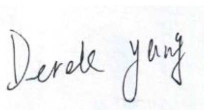
FCC SAR TEST REPORT

Report No:	ZR/2020/A0019
Applicant:	Smawave Technology Co. ,Ltd
Manufacturer:	Smawave Technology Co. ,Ltd
Product Name:	USB Dongle
Model No.(EUT):	SDF311-a
Trade Mark:	Smawave
Contains FCC ID:	2AU8HMGM5607A
Standards:	FCC 47CFR §2.1093
Date of Receipt:	2020-10-16
Date of Test:	2020-12-10 to 2020-12-11
Date of Issue:	2020-12-14
Test conclusion:	**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

Report Number	Revision	Description	Issue Date
ZR/2020/A001901	01	Original	2020-12-14

TEST SUMMARY

Frequency Band	Maximum Reported SAR(W/kg)
	Body(5mm)
LTE Band 43	0.85
LTE Band 48	0.34
LTE Band 53	**0.90**
SAR Limited(W/kg)	1.6

Approved & Released by

Simon Ling

SAR Manager

Tested by

Jackson Li

SAR Engineer

CONTENTS

1 General Information

1.1 Details of Client

Applicant:	Smawave Technology Co.,Ltd
Address:	3/F, Building 8, 1001 North Qinzhou Road，Xuhui District, Shanghai, China
Manufacturer:	Smawave Technology Co.,Ltd
Address:	3/F, Building 8, 1001 North Qinzhou Road，Xuhui District, Shanghai, China

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 17025:2017 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)

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

CAB identifier: CN0006

IC#: 4620C.

1.4 General Description of EUT

Product Name:	USB Dongle		
Model No.(EUT):	SDF311-a		
Contains FCC ID:	2AU8HMGM5607A		
Trade Mark:	Smawave		
Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
Product Phase:	Identical Prototype		
SN:	DF311a02203700001		
Hardware Version:	V1.2		
Software Version:	SG563_V2.0.2		
Antenna Type:	Internal antenna		
Device Operating Configurations :			
Modulation Mode:	**LTE:** QPSK,16QAM		
Power Class	3, tested with power control Max Power(LTE Band 43/48/53)		
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	LTE Band 43	3600~3800	3600~3800
	LTE Band 48	3550~3700	3550~3700
	LTE Band 53	2483.5~2495	2483.5~2495

Note:
Per KDB 447498 D01: When the frequency channels required for SAR testing are not specified in the published RF exposure KDB procedures, the following should be applied to determine the number of required test channels. The test channels should be evenly spread across the transmission frequency band of each wireless mode.

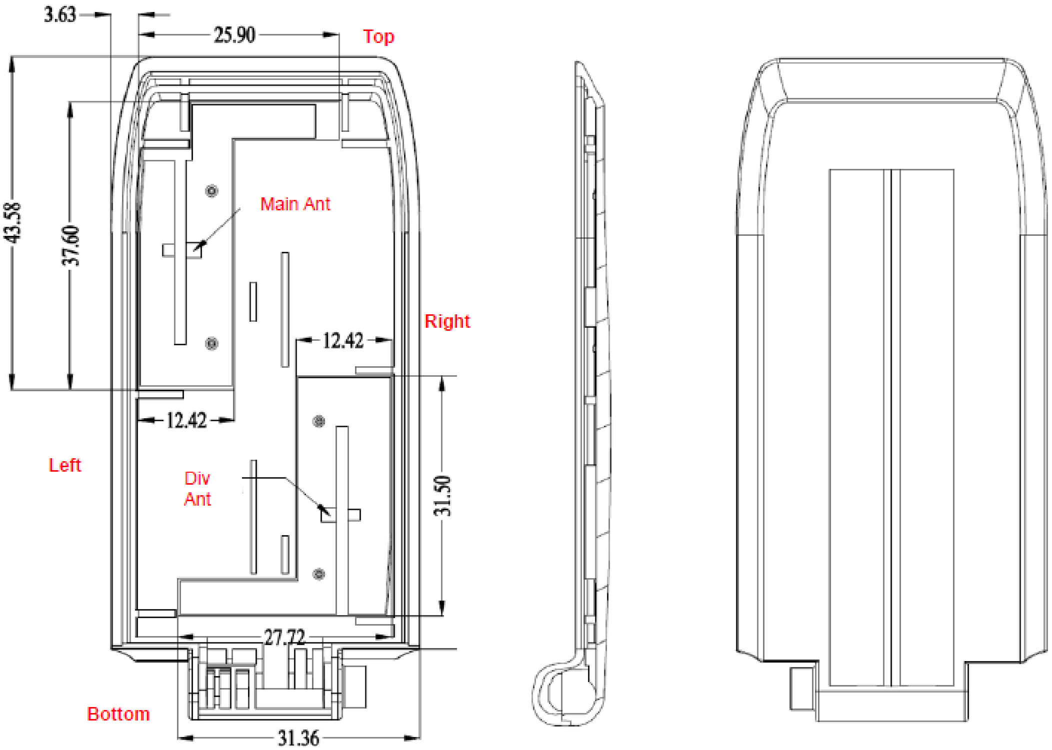
$$N_c = Round\left\{\left[100\left(f_{high} - f_{low}\right)/f_c\right]^{0.5} \times \left(f_c/100\right)^{0.2}\right\},$$

