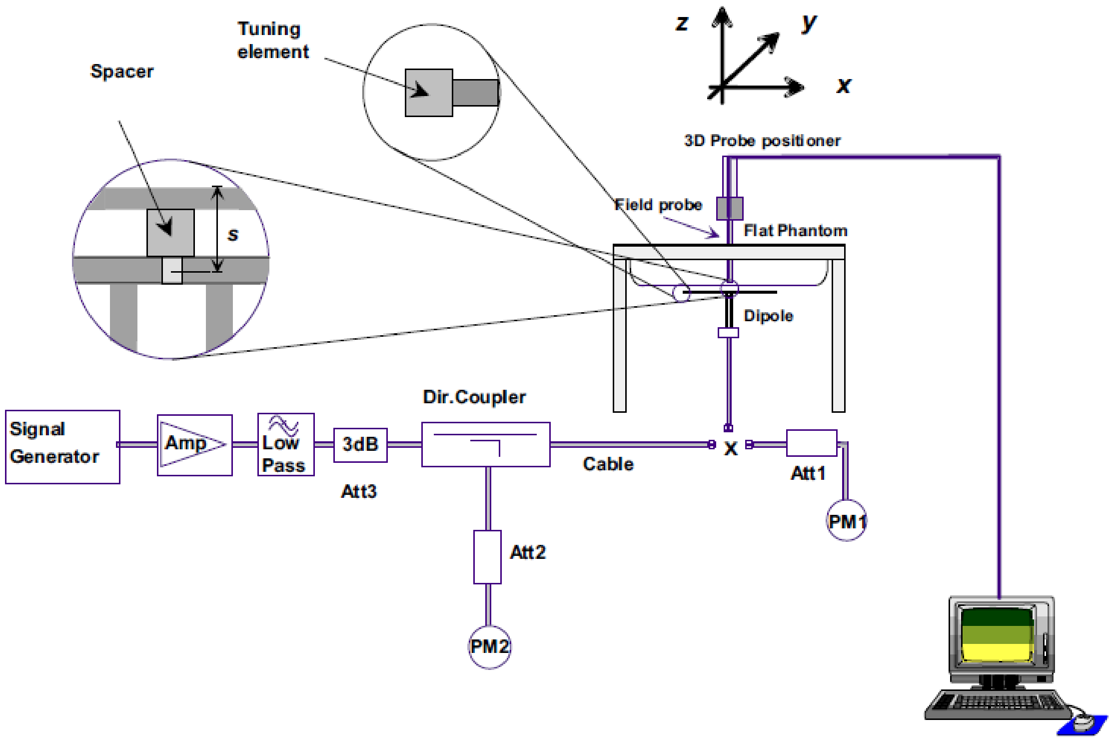
The dielectric properties for this Tissue Simulate Liquids were measured by using the Agilent Model 85070E Dielectric Probe in conjunction with Agilent E5071C Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in Table 2. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was 22±2°C.

Tissue Type	Measured Frequency (MHz)	Target Tissue (±5%)		Measured Tissue		Liquid Temp.	Measured Date
		ε_r	σ(S/m)	ε_r	σ(S/m)	(℃)	
750 Head	750	41.9 (39.81~44)	0.89 (0.85~0.94)	42.729	0.886	22.1	2018/11/4
750 Body	750	55.5 (52.73~58.28)	0.96 (0.91~1.00)	56.757	0.950	22.1	2018/11/3
835 Head	835	41.5 (39.43~43.58)	0.90 (0.86~0.95)	42.372	0.936	22.1	2018/11/4
835 Body	835	55.2 (52.44~57.96)	0.97 (0.92~1.02)	56.408	0.996	22.1	2018/11/3
1750 Head	1750	40.1 (38.10~42.11)	1.37 (1.30~1.44)	40.413	1.318	22.2	2018/11/1
1750 Body	1750	53.4 (50.73~56.07)	1.49 (1.42~1.56)	53.334	1.434	22.2	2018/11/2
1900 Head	1900	40.0 (38.00~42.00)	1.40 (1.33~1.47)	40.221	1.369	22.3	2018/11/5
1900 Body	1900	53.3 (50.64~55.97)	1.52 (1.44~1.60)	52.660	1.500	22.3	2018/11/2
2450 Head	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	39.924	1.819	22.0	2018/11/1
2450 Body	2450	52.70 (50.07~55.34)	1.95 (1.85~2.05)	52.708	1.970	22.0	2018/11/4

Table 2： Measurement result of Tissue electric parameters

4.2 SAR System Check

The microwave circuit arrangement for system Check is sketched in F-12. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the following table (A power level of 250mW (below 3GHz) or 100mW (3-6GHz) was input to the dipole antenna). During the tests, the ambient temperature of the laboratory was in the range 22±2°C, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 15±0.5 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.



F-12. the microwave circuit arrangement used for SAR system check

4.2.1 Justification for Extended SAR Dipole Calibrations

1) Referring to KDB865664 D01 requirements for dipole calibration, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.

a) There is no physical damage on the dipole;
b) System check with specific dipole is within 10% of calibrated value;
c) Return-loss is within 10% of calibrated measurement;
d) Impedance is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

4.2.2 Summary System Check Result(s)

Validation Kit		Measured SAR 250mW	Measured SAR 250mW	Measured SAR (normalized to 1W)	Measured SAR (normalized to 1W)	Target SAR (normalized to 1W) (±10%)	Target SAR (normalized to 1W) (±10%)	Liquid Temp. (℃)	Measured Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)		
D750V3	Head	1.97	1.30	7.88	5.20	8.17 (7.35~8.99)	5.36 (4.82~5.9)	22.1	2018/11/4
	Body	2.10	1.40	8.40	5.60	8.57 (7.71~9.43)	5.66 (5.09~6.23)	22.1	2018/11/3
D835V2	Head	2.57	1.67	10.28	6.68	9.59 (8.63~10.55)	6.29 (5.66~6.92)	22.1	2018/11/4
	Body	2.50	1.65	10.00	6.60	9.65 (8.69~10.62)	6.46 (5.81~7.11)	22.1	2018/11/3
D1750V2	Head	8.77	4.70	35.08	18.80	36.7 (33.03~40.37)	19.5 (17.55~21.45)	22.2	2018/11/1
	Body	9.12	4.85	36.48	19.40	37 (33.30~40.70)	19.7 (17.73~21.67)	22.2	2018/11/2
D1900V2	Head	10.10	5.25	40.40	21.00	40.7 (36.63~44.77)	21.1 (18.99~23.21)	22.3	2018/11/5
	Body	10.20	5.40	40.80	21.60	41.6 (37.44~45.76)	21.4 (19.26~23.54)	22.3	2018/11/2
D2450V2	Head	13.30	6.15	53.20	24.60	53.1 (47.79~58.41)	24.9 (22.41~27.39)	22.0	2018/11/1
	Body	12.70	5.86	50.80	23.44	51.0 (45.9~56.1)	23.5 (21.15~25.85)	22.0	2018/11/4

Table 3： SAR System Check Result

4.2.3 Detailed System Check Results

Please see the Appendix A

5 Test results and Measurement Data

5.1 3G SAR Test Reduction Procedure

According to KDB 941225D01, in the following procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as "otherwise" in the applicable procedures; SAR measurement is required for the secondary mode.

5.2 Operation Configurations

5.2.1 WCDMA Test Configuration

1）. <u>Output Power Verification</u>

Maximum output power is verified on the high, middle and low channels according to procedures described in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all "1's" for WCDMA/HSDPA or by applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) are required in the SAR report. All configurations that are not supported by the handset or cannot be measured due to technical or equipment limitations must be clearly identified.

2）. <u>Head SAR</u>

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure

3）. <u>Body SAR</u>

SAR for body configurations is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreaing code or DPDCHn, for the highest reported body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When more than 2 DPDCHn are supported by the handset, it may be necessary to configure additional DPDCHn using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

4）. <u>HSDPA / HSUPA / DC-HSDPA</u>

According to KDB 941225 D01v03, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA

a) **HSDPA**

HSDPA is configured according to the applicable UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms and a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors(βc, βd), and HS-DPCCH power offset parameters (ΔACK, ΔNACK, ΔCQI) are set according to values indicated in the following table The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Sub-test	βc	Bd	βd(SF)	βc/βd	βhs	CM(dB)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note1: △ACK, △NACK and △CQI= 8 Ahs = βhs/βc=30/15 βhs=30/15*βc
Note2:For the HS-DPCCH power mask requirement test in clause 5.2C,5.7A,and the Error Vector Magnitude(EVM) with HS-DPCCH test in clause 5.13.1.A,and HSDPA EVM with phase discontinuity in clause 5.13.1AA, △ACK and △NACK= 8 (Ahs=30/15) with βhs=30/15*βc,and △CQI= 7 (Ahs=24/15) with βhs=24/15*βc.
Note3: CM=1 forβc/βd =12/15, βhs/βc=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI‟s
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

Table 4： settings of required H-Set 1 QPSK acc. to 3GPP 34.121

HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	MaximumH S-DSCH Transport BlockBits/HS-DSCH TTI	Total Soft Channel Bits
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

Table 5： HSDPA UE category

b) HSUPA

Due to inner loop power control requirements in HSUPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSUPA should be configured according to the values indicated below as well as other applicable procedures described in the „WCDMA Handset" and „Release 5 HSUPA Data Device" sections of 3G device.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ec} (SF)	β_{ed} (code)	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ ACK, Δ NACK and Δ CQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference

Note 3 : For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$

Note 4 : For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$

Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Table 6 : Subtests for UMTS Release 6 HSUPA

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Speading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	10	2SF2&2SF4	11484	5.76
	4	4	2		20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.UE categories 1 to 6 support QPSK only. UE category 7 supports QPSK and 16QAM.(TS25.306-7.3.0).

Table 7： HSUPA UE category

c) HSPA+

SAR is required for Rel. 7 HSPA+ when SAR is required for Rel. 6 HSPA; otherwise, the 3G SAR test reduction procedure is applied to (uplink) HSPA+ with 12.2 kbps RMC as the primary mode. Power is measured for HSPA+ that supports uplink 16 QAM according to configurations in Table C.11.1.4 of 3GPP TS 34.121-1 to determine SAR test reduction.

- **Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM**

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c .

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.

Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.