where

- N_c is the number of test channels, rounded to the nearest integer,
- f_{high} and f_{low} are the highest and lowest channel frequencies within the transmission band,
- f_c is the mid-band channel frequency,
- all frequencies are in MHz.

According to the KDB 447498 D01, the required number of test channels for LTE B43 is 5 and LTE B48 is 4.

1.4.1 DUT Antenna Locations(Front View)



1.5 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
ANSI/IEEE 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 Measurement Procedures v03r01
KDB 941225 D05	SAR for LTE Devices v02r05
KDB 447498 D01	General RF Exposure Guidance v06
KDB 447498 D02	SAR Procedures for Dongle Xmtr v02r01
KDB 865664 D01	SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02	RF Exposure Reporting v01r02
KDB 690783 D01	SAR Listings on Grants v01r03

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 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

Table 1： The Ambient Conditions

3 SAR Measurements System Configuration

3.1 The SAR Measurement System

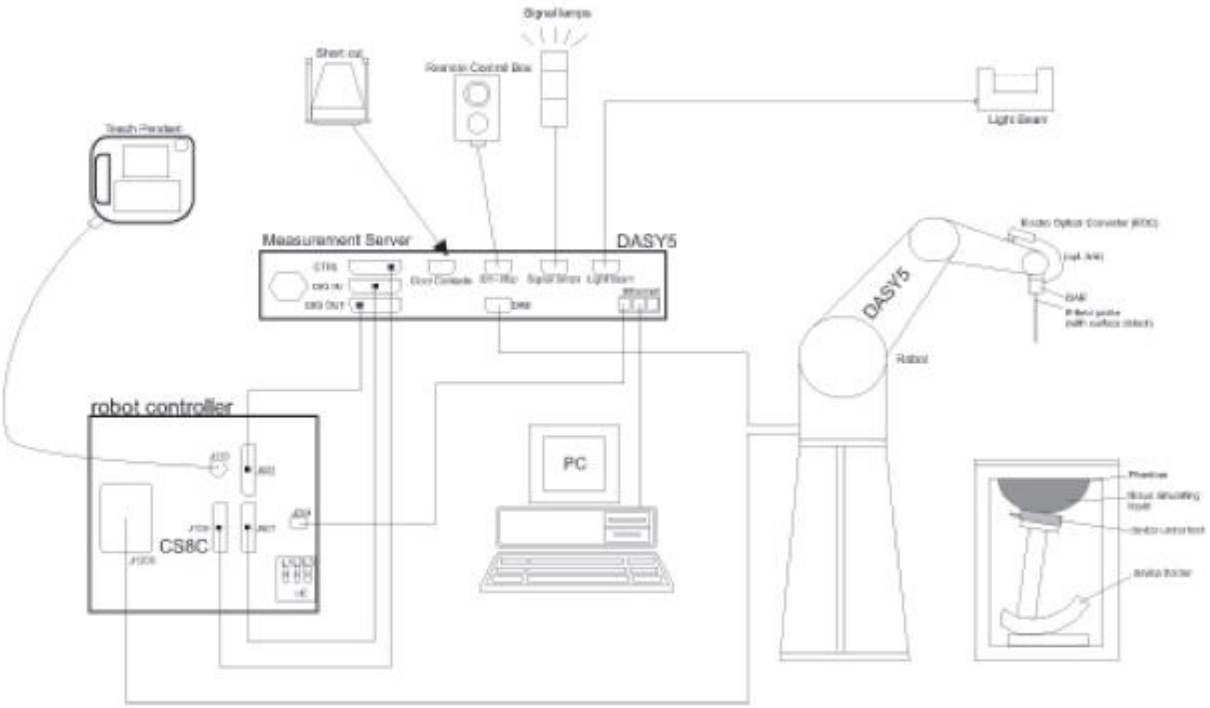
This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY5 professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the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