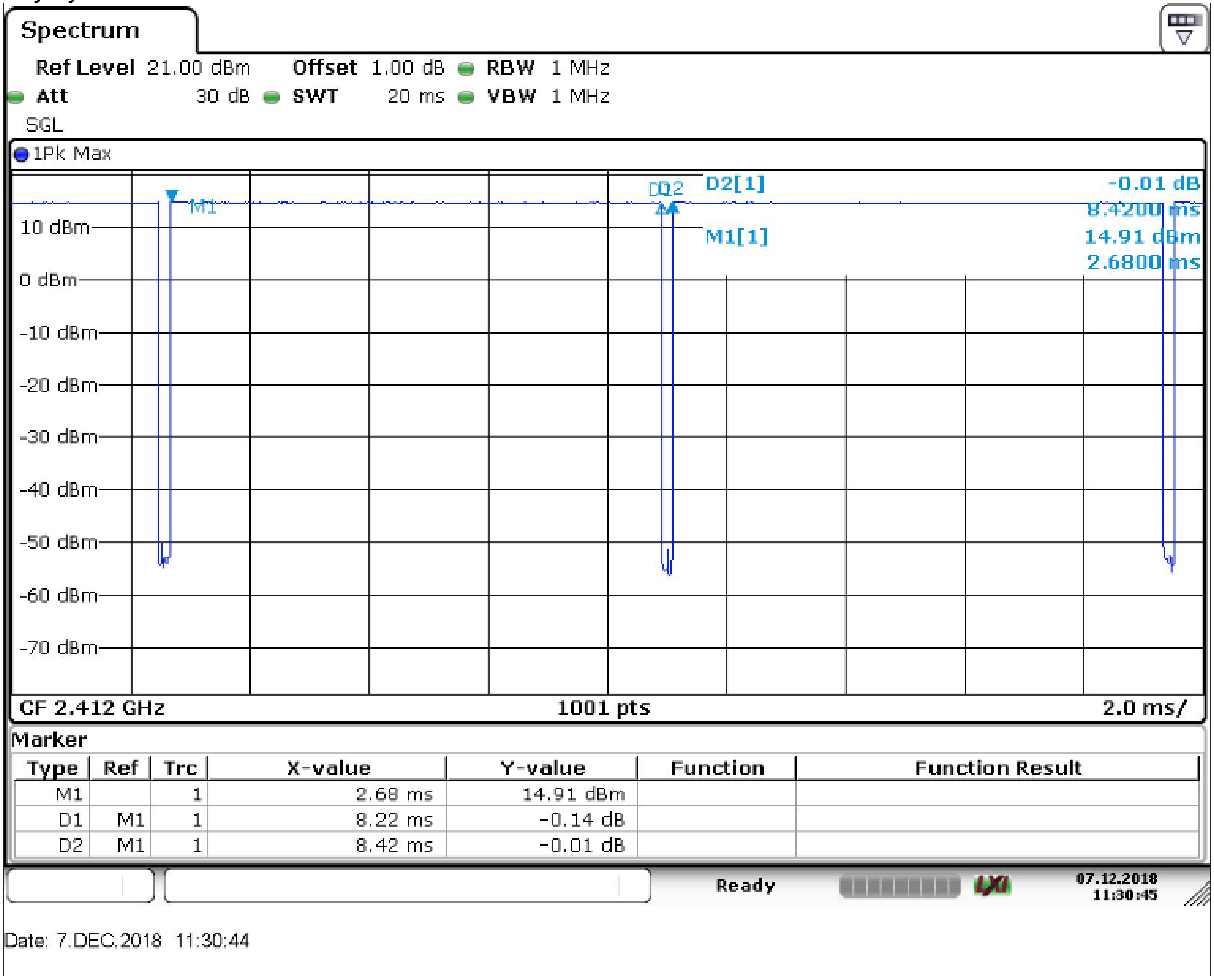
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

5.2.2 WiFi Test Configuration

A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

- WIFI 2.4G 802.11b

  Duty cycle= 8.22/8.42=97.62%



5.2.2.1 Initial Test Position SAR Test Reduction Procedure

DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures. The initial test position procedure is described in the following:

1）. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).
2）. When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.
3）. For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested. a) Additional power measurements may be required for this step, which should be limited to those necessary for identifying the subsequent highest output power channels.

5.2.2.2 Initial Test Configuration Procedures

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required. SAR test reduction for subsequent highest output test channels is determined according to *reported* SAR of the initial test configuration.
For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration.
When the *reported* SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for subsequent next highest measured output power channel(s) in the initial test configuration until *reported* SAR is ≤ 1.2 W/kg or all required channels are tested.

5.2.2.3 Subsequent Test Configuration Procedures

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. The initial test position procedure is applied to next to the ear, UMPC mini-tablet and hotspot mode configurations. When the same maximum output power is specified for multiple transmission modes, additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. The subsequent test configuration and SAR measurement procedures are described in the following.

1）. When SAR test exclusion provisions of KDB Publication 447498 are applicable and SAR measurement is not required for the initial test configuration, SAR is also not required for the next highest maximum output power transmission mode subsequent test configuration(s) in that frequency band or aggregated band and exposure configuration.
2）. When the highest *reported* SAR for the initial test configuration (when applicable, include subsequent highest output channels), according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

3）. The number of channels in the initial test configuration and subsequent test configuration can be different due to differences in channel bandwidth. When SAR measurement is required for a subsequent test configuration and the channel bandwidth is smaller than that in the initial test configuration, all channels in the subsequent test configuration that overlap with the larger bandwidth channel tested in the initial test configuration should be used to determine the highest maximum output power channel. This step requires additional power measurement to identify the highest maximum output power channel in the subsequent test configuration to determine SAR test reduction.

a)SAR should first be measured for the channel with highest measured output power in the subsequent test configuration.

b) SAR for subsequent highest measured maximum output power channels in the subsequent test configuration is required only when the *reported* SAR of the preceding higher maximum output power channel(s) in the subsequent test configuration is > 1.2 W/kg or until all required channels are tested. i) For channels with the same measured maximum output power, SAR should be measured using the channel closest to the center frequency of the larger channel bandwidth channel in the initial test configuration.

4）. SAR measurements for the remaining highest specified maximum output power OFDM transmission mode configurations that have not been tested in the initial test configuration (highest maximum output) or subsequent test configuration(s) (subsequent next highest maximum output power) is determined by recursively applying the subsequent test configuration procedures in this section to the remaining configurations according to the following:

a)replace “subsequent test configuration” with “next subsequent test configuration” (i.e., subsequent next highest specified maximum output power configuration)

b) replace “initial test configuration” with “all tested higher output power configurations”

5.2.2.4 2.4 GHz SAR Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions. When SAR measurement is required for an OFDM configuration, the initial test configuration, subsequent test configuration and initial test position procedures are applied. The SAR test exclusion requirements for 802.11g/n OFDM configurations are described in following.

- **802.11b DSSS SAR Test Requirements**

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1）. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

2）. When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration 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.

- **2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements**

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3, including sub-sections). SAR is not required for the following 2.4 GHz OFDM conditions.

1）. When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.

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

- **SAR Test Requirements for OFDM configurations**

When SAR measurement is required for 802.11 g/n OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

5.2.3 LTE Test Configuration

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The Anritsu MT8821C was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during SAR testing. SAR must be measured with the maximum TTI (transmit time interval) supported by the device in each LTE configuration.

A) Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

B) MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3

C) A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

D) Largest channel bandwidth standalone SAR test requirements

1) QPSK with 1 RB allocation

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

2) QPSK with 50% RB allocation

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

3) QPSK with 100% RB allocation

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

4) Higher order modulations

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

E) Other channel bandwidth standalone SAR test requirements

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

5.2.4 DUT Antenna Locations

Note:

1) The test device is a mobile phone. The display diagonal dimension is 128 mm and the overall diagonal dimension of this device is 153 mm.

2) The diversity Antenna does not support transmitter function.

5.2.5 EUT side for SAR Testing

According to the distance between LTE/WCDAM&WIFI antennas and the sides of the EUT we can draw the conclusion that:

EUT Sides for SAR Testing						
Mode	Front	Back	Left	Right	Top	Bottom
WCDMA	Yes	Yes	Yes	Yes	No	Yes
LTE	Yes	Yes	Yes	Yes	No	Yes
Wi-Fi（2.4GHz）	Yes	Yes	No	Yes	Yes	No

Table 8： EUT Sides for SAR Testing

Note: When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.

5.2.6 Stand-alone SAR test evaluation

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

Freq. Band	Frequency (GHz)	Position	Average Power		Test Separation (mm)	Calculate Value	Exclusion Threshold	Exclusion (Y/N)
			dBm	mW				
Wi-Fi	2.48	Head	14.0	25.12	0	7.91	3	N
		Body-worn	14.0	25.12	15	2.64	3	Y
		Hotspot	14.0	25.12	10	3.96	3	N
Bluetooth	2.48	Head	6.0	3.98	0	1.254	3	Y
		Body-worn	6.0	3.98	15	0.418	3	Y
		Hotspot	6.0	3.98	10	0.627	3	Y

The 1-g and 10-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 and ≤ 7.5 for 10-g extremity 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

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

5.3 Measurement of RF conducted Power

5.3.1 Conducted Power of WCDMA

WCDMA Band II					
Average Conducted Power(dBm)					
Channel		9262	9400	9538	Tune up
WCDMA	12.2kbps RMC	22.91	**22.83**	22.74	23.70
	12.2kbps AMR	22.91	22.82	22.72	23.70
HSDPA	Subtest 1	22.03	22.11	22.15	23.20
	Subtest 2	21.96	21.99	22.08	23.20
	Subtest 3	21.73	21.68	21.52	22.20
	Subtest 4	21.71	21.69	21.54	22.20
HSUPA	Subtest 1	21.48	21.26	21.14	21.70
	Subtest 2	20.83	20.96	20.93	21.70
	Subtest 3	20.75	20.66	20.64	21.70
	Subtest 4	21.01	20.88	20.73	21.70
	Subtest 5	22.11	22.24	22.18	23.20
HSPA+	16QAM	21.38	21.35	21.18	21.70
WCDMA Band IV					
Average Conducted Power(dBm)					
Channel		1312	1412	1513	Tune up
WCDMA	12.2kbps RMC	23.34	**23.38**	23.35	23.70
	12.2kbps AMR	23.35	23.37	23.35	23.70
HSDPA	Subtest 1	22.50	22.46	22.40	23.20
	Subtest 2	22.33	22.27	22.29	23.20
	Subtest 3	21.84	21.85	21.82	22.20
	Subtest 4	21.75	21.78	21.73	22.20
HSUPA	Subtest 1	21.59	21.51	21.56	21.70
	Subtest 2	21.44	21.21	21.15	21.70
	Subtest 3	21.37	21.03	21.17	21.70
	Subtest 4	21.47	21.53	21.27	21.70
	Subtest 5	22.60	22.60	22.30	23.20
HSPA+	16QAM	21.56	21.49	21.50	21.70

WCDMA Band V					
Average Conducted Power(dBm)					
Channel		4132	4182	4233	Tune up
WCDMA	12.2kbps RMC	22.42	**22.25**	22.29	23.70
	12.2kbps AMR	22.42	22.26	22.27	23.70
HSDPA	Subtest 1	21.99	21.97	21.96	23.20
	Subtest 2	21.94	21.85	21.83	23.20
	Subtest 3	21.42	21.34	21.34	22.20
	Subtest 4	21.47	21.29	21.30	22.20
HSUPA	Subtest 1	21.49	21.11	20.93	21.70
	Subtest 2	20.78	20.66	20.85	21.70
	Subtest 3	20.55	19.85	20.07	21.70
	Subtest 4	20.56	20.14	20.75	21.70
	Subtest 5	21.85	21.93	21.88	23.20
HSPA+	16QAM	21.44	21.29	20.88	21.70

Table 9： Conducted Power of WCDMA.