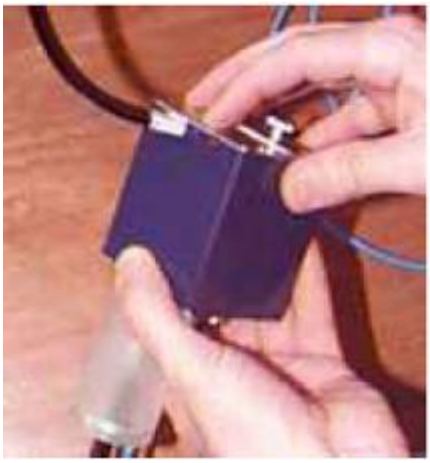
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.
- 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.

3.2 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

3.3 Data Acquisition Electronics (DAE)

Model	DAE
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



3.4 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.

3.5 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.

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3.6 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.

3.7 Measurement procedure

3.7.1 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 32mm*32mm*30mm (f≤2GHz), 30mm*30mm*30mm (f for 2-3GHz) and 24mm*24mm*22mm (f for 5-6GHz) was assessed by measuring 5x5x7 points (f≤2GHz), 7x7x7 points (f for 2-3GHz) and 7x7x12 points (f for 5-6GHz). 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.

<table>
<tr><th colspan="3"></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ $1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
</table>

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 %

3.7.2 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 ".DAE4". 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.

3.7.3 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

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4 SAR measurement variability and uncertainty

4.1 SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.
1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

4.2 SAR 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.

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5 Description of Test Position

5.1 Body Exposure Condition

5.1.1 Test Positions Configuration

Per FCC KDB 447498 D02，for USB dongle transmitters with internal antennas，test all USB orientations(see figure below) with a device-to-phantom separation distance of 5 mm or less. These test orientations are intended for the exposure conditions found in typical laptop/notebook/netbook or tablet computers with either horizontal or vertical USB connector configurations at various locations in the keyboard section of the computer.

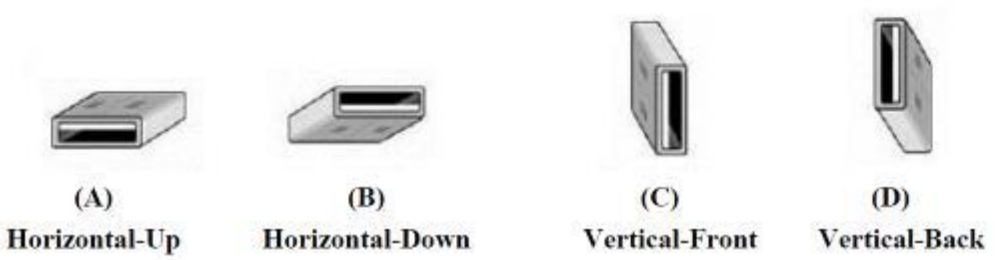


Figure: USB Connector Orientations Implemented on Laptop Computers

6 SAR System Verification Procedure

6.1 Tissue Simulate Liquid

6.1.1 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)				
	700-900	1750-2000	2300-2500	2500-2700	3500-3800
Tissue Type	Head				
Water	40.30	55.24	55.00	54.92	54.61
Salt (NaCl)	1.38	0.31	0.2	0.23	0.25
Sucrose	57.90	0	0	0	0
HEC	0.24	0	0	0	0
Bactericide	0.18	0	0	0	0
Tween	0	44.45	44.80	44.85	44.96
Salt: 99+% Pure Sodium Chloride Water: De-ionized, 16 MΩ+ resistivity Tween: Polyoxyethylene (20) sorbitan monolaurate			Sucrose: 98+% Pure Sucrose HEC: Hydroxyethyl Cellulose		
HSL5GHz is composed of the following ingredients： Water：50-65% Mineral oil：10-30% Emulsifiers：8-25% Sodium salt：0-1.5%					

Table 2： Recipe of Tissue Simulate Liquid

6.1.2 Measurement for Tissue Simulate Liquid

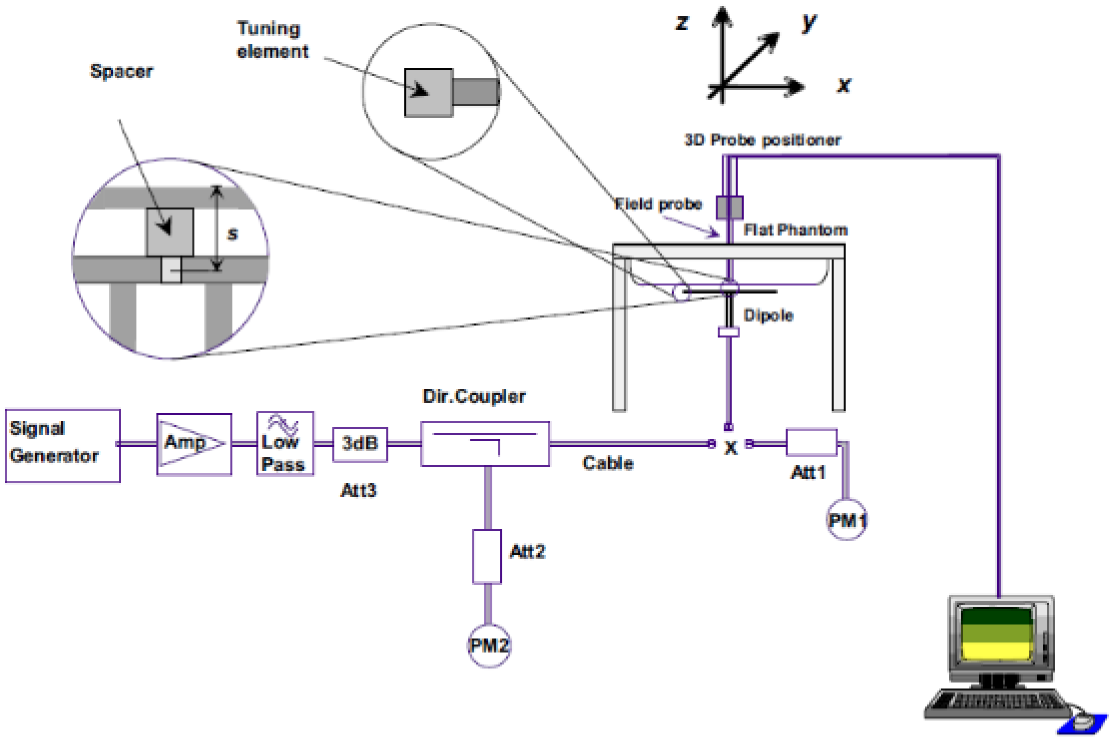
The dielectric properties for this Tissue Simulate Liquids were measured by using the Agilent Model 85070E Dielectric Probe in conjunction with Agilent E5071C Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in bellow table. For the SAR measurement given in this 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)	(℃)	
2450 Head	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	40.224	1.805	22.1	2020/12/10
3500 Head	3500	37.9 (36.01~39.8)	2.91 (2.76~3.06)	37.821	2.853	22.1	2020/12/11
3700 Head	3700	37.7 (35.82~39.59)	3.12 (2.96~3.28)	37.105	3.043	22.1	2020/12/11

Table 3： Measurement result of Tissue electric parameters

6.2 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-3. the microwave circuit arrangement used for SAR system check

6.2.1 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 20% 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.