Note:

1) 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.

5.3.2 Conducted Power of LTE

LTE Band 2				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 18607	Channel 18900	Channel 19193	Tune up
1.4MHz	QPSK	1	0	22.57	22.59	22.69	24.00
		1	2	22.72	22.55	22.62	24.00
		1	5	22.65	22.41	22.57	24.00
		3	0	22.79	22.66	22.65	24.00
		3	2	22.72	22.72	22.73	24.00
		3	3	22.77	22.74	22.65	24.00
		6	0	21.72	21.60	21.55	23.00
	16QAM	1	0	21.92	21.67	22.05	23.00
		1	2	21.32	21.82	21.73	23.00
		1	5	21.08	21.67	21.57	23.00
		3	0	21.74	21.50	21.59	23.00
		3	2	21.34	21.84	21.76	23.00
		3	3	21.37	21.80	21.55	23.00
		6	0	20.49	20.71	20.51	22.00
Bandwidth	Modulation	RB size	RB offset	Channel 18615	Channel 18900	Channel 19185	Tune up
3MHz	QPSK	1	0	22.59	22.81	22.53	24.00
		1	7	22.98	23.05	22.53	24.00
		1	14	22.91	22.99	22.30	24.00
		8	0	21.82	21.70	21.68	23.00
		8	4	21.57	21.77	21.66	23.00
		8	7	21.64	21.79	21.60	23.00
		15	0	21.55	21.75	21.70	23.00
	16QAM	1	0	21.49	21.59	21.75	23.00
		1	7	21.26	21.73	21.61	23.00
		1	14	21.13	21.84	21.37	23.00
		8	0	20.69	20.37	20.93	22.00
		8	4	20.77	20.79	20.88	22.00
		8	7	20.67	20.91	20.75	22.00
		15	0	20.68	20.91	20.65	22.00
Bandwidth	Modulation	RB size	RB offset	Channel 18625	Channel 18900	Channel 19175	Tune up
5MHz	QPSK	1	0	22.40	22.47	22.66	24.00
		1	13	22.57	22.64	22.48	24.00
		1	24	22.53	22.68	22.67	24.00
		12	0	21.72	21.57	21.59	23.00
		12	6	21.57	21.57	21.58	23.00
		12	13	21.69	21.55	21.55	23.00
		25	0	21.57	21.59	21.68	23.00
	16QAM	1	0	21.75	21.72	21.14	23.00
		1	13	21.07	21.26	21.13	23.00
		1	24	21.92	21.76	21.41	23.00
		12	0	20.47	20.54	20.60	22.00
		12	6	20.62	20.55	20.50	22.00
		12	13	20.68	20.52	20.55	22.00

		25	0	20.51	20.64	20.44	22.00
Bandwidth	Modulation	RB size	RB offset	Channel 18650	Channel 18900	Channel 19150	Tune up
10MHz	QPSK	1	0	22.56	22.61	22.70	24.00
		1	25	22.68	22.83	22.54	24.00
		1	49	22.55	22.72	22.70	24.00
		25	0	21.91	21.72	21.70	23.00
		25	13	21.78	21.60	21.77	23.00
		25	25	21.86	21.61	21.66	23.00
		50	0	21.58	21.66	21.80	23.00
	16QAM	1	0	21.86	21.81	21.26	23.00
		1	25	21.09	21.47	21.34	23.00
		1	49	21.05	21.83	21.56	23.00
		25	0	20.68	20.65	20.65	22.00
		25	13	20.82	20.73	20.51	22.00
		25	25	20.80	20.56	20.62	22.00
		50	0	20.71	20.69	20.51	22.00
Bandwidth	Modulation	RB size	RB offset	Channel 18675	Channel 18900	Channel 19125	Tune up
15MHz	QPSK	1	0	22.56	22.88	22.70	24.00
		1	38	22.82	22.60	22.54	24.00
		1	74	22.80	22.76	22.77	24.00
		36	0	21.60	21.52	21.56	23.00
		36	18	21.56	21.50	21.39	23.00
		36	39	21.50	21.78	21.45	23.00
		75	0	21.68	21.53	21.40	23.00
	16QAM	1	0	21.28	21.45	21.11	23.00
		1	38	21.96	21.60	21.19	23.00
		1	74	21.30	21.34	21.10	23.00
		36	0	20.62	20.82	20.59	22.00
		36	18	20.60	20.67	20.62	22.00
		36	39	20.55	20.91	20.55	22.00
		75	0	20.69	20.83	20.68	22.00
Bandwidth	Modulation	RB size	RB offset	Channel 18700	Channel 18900	Channel 19100	Tune up
20MHz	QPSK	1	0	**23.09**	22.61	22.91	24.00
		1	50	22.75	22.61	22.76	24.00
		1	99	22.55	22.63	23.08	24.00
		50	0	21.66	21.92	21.77	23.00
		50	25	**21.93**	21.70	21.68	23.00
		50	50	21.81	21.78	21.52	23.00
		100	0	21.79	21.83	21.60	23.00
	16QAM	1	0	21.09	21.66	21.19	23.00
		1	50	21.62	21.86	21.74	23.00
		1	99	21.64	22.07	21.61	23.00
		50	0	20.99	21.01	20.86	22.00
		50	25	20.91	20.75	20.73	22.00
		50	50	21.01	20.92	20.63	22.00
		100	0	20.74	20.83	20.75	22.00

LTE Band 4				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 19957	Channel 20175	Channel 20393	Tune up
1.4MHz	QPSK	1	0	23.60	23.83	23.69	24.50
		1	2	24.06	23.97	23.68	24.50
		1	5	23.95	23.72	23.59	24.50
		3	0	23.57	23.86	24.08	24.50
		3	2	23.91	23.93	23.68	24.50
		3	3	23.45	23.78	24.06	24.50
		6	0	22.97	22.89	22.80	23.50
	16QAM	1	0	22.44	23.29	22.70	23.50
		1	2	22.82	23.22	23.10	23.50
		1	5	22.37	23.06	23.26	23.50
		3	0	22.55	22.98	22.78	23.50
		3	2	23.19	23.00	22.87	23.50
		3	3	22.50	23.13	22.87	23.50
		6	0	21.99	21.77	22.03	22.40
Bandwidth	Modulation	RB size	RB offset	Channel 19965	Channel 20175	Channel 20385	Tune up
3MHz	QPSK	1	0	23.93	24.07	23.96	24.50
		1	7	23.99	24.18	24.06	24.50
		1	14	23.72	24.09	24.01	24.50
		8	0	22.78	23.03	22.84	23.50
		8	4	22.84	22.92	22.92	23.50
		8	7	23.01	22.97	22.79	23.50
		15	0	22.76	22.85	22.90	23.50
	16QAM	1	0	22.81	22.43	22.54	23.50
		1	7	22.72	22.96	22.79	23.50
		1	14	22.90	23.12	22.25	23.50
		8	0	21.87	22.01	21.91	22.40
		8	4	22.00	21.91	21.92	22.40
		8	7	21.99	22.02	21.91	22.40
		15	0	21.90	21.85	21.90	22.40
Bandwidth	Modulation	RB size	RB offset	Channel 19975	Channel 20175	Channel 20375	Tune up
5MHz	QPSK	1	0	23.54	23.58	24.04	24.50
		1	13	23.50	23.67	23.97	24.50
		1	24	23.34	23.66	23.83	24.50
		12	0	22.80	22.76	22.91	23.50
		12	6	22.71	23.04	22.80	23.50
		12	13	22.76	22.84	23.02	23.50
		25	0	22.79	22.84	22.96	23.50
	16QAM	1	0	22.21	22.85	23.03	23.50
		1	13	22.64	22.45	22.52	23.50
		1	24	22.03	22.80	22.69	23.50
		12	0	21.90	21.61	21.82	22.40
		12	6	21.61	21.63	21.74	22.40
		12	13	21.77	21.55	21.83	22.40

		25	0	22.00	21.61	21.73	22.40
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20000	20175	20350	
10MHz	QPSK	1	0	23.55	23.68	24.08	24.50
		1	25	23.57	23.75	24.18	24.50
		1	49	23.40	23.68	24.00	24.50
		25	0	22.95	22.78	22.93	23.50
		25	13	22.89	23.17	22.90	23.50
		25	25	22.79	22.95	23.06	23.50
		50	0	22.81	22.90	23.16	23.50
	16QAM	1	0	22.38	22.86	23.04	23.50
		1	25	22.80	22.52	22.58	23.50
		1	49	22.09	22.99	22.88	23.50
		25	0	21.98	21.77	21.84	22.40
		25	13	21.73	21.68	21.78	22.40
		25	25	21.79	21.56	22.01	22.40
		50	0	22.11	21.82	21.75	22.40
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20025	20175	20325	
15MHz	QPSK	1	0	23.77	24.14	24.10	24.50
		1	38	23.66	23.66	23.98	24.50
		1	74	24.19	24.15	24.30	24.50
		36	0	23.28	22.82	22.97	23.50
		36	18	22.92	22.84	23.02	23.50
		36	39	22.85	22.89	22.92	23.50
		75	0	22.72	22.89	23.10	23.50
	16QAM	1	0	22.12	23.45	22.37	23.50
		1	38	22.51	22.48	22.46	23.50
		1	74	22.30	22.49	22.70	23.50
		36	0	21.68	21.88	22.08	22.40
		36	18	21.93	21.77	21.99	22.40
		36	39	21.73	21.93	22.14	22.40
		75	0	21.83	21.89	22.04	22.40
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20050	20175	20300	
20MHz	QPSK	1	0	23.89	23.96	**24.19**	24.50
		1	50	23.67	23.75	24.18	24.50
		1	99	23.86	23.59	23.91	24.50
		50	0	22.69	22.89	23.00	23.50
		50	25	22.98	22.75	**23.03**	23.50
		50	50	22.84	22.89	22.99	23.50
		100	0	22.81	22.81	22.91	23.50
	16QAM	1	0	22.89	21.95	22.10	23.50
		1	50	22.31	23.03	22.78	23.50
		1	99	22.81	22.97	22.26	23.50
		50	0	21.67	21.76	22.01	22.40
		50	25	21.64	21.71	22.03	22.40
		50	50	21.81	21.43	21.85	22.40
		100	0	21.63	21.81	21.91	22.40