6.2.2 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)		
D2450V2	Head	13.20	5.99	52.80	23.96	51.9 (46.71~57.09)	23.8 (21.42~26.18)	22.1	2020/12/10
Validation Kit		Measured SAR 100mW	Measured SAR 100mW	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)		
D3500V2	Head(3.5GHz)	6.34	2.61	63.40	26.10	66.5 (59.85~73.15)	25.1 (22.59~27.61)	22.1	2020/12/11
D3700V2	Head(3.7GHz)	6.51	2.45	65.10	24.50	67.8 (61.02~74.58)	24.7 (22.23~27.17)	22.1	2020/12/11

Table 4： SAR System Check Result

6.2.3 Detailed System Check Results

Please see the Appendix A

7 Test Configuration

7.1 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.

7.2 Operation Configurations

7.2.1 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.

TDD LTE test consideration

For Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.

LTE TDD Band support 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Frame structure type 2:

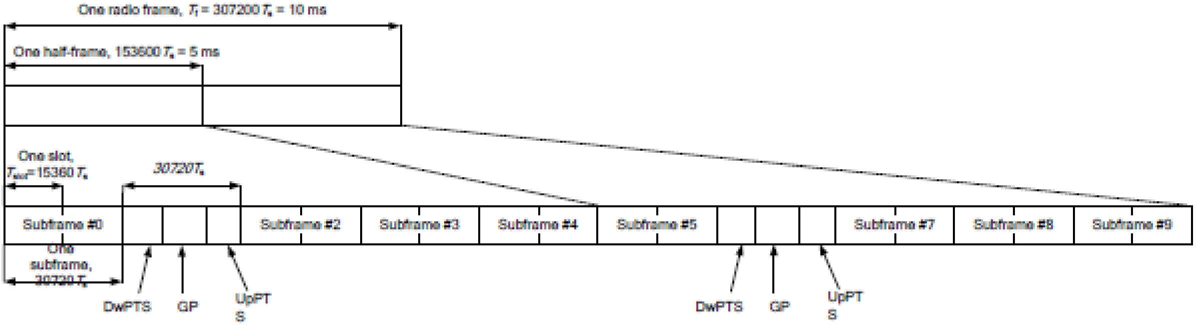


Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

<table>
<tr><th rowspan="3">Special subframe configuration</th><th colspan="3">Normal cyclic prefix in downlink</th><th colspan="3">Extended cyclic prefix in downlink</th></tr>
<tr><th>DwPTS</th><th colspan="2">UpPTS</th><th>DwPTS</th><th colspan="2">UpPTS</th></tr>
<tr><th></th><th>Normal cyclic prefix in uplink</th><th>Extended cyclic prefix in uplink</th><th></th><th>Normal cyclic prefix in uplink</th><th>Extended cyclic prefix in uplink</th></tr>
<tr><td>0</td><td>6592.Ts</td><td rowspan="5">2192.Ts</td><td rowspan="5">2560.Ts</td><td>7680.Ts</td><td rowspan="4">2192.Ts</td><td rowspan="4">2560.Ts</td></tr>
<tr><td>1</td><td>19760.Ts</td><td>20480.Ts</td></tr>
<tr><td>2</td><td>21952.Ts</td><td>23040.Ts</td></tr>
<tr><td>3</td><td>24144.Ts</td><td>25600.Ts</td></tr>
<tr><td>4</td><td>26336.Ts</td><td>7680.Ts</td><td rowspan="4">4384.Ts</td><td rowspan="4">5120.Ts</td></tr>
<tr><td>5</td><td>6592.Ts</td><td rowspan="5">4384.Ts</td><td rowspan="5">5120.Ts</td><td>20480.Ts</td></tr>
<tr><td>6</td><td>19760.Ts</td><td>23040.Ts</td></tr>
<tr><td>7</td><td>21952.Ts</td><td>25600.Ts</td></tr>
<tr><td>8</td><td>24144.Ts</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>9</td><td>13168.Ts</td><td>-</td><td>-</td><td>-</td></tr>
</table>

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Calculated Duty Cycle=[Extended cyclic prefix in uplink x (Ts) x # of S + # of U]/10ms

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-point Periodicity	Subframe Number										Calculated Duty Cycle (%)
		0	1	2	3	4	5	6	7	8	9	
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	U	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33

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.