LTE FDD Band 12				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 23017	Channel 23095	Channel 23173	Tune up
1.4MHz	QPSK	1	0	23.38	23.53	23.42	24.50
		1	2	23.50	23.51	23.56	24.50
		1	5	23.56	23.36	23.30	24.50
		3	0	23.49	23.64	23.69	24.50
		3	2	23.56	23.53	23.61	24.50
		3	3	23.65	23.59	23.64	24.50
		6	0	22.47	22.48	22.52	23.50
	16QAM	1	0	22.27	22.43	22.80	23.50
		1	2	22.27	22.69	22.57	23.50
		1	5	21.78	22.73	22.68	23.50
		3	0	22.24	22.95	22.72	23.50
		3	2	22.38	22.88	22.73	23.50
		3	3	22.68	22.61	22.79	23.50
		6	0	21.63	21.43	21.30	22.40
Bandwidth	Modulation	RB size	RB offset	Channel 23025	Channel 23095	Channel 23165	Tune up
3MHz	QPSK	1	0	23.57	23.51	23.67	24.50
		1	7	23.86	23.24	23.66	24.50
		1	14	23.69	23.16	23.23	24.50
		8	0	22.65	22.62	22.77	23.50
		8	4	22.71	22.55	22.59	23.50
		8	7	22.60	22.44	22.59	23.50
		15	0	22.72	22.56	22.52	23.50
	16QAM	1	0	21.89	22.05	21.93	23.50
		1	7	22.27	21.86	22.03	23.50
		1	14	23.26	21.78	21.97	23.50
		8	0	21.73	21.33	21.68	22.40
		8	4	21.97	21.46	21.63	22.40
		8	7	21.83	21.52	21.55	22.40
		15	0	21.78	21.46	21.51	22.40
Bandwidth	Modulation	RB size	RB offset	Channel 23035	Channel 23095	Channel 23155	Tune up
5MHz	QPSK	1	0	23.23	23.49	23.32	24.50
		1	13	23.43	23.08	23.56	24.50
		1	24	23.37	22.98	23.14	24.50
		12	0	22.53	22.51	22.53	23.50
		12	6	22.61	22.42	22.65	23.50
		12	13	22.51	22.46	22.32	23.50
		25	0	22.56	22.42	22.47	23.50
	16QAM	1	0	22.35	22.00	22.51	23.50
		1	13	22.28	22.32	23.11	23.50
		1	24	22.63	21.91	21.57	23.50
		12	0	21.40	21.39	21.51	22.40
		12	6	21.59	21.29	21.74	22.40
		12	13	21.65	21.19	21.52	22.40
		25	0	21.60	21.46	21.50	22.40
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up

				23060	23095	23130	
10MHz	QPSK	1	0	23.47	23.75	23.35	24.50
		1	25	**23.82**	23.11	23.81	24.50
		1	49	23.46	23.01	23.39	24.50
		25	0	22.75	22.69	22.62	23.50
		25	13	**22.95**	22.80	22.93	23.50
		25	25	22.63	22.50	22.59	23.50
		50	0	22.99	22.44	22.64	23.50
	16QAM	1	0	22.77	22.17	22.74	23.50
		1	25	22.30	22.40	22.43	23.50
		1	49	22.90	22.40	21.98	23.50
		25	0	21.49	21.78	21.72	22.40
		25	13	21.64	21.72	21.80	22.40
		25	25	22.12	21.39	21.53	22.40
		50	0	21.92	21.72	21.52	22.40

LTE Band 66				**Conducted Power(dBm)**			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				131979	132322	132665	
1.4MHz	QPSK	1	0	23.83	24.04	23.61	24.50
		1	2	23.89	23.93	24.05	24.50
		1	5	23.94	23.94	23.95	24.50
		3	0	23.90	24.04	24.01	24.50
		3	2	24.01	24.25	24.16	24.50
		3	3	23.96	24.20	24.08	24.50
		6	0	22.93	23.07	22.87	23.50
	16QAM	1	0	22.81	22.94	22.77	23.50
		1	2	22.50	22.48	22.50	23.50
		1	5	22.40	22.55	22.23	23.50
		3	0	22.89	23.27	23.04	23.50
		3	2	22.97	23.39	23.13	23.50
		3	3	22.93	23.45	22.85	23.50
		6	0	21.93	21.77	21.94	22.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				131987	132322	132657	
3MHz	QPSK	1	0	24.11	24.31	24.04	24.50
		1	7	23.72	23.66	23.56	24.50
		1	14	24.11	24.32	24.04	24.50
		8	0	22.82	23.05	22.89	23.50
		8	4	22.94	23.12	22.98	23.50
		8	7	22.84	23.17	22.91	23.50
		15	0	22.87	23.12	23.00	23.50
	16QAM	1	0	22.88	22.21	22.13	23.50
		1	7	22.05	22.47	22.20	23.50
		1	14	22.92	22.45	21.82	23.50
		8	0	21.68	21.82	21.95	22.50
		8	4	21.72	22.06	21.95	22.50
		8	7	21.71	22.11	21.97	22.50
		15	0	21.78	22.06	21.95	22.50

Bandwidth	Modulation	RB size	RB offset	Channel 131997	Channel 132322	Channel 132647	Tune up
5MHz	QPSK	1	0	23.80	23.99	23.99	24.50
		1	13	23.69	23.95	23.50	24.50
		1	24	24.12	24.33	23.97	24.50
		12	0	23.08	23.09	22.82	23.50
		12	6	22.77	22.95	22.66	23.50
		12	13	23.08	23.33	22.93	23.50
		25	0	22.97	23.06	22.89	23.50
	16QAM	1	0	22.80	22.47	22.21	23.50
		1	13	22.86	22.62	22.88	23.50
		1	24	22.70	22.46	22.78	23.50
		12	0	21.70	21.62	21.72	22.50
		12	6	21.70	21.93	21.52	22.50
		12	13	21.72	21.66	21.64	22.50
		25	0	21.90	21.80	21.68	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 132022	Channel 132322	Channel 132622	Tune up
10MHz	QPSK	1	0	23.93	24.11	23.66	24.50
		1	25	24.08	24.23	24.09	24.50
		1	49	24.27	24.25	24.19	24.50
		25	0	23.02	23.17	22.94	23.50
		25	13	22.75	23.02	22.68	23.50
		25	25	23.09	23.33	22.89	23.50
		50	0	23.06	23.14	22.90	23.50
	16QAM	1	0	22.50	22.42	22.17	23.50
		1	25	22.46	22.51	22.67	23.50
		1	49	22.27	22.48	22.43	23.50
		25	0	21.84	22.06	21.67	22.50
		25	13	21.68	21.96	21.62	22.50
		25	25	21.72	22.05	21.80	22.50
		50	0	21.75	22.07	21.87	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 132047	Channel 132322	Channel 132597	Tune up
15MHz	QPSK	1	0	23.90	24.09	23.96	24.50
		1	38	23.93	24.09	23.54	24.50
		1	74	24.27	24.11	23.75	24.50
		36	0	22.81	23.25	22.90	23.50
		36	18	22.80	22.97	22.71	23.50
		36	39	23.32	23.30	22.89	23.50
		75	0	22.95	23.11	22.91	23.50
	16QAM	1	0	22.96	22.38	22.89	23.50
		1	38	22.91	22.59	22.29	23.50
		1	74	22.88	22.45	22.39	23.50
		36	0	21.82	21.99	21.77	22.50
		36	18	21.87	21.95	21.64	22.50
		36	39	21.83	22.05	21.64	22.50
		75	0	22.03	22.02	21.69	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 132072	Channel 132322	Channel 132572	Tune up
20MHz	QPSK	1	0	24.03	24.18	23.89	24.50

		1	50	24.19	**24.35**	23.72	24.50
		1	99	23.99	24.01	23.70	24.50
		50	0	22.86	**23.08**	22.81	23.50
		50	25	22.73	22.95	22.52	23.50
		50	50	23.03	23.06	22.61	23.50
		100	0	22.81	22.93	22.73	23.50
	16QAM	1	0	22.44	22.52	22.30	23.50
		1	50	22.65	22.50	22.22	23.50
		1	99	22.69	22.46	22.37	23.50
		50	0	21.92	22.02	21.79	22.50
		50	25	21.84	21.98	21.71	22.50
		50	50	21.80	21.98	21.65	22.50
		100	0	21.79	21.88	21.78	22.50

LTE Band 71				**Conducted Power(dBm)**			
Bandwidth	Modulation	RB size	RB offset	Channel 133147	Channel 133297	Channel 133447	Tune up
5MHz	QPSK	1	0	22.93	22.86	22.90	24.00
		1	13	22.70	22.35	22.28	24.00
		1	24	22.87	22.91	22.38	24.00
		12	0	21.61	21.85	21.73	23.00
		12	6	21.73	21.49	21.46	23.00
		12	13	21.97	21.96	21.84	23.00
		25	0	21.78	21.81	21.67	23.00
	16QAM	1	0	21.32	21.32	21.05	23.00
		1	13	21.73	21.82	21.81	23.00
		1	24	21.63	21.23	21.06	23.00
		12	0	20.62	20.80	20.84	22.00
		12	6	20.66	20.85	20.94	22.00
		12	13	20.73	20.80	20.66	22.00
		25	0	20.78	20.81	20.60	22.00
Bandwidth	Modulation	RB size	RB offset	Channel 133172	Channel 133297	Channel 133422	Tune up
10MHz	QPSK	1	0	22.76	22.86	22.93	24.00
		1	25	22.62	22.23	22.73	24.00
		1	49	22.65	22.91	22.63	24.00
		25	0	21.87	21.99	21.89	23.00
		25	13	21.57	21.57	21.57	23.00
		25	25	21.73	21.79	21.62	23.00
		50	0	21.78	21.86	21.70	23.00
	16QAM	1	0	21.14	21.19	21.15	23.00
		1	25	21.46	21.11	21.55	23.00
		1	49	21.06	21.03	21.14	23.00
		25	0	20.78	20.86	20.90	22.00
		25	13	20.69	21.03	20.94	22.00
		25	25	20.84	20.94	20.52	22.00
		50	0	20.69	20.87	20.83	22.00
Bandwidth	Modulation	RB size	RB offset	Channel 133197	Channel 133297	Channel 133397	Tune up

15MHz	QPSK	1	0	22.77	22.90	22.79	24.00
		1	38	22.51	22.58	22.73	24.00
		1	74	22.90	22.89	22.71	24.00
		36	0	21.67	21.87	21.63	23.00
		36	18	21.59	21.43	21.75	23.00
		36	39	21.78	21.83	21.68	23.00
		75	0	21.75	21.84	21.77	23.00
	16QAM	1	0	21.33	21.10	21.81	23.00
		1	38	21.10	21.15	21.22	23.00
		1	74	21.11	21.10	21.14	23.00
		36	0	20.69	20.92	20.81	22.00
		36	18	20.91	20.93	20.92	22.00
		36	39	20.81	20.85	20.70	22.00
		75	0	20.76	20.87	20.69	22.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				133222	133297	133372	
20MHz	QPSK	1	0	**22.77**	22.61	22.76	24.00
		1	50	22.50	22.26	22.64	24.00
		1	99	22.35	22.55	22.63	24.00
		50	0	22.02	21.95	21.63	23.00
		50	25	**22.05**	21.53	21.78	23.00
		50	50	21.57	21.82	22.03	23.00
		100	0	21.81	21.75	21.59	23.00
	16QAM	1	0	21.48	21.47	21.68	23.00
		1	50	21.90	21.98	21.85	23.00
		1	99	21.67	21.07	21.21	23.00
		50	0	20.93	20.99	20.85	22.00
		50	25	20.68	20.97	20.82	22.00
		50	50	20.74	20.82	20.72	22.00
		100	0	20.83	20.87	20.74	22.00

Table 10：Conducted Power of LTE.

5.3.3 Conducted Power of WIFI and BT

Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Tune up	Average Power (dBm)	SAR Test
802.11b	1	2412	1	14	12.62	No
	6	2437		14	**13.32**	Yes
	11	2462		14	12.41	No
802.11g	1	2412	6	13	11.63	No
	6	2437		13	12.33	No
	11	2462		13	11.47	No
802.11n HT20 SISO	1	2412	6.5	13	11.62	No
	6	2437		13	12.25	No
	11	2462		13	12.41	No

Table 11：Conducted Power of WIFI.

Note:
a) Power must be measured at each transmit antenna port according to the DSSS and OFDM transmission configurations in each standalone and aggregated frequency band.
b) Power measurement is required for the transmission mode configuration with the highest maximum output power specified for production units.
1) When the same highest maximum output power specification applies to multiple transmission modes, the largest channel bandwidth configuration with the lowest order modulation and lowest data rate is measured.
2) When the same highest maximum output power is specified for multiple largest channel bandwidth configurations with the same lowest order modulation or lowest order modulation and lowest data rate, power measurement is required for all equivalent 802.11 configurations with the same maximum output power.
c) For each transmission mode configuration, power must be measured for the highest and lowest channels; and at the mid-band channel(s) when there are at least 3 channels. For configurations with multiple mid-band channels, due to an even number of channels, both channels should be measured.

BT			Tune up (dBm)	Average Conducted Power(dBm)
Modulation	Channel	Frequency(MHz)		
GFSK	0	2402	6.00	4.66
	39	2441	6.00	4.02
	78	2480	6.00	3.61
π/4DQPSK	0	2402	6.00	3.21
	39	2441	6.00	2.61
	78	2480	6.00	2.08
8DPSK	0	2402	6.00	3.24
	39	2441	6.00	2.63
	78	2480	6.00	2.11

BLE			Tune up (dBm)	Average Conducted Power(dBm)
Modulation	Channel	Frequency(MHz)		
GFSK	0	2402	1.00	0.08
	19	2440	1.00	-0.30
	39	2480	1.00	-0.61

Table 12：Conducted Power of BT.

5.4 Measurement of SAR Data

5.4.1 SAR Result of WCDMA Band II

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift(dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp. (℃)
Head Test data										
Left cheek	RMC	9400/1880	1:1	0.452	-0.04	22.83	23.70	1.222	**0.552**	22.3
Left tilted	RMC	9400/1880	1:1	0.173	-0.01	22.83	23.70	1.222	0.211	22.3
Right cheek	RMC	9400/1880	1:1	0.323	-0.07	22.83	23.70	1.222	0.395	22.3
Right tilted	RMC	9400/1880	1:1	0.177	-0.01	22.83	23.70	1.222	0.216	22.3
Body worn Test data(Separate 15mm)										
Front side	RMC	9400/1880	1:1	0.287	0.11	22.83	23.70	1.222	**0.351**	22.3
Back side	RMC	9400/1880	1:1	0.262	0.07	22.83	23.70	1.222	0.320	22.3
Hotspot Test data(Separate 10mm)										
Front side	RMC	9400/1880	1:1	0.534	0.08	22.83	23.70	1.222	**0.652**	22.3
Back side	RMC	9400/1880	1:1	0.526	0.03	22.83	23.70	1.222	0.643	22.3
Left side	RMC	9400/1880	1:1	0.309	0.00	22.83	23.70	1.222	0.378	22.3
Right side	RMC	9400/1880	1:1	0.178	-0.12	22.83	23.70	1.222	0.217	22.3
Bottom side	RMC	9400/1880	1:1	0.391	0.08	22.83	23.70	1.222	0.478	22.3

Table 13：SAR of WCDMA Band II for Head and Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

5.4.2 SAR Result of WCDMA Band IV

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift(dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp. (℃)
Head Test data										
Left cheek	RMC	1412/1732.4	1:1	0.285	-0.04	23.38	23.70	1.076	0.307	22.2
Left tilted	RMC	1412/1732.4	1:1	0.139	0.07	23.38	23.70	1.076	0.150	22.2
Right cheek	RMC	1412/1732.4	1:1	0.394	0.02	23.38	23.70	1.076	**0.424**	22.2
Right tilted	RMC	1412/1732.4	1:1	0.082	0.09	23.38	23.70	1.076	0.089	22.2
Body worn Test data(Separate 15mm)										
Front side	RMC	1412/1732.4	1:1	0.233	-0.10	23.38	23.70	1.076	0.251	22.2
Back side	RMC	1412/1732.4	1:1	0.339	-0.01	23.38	23.70	1.076	**0.365**	22.2
Hotspot Test data(Separate 10mm)										
Front side	RMC	1412/1732.4	1:1	0.441	-0.02	23.38	23.70	1.076	0.475	22.2
Back side	RMC	1412/1732.4	1:1	0.713	-0.17	23.38	23.70	1.076	**0.768**	22.2
Left side	RMC	1412/1732.4	1:1	0.268	0.07	23.38	23.70	1.076	0.288	22.2
Right side	RMC	1412/1732.4	1:1	0.223	0.09	23.38	23.70	1.076	0.240	22.2
Bottom side	RMC	1412/1732.4	1:1	0.500	0.06	23.38	23.70	1.076	0.538	22.2

Table 14： SAR of WCDMA Band IV for Head and Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

5.4.3 SAR Result of WCDMA Band V

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp. (℃)
Head Test data										
Left cheek	RMC	4182/836.4	1:1	0.229	0.02	22.25	23.70	1.396	0.320	22.1
Left tilted	RMC	4182/836.4	1:1	0.158	-0.03	22.25	23.70	1.396	0.221	22.1
Right cheek	RMC	4182/836.4	1:1	0.259	0.07	22.25	23.70	1.396	**0.362**	22.1
Right tilted	RMC	4182/836.4	1:1	0.185	0.02	22.25	23.70	1.396	0.258	22.1
Body worn Test data(Separate 15mm)										
Front side	RMC	4182/836.4	1:1	0.276	0.00	22.25	23.70	1.396	0.385	22.1
Back side	RMC	4182/836.4	1:1	0.317	-0.09	22.25	23.70	1.396	**0.443**	22.1
Hotspot Test data(Separate 10mm)										
Front side	RMC	4182/836.4	1:1	0.293	-0.01	22.25	23.70	1.396	0.409	22.1
Back side	RMC	4182/836.4	1:1	0.359	-0.04	22.25	23.70	1.396	**0.501**	22.1
Left side	RMC	4182/836.4	1:1	0.233	-0.06	22.25	23.70	1.396	0.325	22.1
Right side	RMC	4182/836.4	1:1	0.328	0.10	22.25	23.70	1.396	0.458	22.1
Bottom side	RMC	4182/836.4	1:1	0.066	0.09	22.25	23.70	1.396	0.092	22.1

Table 15：SAR of WCDMA Band V for Head and Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