8 Test Result

8.1 Measurement of RF conducted Power

8.1.1 Conducted Power of Main Antenna

8.1.1.1 Conducted Power of LTE

LTE Band 43				Conducted Power(dBm)					
Bandwidth	Modulation	RB size	RB offset	Channel 43615	Channel 44103	Channel 44590	Channel 45078	Channel 45565	Tune up
5MHz	QPSK	1	0	20.32	20.55	20.49	20.66	20.57	21.00
		1	13	20.63	20.39	20.23	20.48	20.37	21.00
		1	24	20.80	20.32	20.20	20.37	20.30	21.00
		12	0	20.28	20.61	20.63	20.68	20.61	21.00
		12	6	19.87	20.29	20.14	20.38	20.31	21.00
		12	13	20.64	20.38	20.71	20.49	20.43	21.00
		25	0	20.43	20.46	20.68	20.54	20.44	21.00
	16QAM	1	0	20.44	20.46	20.54	20.53	20.45	21.00
		1	13	20.54	20.16	20.45	20.23	20.12	21.00
		1	24	20.43	20.53	20.11	20.61	20.52	21.00
		12	0	20.44	20.76	20.44	20.31	20.70	21.00
		12	6	20.40	20.12	20.11	20.20	20.14	21.00
		12	13	19.98	20.41	20.56	20.50	20.43	21.00
		25	0	19.27	20.76	20.48	20.42	20.76	21.00
Bandwidth	Modulation	RB size	RB offset	Channel 43640	Channel 44115	Channel 44590	Channel 45065	Channel 45540	Tune up
10MHz	QPSK	1	0	20.58	20.53	20.78	20.60	20.51	21.00
		1	25	20.39	20.38	20.49	20.48	20.37	21.00
		1	49	20.47	20.40	20.11	20.46	20.41	21.00
		25	0	20.24	20.61	20.24	20.68	20.63	21.00
		25	13	19.21	20.13	20.24	20.21	20.10	21.00
		25	25	20.22	20.21	20.81	20.27	20.19	21.00
		50	0	20.70	20.27	20.16	20.37	20.29	21.00
	16QAM	1	0	20.33	20.33	20.46	20.40	20.33	21.00
		1	25	20.59	20.46	20.72	20.56	20.45	21.00
		1	49	20.68	20.57	20.39	20.68	20.60	21.00
		25	0	20.06	20.17	20.33	20.23	20.14	21.00
		25	13	20.72	20.26	20.38	20.36	20.28	21.00
		25	25	20.29	20.46	20.04	20.53	20.42	21.00
		50	0	19.80	20.66	20.39	20.75	20.65	21.00

Bandwidth	Modulation	RB size	RB offset	Channel 43665	Channel 44128	Channel 44590	Channel 45053	Channel 45515	Tune up
15MHz	QPSK	1	0	20.55	20.62	20.27	20.67	20.57	21.00
		1	38	20.79	20.70	20.52	20.45	20.74	21.00
		1	74	20.52	20.72	20.40	20.72	20.71	21.00
		36	0	20.64	20.18	20.16	20.26	20.18	21.00
		36	18	19.44	20.31	20.72	20.42	20.33	21.00
		36	39	20.70	20.13	20.73	20.22	20.12	21.00
		75	0	20.19	20.17	20.31	20.22	20.15	21.00
	16QAM	1	0	20.75	20.06	20.22	20.14	20.06	21.00
		1	38	20.38	20.43	20.50	20.49	20.38	21.00
		1	74	20.24	20.78	20.46	20.74	20.77	21.00
		36	0	20.31	20.57	20.56	20.62	20.51	21.00
		36	18	20.04	20.54	20.21	20.20	20.64	21.00
		36	39	20.68	20.65	19.98	20.70	20.65	21.00
		75	0	19.49	20.48	20.50	20.56	20.46	21.00
Bandwidth	Modulation	RB size	RB offset	Channel 43690	Channel 44140	Channel 44590	Channel 45040	Channel 45490	Tune up
20MHz	QPSK	1	0	**20.33**	20.59	20.18	20.69	20.59	21.00
		1	50	20.14	20.17	20.63	20.23	20.16	21.00
		1	99	20.29	**20.68**	**20.85**	**20.75**	**20.67**	21.00
		50	0	20.21	19.97	20.71	20.04	19.97	21.00
		50	25	19.76	20.64	20.15	20.51	20.65	21.00
		50	50	**20.26**	**20.67**	**20.75**	**20.65**	**20.66**	21.00
		100	0	20.22	20.40	**20.78**	20.50	20.45	21.00
	16QAM	1	0	20.71	20.18	20.30	20.25	20.19	21.00
		1	50	20.57	20.42	20.20	20.49	20.44	21.00
		1	99	20.60	20.29	20.35	20.38	20.32	21.00
		50	0	20.50	20.50	20.73	20.61	20.56	21.00
		50	25	20.67	20.63	20.60	20.68	20.62	21.00
		50	50	20.51	20.10	20.29	20.16	20.11	21.00
		100	0	19.21	20.60	20.26	20.71	20.61	21.00