5.4.4 SAR Result of LTE Band 2

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp. (℃)
Head Test data(1RB)											
Left cheek	20	QPSK 1RB_0	18700/1860	1:1	0.527	0.03	23.09	24.00	1.233	**0.650**	22.3
Left tilted	20	QPSK 1RB_0	18700/1860	1:1	0.222	0.19	23.09	24.00	1.233	0.274	22.3
Right cheek	20	QPSK 1RB_0	18700/1860	1:1	0.374	-0.06	23.09	24.00	1.233	0.461	22.3
Right tilted	20	QPSK 1RB_0	18700/1860	1:1	0.260	-0.03	23.09	24.00	1.233	0.321	22.3
Head Test data(50%RB)											
Left cheek	20	QPSK 50RB_25	18700/1860	1:1	0.429	0.05	21.93	23.00	1.279	0.549	22.3
Left tilted	20	QPSK 50RB_25	18700/1860	1:1	0.183	-0.05	21.93	23.00	1.279	0.234	22.3
Right cheek	20	QPSK 50RB_25	18700/1860	1:1	0.294	0.04	21.93	23.00	1.279	0.376	22.3
Right tilted	20	QPSK 50RB_25	18700/1860	1:1	0.207	-0.05	21.93	23.00	1.279	0.265	22.3
Body worn Test data(Separate 15mm 1RB)											
Front side	20	QPSK 1RB_0	18700/1860	1:1	0.350	-0.07	23.09	24.00	1.233	**0.432**	22.3
Back side	20	QPSK 1RB_0	18700/1860	1:1	0.298	-0.06	23.09	24.00	1.233	0.367	22.3
Body worn Test data (Separate 15mm 50%RB)											
Front side	20	QPSK 50RB_25	18700/1860	1:1	0.272	0.05	21.93	23.00	1.279	0.348	22.3
Back side	20	QPSK 50RB_25	18700/1860	1:1	0.237	0.03	21.93	23.00	1.279	0.303	22.3
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1RB_0	18700/1860	1:1	0.602	0.02	23.09	24.00	1.233	**0.742**	22.3
Back side	20	QPSK 1RB_0	18700/1860	1:1	0.602	-0.06	23.09	24.00	1.233	0.742	22.3
Left side	20	QPSK 1RB_0	18700/1860	1:1	0.380	0.01	23.09	24.00	1.233	0.469	22.3
Right side	20	QPSK 1RB_0	18700/1860	1:1	0.192	-0.04	23.09	24.00	1.233	0.237	22.3
Bottom side	20	QPSK 1RB_0	18700/1860	1:1	0.471	-0.09	23.09	24.00	1.233	0.581	22.3
Hotspot Test data (Separate 10mm 50%RB)											
Front side	20	QPSK 50RB_25	18700/1860	1:1	0.479	0.13	21.93	23.00	1.279	0.613	22.3
Back side	20	QPSK 50RB_25	18700/1860	1:1	0.481	0.06	21.93	23.00	1.279	0.615	22.3
Left side	20	QPSK 50RB_25	18700/1860	1:1	0.309	0.02	21.93	23.00	1.279	0.395	22.3
Right side	20	QPSK 50RB_25	18700/1860	1:1	0.159	-0.12	21.93	23.00	1.279	0.203	22.3
Bottom side	20	QPSK 50RB_25	18700/1860	1:1	0.369	-0.15	21.93	23.00	1.279	0.472	22.3

Table 16：SAR of LTE Band 2 for Head and Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

5.4.5 SAR Result of LTE Band 4

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp. (℃)
Head Test data(1RB)											
Left cheek	20	QPSK 1RB_0	20300/1745	1:1	0.214	-0.02	24.19	24.50	1.074	0.230	22.2
Left tilted	20	QPSK 1RB_0	20300/1745	1:1	0.139	0.02	24.19	24.50	1.074	0.149	22.2
Right cheek	20	QPSK 1RB_0	20300/1745	1:1	0.358	0.05	24.19	24.50	1.074	**0.384**	22.2
Right tilted	20	QPSK 1RB_0	20300/1745	1:1	0.091	0.03	24.19	24.50	1.074	0.097	22.2
Head Test data(50%RB)											
Left cheek	20	QPSK 50RB_25	20300/1745	1:1	0.157	0.17	23.03	23.50	1.114	0.175	22.2
Left tilted	20	QPSK 50RB_25	20300/1745	1:1	0.093	0.05	23.03	23.50	1.114	0.103	22.2
Right cheek	20	QPSK 50RB_25	20300/1745	1:1	0.290	0.09	23.03	23.50	1.114	0.323	22.2
Right tilted	20	QPSK 50RB_25	20300/1745	1:1	0.078	0.03	23.03	23.50	1.114	0.087	22.2
Body worn Test data(Separate 15mm 1RB)											
Front side	20	QPSK 1RB_0	20300/1745	1:1	0.253	0.03	24.19	24.50	1.074	0.272	22.2
Back side	20	QPSK 1RB_0	20300/1745	1:1	0.371	-0.02	24.19	24.50	1.074	**0.398**	22.2
Body worn Test data (Separate 15mm 50%RB)											
Front side	20	QPSK 50RB_25	20300/1745	1:1	0.231	-0.13	23.03	23.50	1.114	0.257	22.2
Back side	20	QPSK 50RB_25	20300/1745	1:1	0.321	-0.09	23.03	23.50	1.114	0.358	22.2
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1RB_0	20300/1745	1:1	0.611	0.06	24.19	24.50	1.074	0.656	22.2
Back side	20	QPSK 1RB_0	20300/1745	1:1	0.709	-0.12	24.19	24.50	1.074	**0.761**	22.2
Left side	20	QPSK 1RB_0	20300/1745	1:1	0.327	-0.03	24.19	24.50	1.074	0.351	22.2
Right side	20	QPSK 1RB_0	20300/1745	1:1	0.258	0.05	24.19	24.50	1.074	0.277	22.2
Bottom side	20	QPSK 1RB_0	20300/1745	1:1	0.528	0.05	24.19	24.50	1.074	0.567	22.2
Hotspot Test data (Separate 10mm 50%RB)											
Front side	20	QPSK 50RB_25	20300/1745	1:1	0.519	-0.12	23.03	23.50	1.114	0.578	22.2
Back side	20	QPSK 50RB_25	20300/1745	1:1	0.606	0.09	23.03	23.50	1.114	0.675	22.2
Left side	20	QPSK 50RB_25	20300/1745	1:1	0.272	-0.08	23.03	23.50	1.114	0.303	22.2
Right side	20	QPSK 50RB_25	20300/1745	1:1	0.209	-0.16	23.03	23.50	1.114	0.233	22.2
Bottom side	20	QPSK 50RB_25	20300/1745	1:1	0.428	-0.01	23.03	23.50	1.114	0.477	22.2

Table 17：SAR of LTE Band 4 for Head and Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s)

5.4.6 SAR Result of LTE Band 12

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp. (℃)
Head Test data(1RB)											
Left cheek	10	QPSK 1RB_25	23060/704	1:1	0.343	0.14	23.82	24.50	1.169	0.401	22.1
Left tilted	10	QPSK 1RB_25	23060/704	1:1	0.192	0.07	23.82	24.50	1.169	0.225	22.1
Right cheek	10	QPSK 1RB_25	23060/704	1:1	0.359	0.03	23.82	24.50	1.169	**0.420**	22.1
Right tilted	10	QPSK 1RB_25	23060/704	1:1	0.219	-0.04	23.82	24.50	1.169	0.256	22.1
Head Test data(50%RB)											
Left cheek	10	QPSK 25RB_13	23060/704	1:1	0.278	0.04	22.95	23.50	1.135	0.316	22.1
Left tilted	10	QPSK 25RB_13	23060/704	1:1	0.153	0.07	22.95	23.50	1.135	0.174	22.1
Right cheek	10	QPSK 25RB_13	23060/704	1:1	0.297	0.02	22.95	23.50	1.135	0.337	22.1
Right tilted	10	QPSK 25RB_13	23060/704	1:1	0.174	0.19	22.95	23.50	1.135	0.197	22.1
Body worn Test data(Separate 15mm 1RB)											
Front side	10	QPSK 1RB_25	23060/704	1:1	0.299	0.02	23.82	24.50	1.169	0.350	22.1
Back side	10	QPSK 1RB_25	23060/704	1:1	0.362	-0.14	23.82	24.50	1.169	**0.423**	22.1
Body worn Test data (Separate 15mm 50%RB)											
Front side	10	QPSK 25RB_13	23060/704	1:1	0.245	0.05	22.95	23.50	1.135	0.278	22.1
Back side	10	QPSK 25RB_13	23060/704	1:1	0.292	0.00	22.95	23.50	1.135	0.331	22.1
Hotspot Test data(Separate 10mm 1RB)											
Front side	10	QPSK 1RB_25	23060/704	1:1	0.375	0.10	23.82	24.50	1.169	0.439	22.1
Back side	10	QPSK 1RB_25	23060/704	1:1	0.460	0.00	23.82	24.50	1.169	**0.538**	22.1
Left side	10	QPSK 1RB_25	23060/704	1:1	0.249	0.14	23.82	24.50	1.169	0.291	22.1
Right side	10	QPSK 1RB_25	23060/704	1:1	0.321	-0.02	23.82	24.50	1.169	0.375	22.1
Bottom side	10	QPSK 1RB_25	23060/704	1:1	0.046	0.05	23.82	24.50	1.169	0.054	22.1
Hotspot Test data (Separate 10mm 50%RB)											
Front side	10	QPSK 25RB_13	23060/704	1:1	0.310	0.02	22.95	23.50	1.135	0.352	22.1
Back side	10	QPSK 25RB_13	23060/704	1:1	0.383	0.02	22.95	23.50	1.135	0.435	22.1
Left side	10	QPSK 25RB_13	23060/704	1:1	0.211	0.01	22.95	23.50	1.135	0.239	22.1
Right side	10	QPSK 25RB_13	23060/704	1:1	0.260	0.02	22.95	23.50	1.135	0.295	22.1
Bottom side	10	QPSK 25RB_13	23060/704	1:1	0.038	0.13	22.95	23.50	1.135	0.043	22.1

Table 18：SAR of LTE Band 12 for Head and Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s)

5.4.7 SAR Result of LTE Band 66

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp. (℃)
Head Test data(1RB)											
Left cheek	20	QPSK 1RB_50	132322/1745	1:1	0.350	0.01	24.35	24.50	1.035	0.362	22.1
Left tilted	20	QPSK 1RB_50	132322/1745	1:1	0.131	0.06	24.35	24.50	1.035	0.136	22.1
Right cheek	20	QPSK 1RB_50	132322/1745	1:1	0.415	-0.04	24.35	24.50	1.035	**0.430**	22.1
Right tilted	20	QPSK 1RB_50	132322/1745	1:1	0.115	0.04	24.35	24.50	1.035	0.119	22.1
Head Test data(50%RB)											
Left cheek	20	QPSK 50RB_0	132322/1745	1:1	0.229	0.02	23.08	23.50	1.102	0.252	22.1
Left tilted	20	QPSK 50RB_0	132322/1745	1:1	0.108	0.01	23.08	23.50	1.102	0.119	22.1
Right cheek	20	QPSK 50RB_0	132322/1745	1:1	0.341	0.02	23.08	23.50	1.102	0.376	22.1
Right tilted	20	QPSK 50RB_0	132322/1745	1:1	0.089	0.08	23.08	23.50	1.102	0.098	22.1
Body worn Test data(Separate 15mm 1RB)											
Front side	20	QPSK 1RB_50	132322/1745	1:1	0.274	-0.15	24.35	24.50	1.035	0.284	22.1
Back side	20	QPSK 1RB_50	132322/1745	1:1	0.379	0.07	24.35	24.50	1.035	**0.392**	22.1
Body worn Test data (Separate 15mm 50%RB)											
Front side	20	QPSK 50RB_0	132322/1745	1:1	0.213	0.05	23.08	23.50	1.102	0.235	22.1
Back side	20	QPSK 50RB_0	132322/1745	1:1	0.302	0.10	23.08	23.50	1.102	0.333	22.1
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1RB_50	132322/1745	1:1	0.609	-0.09	24.35	24.50	1.035	0.630	22.1
Back side	20	QPSK 1RB_50	132322/1745	1:1	0.771	-0.06	24.35	24.50	1.035	**0.798**	22.1
Left side	20	QPSK 1RB_50	132322/1745	1:1	0.334	-0.13	24.35	24.50	1.035	0.346	22.1
Right side	20	QPSK 1RB_50	132322/1745	1:1	0.248	0.12	24.35	24.50	1.035	0.257	22.1
Bottom side	20	QPSK 1RB_50	132322/1745	1:1	0.55	-0.05	24.35	24.50	1.035	0.569	22.1
Hotspot Test data (Separate 10mm 50%RB)											
Front side	20	QPSK 50RB_0	132322/1745	1:1	0.492	-0.07	23.08	23.50	1.102	0.542	22.1
Back side	20	QPSK 50RB_0	132322/1745	1:1	0.598	0.00	23.08	23.50	1.102	0.659	22.1
Left side	20	QPSK 50RB_0	132322/1745	1:1	0.261	0.10	23.08	23.50	1.102	0.288	22.1
Right side	20	QPSK 50RB_0	132322/1745	1:1	0.201	-0.14	23.08	23.50	1.102	0.221	22.1
Bottom side	20	QPSK 50RB_0	132322/1745	1:1	0.444	-0.02	23.08	23.50	1.102	0.489	22.1

Table 19：SAR of LTE Band 66 for Head and Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s)

5.4.8 SAR Result of LTE Band 71

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp. (℃)
Head Test data(1RB)											
Left cheek	20	QPSK 1RB_0	133222/673	1:1	0.209	0.03	22.77	24.00	1.327	0.277	22.1
Left tilted	20	QPSK 1RB_0	133222/673	1:1	0.094	0.02	22.77	24.00	1.327	0.125	22.1
Right cheek	20	QPSK 1RB_0	133222/673	1:1	0.219	0.06	22.77	24.00	1.327	**0.291**	22.1
Right tilted	20	QPSK 1RB_0	133222/673	1:1	0.096	0.04	22.77	24.00	1.327	0.127	22.1
Head Test data(50%RB)											
Left cheek	20	QPSK 50RB_0	133222/673	1:1	0.17	0.03	22.05	23.00	1.245	0.212	22.1
Left tilted	20	QPSK 50RB_0	133222/673	1:1	0.0774	0.05	22.05	23.00	1.245	0.096	22.1
Right cheek	20	QPSK 50RB_0	133222/673	1:1	0.17	0.07	22.05	23.00	1.245	0.212	22.1
Right tilted	20	QPSK 50RB_0	133222/673	1:1	0.077	0.18	22.05	23.00	1.245	0.096	22.1
Body worn Test data(Separate 15mm 1RB)											
Front side	20	QPSK 1RB_50	133222/673	1:1	0.115	-0.18	22.77	24.00	1.327	0.153	22.1
Back side	20	QPSK 1RB_50	133222/673	1:1	0.152	0.03	22.77	24.00	1.327	**0.202**	22.1
Body worn Test data (Separate 15mm 50%RB)											
Front side	20	QPSK 50RB_25	133222/673	1:1	0.098	0.07	22.05	23.00	1.245	0.122	22.1
Back side	20	QPSK 50RB_25	133222/673	1:1	0.127	0.03	22.05	23.00	1.245	0.158	22.1
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1RB_50	133222/673	1:1	0.185	0.03	22.77	24.00	1.327	0.246	22.1
Back side	20	QPSK 1RB_50	133222/673	1:1	0.268	0.05	22.77	24.00	1.327	**0.356**	22.1
Left side	20	QPSK 1RB_50	133222/673	1:1	0.0677	-0.06	22.77	24.00	1.327	0.090	22.1
Right side	20	QPSK 1RB_50	133222/673	1:1	0.125	0.14	22.77	24.00	1.327	0.166	22.1
Bottom side	20	QPSK 1RB_50	133222/673	1:1	0.0366	0.12	22.77	24.00	1.327	0.049	22.1
Hotspot Test data (Separate 10mm 50%RB)											
Front side	20	QPSK 50RB_25	133222/673	1:1	0.150	0.05	22.05	23.00	1.245	0.187	22.1
Back side	20	QPSK 50RB_25	133222/673	1:1	0.213	-0.01	22.05	23.00	1.245	0.265	22.1
Left side	20	QPSK 50RB_25	133222/673	1:1	0.0576	0.05	22.05	23.00	1.245	0.072	22.1
Right side	20	QPSK 50RB_25	133222/673	1:1	0.102	0.01	22.05	23.00	1.245	0.127	22.1
Bottom side	20	QPSK 50RB_25	133222/673	1:1	0.0289	0.01	22.05	23.00	1.245	0.036	22.1

Table 20：SAR of LTE Band 71 for Head and Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s)

5.4.9 SAR Result of WIFI 2.4GHz

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	Power drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp. (℃)
Head Test data											
Left cheek	802.11b	6/2437	97.62%	1.024	0.350	-0.04	13.32	14.00	1.169	**0.419**	22
Left tilted	802.11b	6/2437	97.62%	1.024	0.222	-0.16	13.32	14.00	1.169	0.266	22
Right cheek	802.11b	6/2437	97.62%	1.024	0.289	0.02	13.32	14.00	1.169	0.346	22
Right tilted	802.11b	6/2437	97.62%	1.024	0.202	-0.18	13.32	14.00	1.169	0.242	22
Body worn Test data(Separate 15mm)											
Front side	802.11b	6/2437	97.62%	1.024	0.049	-0.10	13.32	14.00	1.169	**0.059**	22
Back side	802.11b	6/2437	97.62%	1.024	0.047	-0.02	13.32	14.00	1.169	0.056	22
Hotspot Test data (Separate 10mm)											
Front side	802.11b	6/2437	97.62%	1.024	0.090	0.08	13.32	14.00	1.169	**0.107**	22
Back side	802.11b	6/2437	97.62%	1.024	0.075	-0.01	13.32	14.00	1.169	0.090	22
Left side	802.11b	6/2437	97.62%	1.024	0.022	-0.18	13.32	14.00	1.169	0.026	22
Right side	802.11b	6/2437	97.62%	1.024	0.035	-0.04	13.32	14.00	1.169	0.042	22
Top side	802.11b	6/2437	97.62%	1.024	0.061	0.04	13.32	14.00	1.169	0.073	22

Table 21：SAR of WIFI 2.4GHz for Head and Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix B

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3) Per KDB248227D01, for Body SAR test of WiFi 2.4G, SAR is measured for 2.4 GHz 802.11b DSSS using the initial test position procedure.The highest reported SAR for DSSS is adjusted by the ratio of OFDM 802.11g/n to DSSS specified maximum output power and the adjusted SAR is < 1.2 W/kg, so SAR for 802.11g/n is not required.

Mode	Tune-up (dBm)	Tune-up (mw)	Max Reported SAR1-g(W/kg)	Adjusted SAR1-g(W/kg)	SAR test
Head					
802.11b	14.00	25.12	0.419	/	Yes
802.11g	13.00	19.95	/	0.333	No
802.1n 20M	13.00	19.95	/	0.333	No
Body worn					
802.11b	14.00	25.12	0.059	/	Yes
802.11g	13.00	19.95	/	0.047	No
802.1n 20M	13.00	19.95	/	0.047	No
Hotspot					
802.11b	14.00	25.12	0.107	/	Yes
802.11g	13.00	19.95	/	0.085	No
802.1n 20M	13.00	19.95	/	0.085	No

5.5 Multiple Transmitter Evaluation

5.5.1 Simultaneous SAR SAR test evaluation

1) Simultaneous Transmission

NO.	Simultaneous Transmission Configuration	Head	Body worn	Hotspot
3	WCDMA(Voice) + WiFi	Yes	Yes	No
4	WCDMA(Voice) + BT	Yes	Yes	No
7	WCDMA(Data) + WiFi	No	Yes	Yes
8	WCDMA(Data) + BT	No	Yes	Yes
9	LTE(Data) + WiFi	Yes	Yes	Yes
10	LTE(Data) + BT	Yes	Yes	Yes
11	BT+WIFI (They share the same antenna and cannot transmit at the same time by design.)	No	No	No

Note:

1) Wi-Fi 2.4G and Bluetooth share the same Tx antenna and can't transmit simultaneously.
2) * VoLTE or pre-installed VOIP applications are considered.
3) The Main Antenna and Second Antenna can't transmit simultaneously.
4) The device supports VoWIFI function.

5.5.2 Estimated SAR

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the 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.

• 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Estimated SAR Result

Freq. Band	Frequency (GHz)	Test Position	max. power(dBm)	Test Separation (mm)	Estimated 1g SAR (W/kg)
Bluetooth	2.48	Head	6.0	0	0.167
		Body-worn	6.0	15	0.056
		hotspot	6.0	10	0.084

2) Simultaneous Transmission SAR Summation Scenario for head

WWAN Band	Exposure position	① MAX.WWAN SAR(W/kg)	②MAX.WLAN SAR(W/kg)	③ MAX.BT SAR(W/kg)	Summed SAR①+②	Summed SAR①+③	Case NO.
WCDMA Band II	Left Touch	0.552	0.419	0.167	0.971	0.719	No
	Left Tilt	0.211	0.266	0.167	0.477	0.378	No
	Right Touch	0.395	0.346	0.167	0.741	0.562	No
	Right Tilt	0.216	0.242	0.167	0.458	0.383	No
WCDMA Band IV	Left Touch	0.307	0.419	0.167	0.726	0.474	No
	Left Tilt	0.150	0.266	0.167	0.416	0.317	No
	Right Touch	0.424	0.346	0.167	0.770	0.591	No
	Right Tilt	0.089	0.242	0.167	0.331	0.256	No
WCDMA Band V	Left Touch	0.320	0.419	0.167	0.739	0.487	No
	Left Tilt	0.221	0.266	0.167	0.487	0.388	No
	Right Touch	0.362	0.346	0.167	0.708	0.529	No
	Right Tilt	0.258	0.242	0.167	0.500	0.425	No
LTE Band 2	Left Touch	0.650	0.419	0.167	**1.069**	0.817	No
	Left Tilt	0.274	0.266	0.167	0.540	0.441	No
	Right Touch	0.461	0.346	0.167	0.807	0.628	No
	Right Tilt	0.321	0.242	0.167	0.563	0.488	No
LTE Band 4	Left Touch	0.230	0.419	0.167	0.649	0.397	No
	Left Tilt	0.149	0.266	0.167	0.415	0.316	No
	Right Touch	0.384	0.346	0.167	0.730	0.551	No
	Right Tilt	0.097	0.242	0.167	0.339	0.264	No
LTE Band 12	Left Touch	0.401	0.419	0.167	0.820	0.568	No
	Left Tilt	0.225	0.266	0.167	0.491	0.392	No
	Right Touch	0.420	0.346	0.167	0.766	0.587	No
	Right Tilt	0.256	0.242	0.167	0.498	0.423	No
LTE Band 66	Left Touch	0.362	0.419	0.167	0.781	0.529	No
	Left Tilt	0.136	0.266	0.167	0.402	0.303	No
	Right Touch	0.430	0.346	0.167	0.776	0.597	No
	Right Tilt	0.119	0.242	0.167	0.361	0.286	No
LTE Band 71	Left Touch	0.277	0.419	0.167	0.696	0.444	No
	Left Tilt	0.125	0.266	0.167	0.391	0.292	No
	Right Touch	0.291	0.346	0.167	0.637	0.458	No
	Right Tilt	0.127	0.242	0.167	0.369	0.294	No

3) Simultaneous Transmission SAR Summation Scenario for body worn

WWAN Band	Exposure position	① MAX.WWAN SAR(W/kg)	②MAX.WLAN SAR(W/kg)	③MAX.BT SAR(W/kg)	Summed SAR①+②	Summed SAR①+③	Case NO.
WCDMA Band II	Front	0.351	0.059	0.056	0.410	0.407	No
	Back	0.320	0.056	0.056	0.376	0.376	No
WCDMA Band IV	Front	0.251	0.059	0.056	0.310	0.307	No
	Back	0.365	0.056	0.056	0.421	0.421	No
WCDMA Band V	Front	0.385	0.059	0.056	0.444	0.441	No
	Back	0.443	0.056	0.056	**0.499**	0.499	No
LTE Band 2	Front	0.432	0.059	0.056	0.491	0.488	No
	Back	0.367	0.056	0.056	0.423	0.423	No
LTE Band 4	Front	0.272	0.059	0.056	0.331	0.328	No
	Back	0.398	0.056	0.056	0.454	0.454	No
LTE Band 12	Front	0.350	0.059	0.056	0.409	0.406	No
	Back	0.423	0.056	0.056	0.479	0.479	No
LTE Band 66	Front	0.284	0.059	0.056	0.343	0.340	No
	Back	0.392	0.056	0.056	0.448	0.448	No
LTE Band 71	Front	0.153	0.059	0.056	0.212	0.209	No
	Back	0.202	0.056	0.056	0.258	0.258	No

4) Simultaneous Transmission SAR Summation Scenario for hotspot

WWAN Band	Exposure position	① MAX.WWAN SAR(W/kg)	②MAX.WLAN SAR(W/kg)	③MAX.BT SAR(W/kg)	Summed SAR①+②	Summed SAR①+③	Case NO.
WCDMA Band II	Front	0.652	0.107	0.084	0.759	0.736	No
	Back	0.643	0.090	0.084	0.733	0.727	No
	Left	0.378	0.026	0.084	0.404	0.462	No
	Right	0.217	0.042	0.084	0.259	0.301	No
	Top	0.000	0.073	0.084	0.073	0.084	No
	Bottom	0.478	0.000	0.084	0.478	0.562	No
WCDMA Band IV	Front	0.475	0.107	0.084	0.582	0.559	No
	Back	0.768	0.090	0.084	0.858	0.852	No
	Left	0.288	0.026	0.084	0.314	0.372	No
	Right	0.240	0.042	0.084	0.282	0.324	No
	Top	0.000	0.073	0.084	0.073	0.084	No
	Bottom	0.538	0.000	0.084	0.538	0.622	No
WCDMA Band V	Front	0.409	0.107	0.084	0.516	0.493	No
	Back	0.501	0.090	0.084	0.591	0.585	No
	Left	0.325	0.026	0.084	0.351	0.409	No
	Right	0.458	0.042	0.084	0.500	0.542	No
	Top	0.000	0.073	0.084	0.073	0.084	No
	Bottom	0.092	0.000	0.084	0.092	0.176	No
LTE Band 2	Front	0.742	0.107	0.084	0.849	0.826	No
	Back	0.742	0.090	0.084	0.832	0.826	No
	Left	0.469	0.026	0.084	0.495	0.553	No
	Right	0.237	0.042	0.084	0.279	0.321	No
	Top	0.000	0.073	0.084	0.073	0.084	No
	Bottom	0.581	0.000	0.084	0.581	0.665	No
LTE Band 4	Front	0.656	0.107	0.084	0.763	0.740	No
	Back	0.761	0.090	0.084	0.851	0.845	No
	Left	0.351	0.026	0.084	0.377	0.435	No
	Right	0.277	0.042	0.084	0.319	0.361	No
	Top	0.000	0.073	0.084	0.073	0.084	No
	Bottom	0.567	0.000	0.084	0.567	0.651	No
LTE Band 12	Front	0.439	0.107	0.084	0.546	0.523	No
	Back	0.538	0.090	0.084	0.628	0.622	No
	Left	0.291	0.026	0.084	0.317	0.375	No
	Right	0.375	0.042	0.084	0.417	0.459	No
	Top	0.000	0.073	0.084	0.073	0.084	No
	Bottom	0.054	0.000	0.084	0.054	0.138	No
LTE Band 66	Front	0.630	0.107	0.084	0.737	0.714	No
	Back	0.798	0.090	0.084	**0.888**	0.882	No
	Left	0.346	0.026	0.084	0.372	0.430	No
	Right	0.257	0.042	0.084	0.299	0.341	No
	Top	0.000	0.073	0.084	0.073	0.084	No
	Bottom	0.569	0.000	0.084	0.569	0.653	No
LTE Band 71	Front	0.246	0.107	0.084	0.353	0.330	No
	Back	0.356	0.090	0.084	0.446	0.440	No
	Left	0.090	0.026	0.084	0.116	0.174	No
	Right	0.166	0.042	0.084	0.208	0.250	No
	Top	0.000	0.073	0.084	0.073	0.084	No
	Bottom	0.049	0.000	0.084	0.049	0.133	No

6 Equipment list

Test Platform	SPEAG DASY5 Professional					
Location	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch					
Description	SAR Test System (Frequency range 300MHz-6GHz)					
Software Reference	DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)					
Hardware Reference						
Equipment		Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	Twin Phantom	SPEAG	SAM 1	1283	NCR	NCR
☒	Twin Phantom	SPEAG	SAM 2	1913	NCR	NCR
☒	Twin Phantom	SPEAG	SAM 1	1912	NCR	NCR
☒	ELI	SPEAG	ELI V5.0	1123	NCR	NCR
☒	DAE	SPEAG	DAE4	1267	2017-11-28	2018-11-27
☒	DAE	SPEAG	DAE4	1428	2018-01-17	2019-01-16
☒	E-Field Probe	SPEAG	EX3DV4	3962	2018-01-11	2019-01-10
☒	E-Field Probe	SPEAG	EX3DV4	3789	2018-02-08	2019-02-07
☒	Validation Kits	SPEAG	D750V3	1160	2016-06-22	2019-06-21
☒	Validation Kits	SPEAG	D835V2	4d105	2016-12-08	2019-12-07
☒	Validation Kits	SPEAG	D1750V2	1149	2016-06-23	2019-06-22
☒	Validation Kits	SPEAG	D1900V2	5d028	2016-12-07	2019-12-06
☒	Validation Kits	SPEAG	D2450V2	733	2016-12-07	2019-12-06
☒	Agilent Network Analyzer	Agilent	E5071C	MY46523590	2018-03-13	2019-03-12
☒	Dielectric Probe Kit	Agilent	85070E	US01440210	NCR	NCR
☒	Universal Radio Communication Tester	R&S	CMU200	123090	2018-06-21	2019-06-20
☒	Radio Communication Analyzer	Anritsu Corporation	MT8821C	6201502984	2018-05-02	2019-05-01
☒	RF Bi-Directional Coupler	Agilent	86205-60001	MY31400031	NCR	NCR
☒	Signal Generator	Agilent	N5171B	MY53050736	2018-03-13	2019-03-12
☒	Preamplifier	Mini-Circuits	ZHL-42W	15542	NCR	NCR
☒	Preamplifier	Compliance Directions Systems Inc.	AMP28-3W	073501433	NCR	NCR
☒	Power Meter	Agilent	E4416A	GB41292095	2018-03-13	2019-03-12
☒	Power Sensor	Agilent	8481H	MY41091234	2018-03-13	2019-03-12
☒	Power Sensor	R&S	NRP-Z92	100025	2018-03-13	2019-03-12
☒	Attenuator	SHX	TS2-3dB	30704	NCR	NCR
☒	Coaxial low pass filter	Mini-Circuits	VLF-2500(+)	NA	NCR	NCR
☒	Coaxial low pass filter	Microlab Fxr	LA-F13	NA	NCR	NCR
☒	50 Ω coaxial load	Mini-Circuits	KARN-50+	00850	NCR	NCR

☒	DC POWER SUPPLY	SAKO	SK1730SL5A	NA	NCR	NCR
☒	Speed reading thermometer	MingGao	T809	NA	2018-03-19	2019-03-18
☒	Humidity and Temperature Indicator	KIMTOKA	KIMTOKA	NA	2018-03-19	2019-03-18

Note: All the equipments are within the valid period when the tests are performed.

7 Measurement Uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

8 Calibration certificate

Please see the Appendix C

9 Photographs

Please see the Appendix D

Appendix A: Detailed System Check Results

Appendix B: Detailed Test Results

Appendix C: Calibration certificate

Appendix D: Photographs

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