LTE Band 48				Conducted Power(dBm)				
Bandwidth	Modulation	RB size	RB offset	Channel 55265	Channel 55748	Channel 56232	Channel 56715	Tune up
5MHz	QPSK	1	0	22.20	22.11	22.51	22.40	23.00
		1	13	22.35	22.31	22.76	22.65	23.00
		1	24	22.38	22.64	22.36	22.28	23.00
		12	0	22.73	22.12	22.13	22.03	23.00
		12	6	21.19	22.45	22.38	22.32	23.00
		12	13	22.51	22.75	22.60	22.52	23.00
		25	0	22.50	22.22	22.39	22.33	23.00
	16QAM	1	0	22.68	22.70	22.43	22.36	23.00
		1	13	22.34	22.34	22.19	22.13	23.00
		1	24	22.25	22.73	22.18	22.10	23.00
		12	0	22.54	22.42	22.51	22.69	23.00
		12	6	22.26	22.62	22.38	22.28	23.00
		12	13	22.70	22.72	22.71	22.60	23.00
		25	0	21.16	22.57	22.27	22.22	23.00
Bandwidth	Modulation	RB size	RB offset	Channel 55290	Channel 55757	Channel 56223	Channel 56690	Tune up
10MHz	QPSK	1	0	22.46	22.31	22.65	22.56	23.00
		1	25	22.39	22.32	22.54	22.48	23.00
		1	49	22.54	22.55	22.31	22.24	23.00
		25	0	22.15	22.55	22.57	22.47	23.00
		25	13	21.44	22.15	22.36	22.28	23.00
		25	25	22.23	22.28	22.31	22.22	23.00
		50	0	22.41	22.33	22.54	22.48	23.00
	16QAM	1	0	22.28	22.60	22.33	22.22	23.00
		1	25	22.44	22.46	22.52	22.43	23.00
		1	49	22.37	22.23	22.25	22.18	23.00
		25	0	22.26	22.29	22.61	22.53	23.00
		25	13	22.64	22.32	22.34	22.26	23.00
		25	25	22.53	22.56	22.23	22.15	23.00
		50	0	21.15	22.64	22.41	22.33	23.00

Bandwidth	Modulation	RB size	RB offset	Channel 55315	Channel 55765	Channel 56215	Channel 56665	Tune up
15MHz	QPSK	1	0	22.39	22.12	22.21	22.11	23.00
		1	38	22.14	22.52	22.31	22.23	23.00
		1	74	22.41	22.23	22.00	21.89	23.00
		36	0	22.33	22.30	22.35	22.24	23.00
		36	18	21.72	22.59	22.24	22.15	23.00
		36	39	22.64	22.38	22.36	22.26	23.00
		75	0	22.21	22.28	22.54	22.46	23.00
	16QAM	1	0	22.16	22.35	22.55	22.55	23.00
		1	38	22.24	22.19	22.35	22.28	23.00
		1	74	22.43	22.26	22.14	22.04	23.00
		36	0	22.53	22.11	22.50	22.41	23.00
		36	18	22.56	22.55	22.51	22.40	23.00
		36	39	22.21	22.56	22.61	22.50	23.00
		75	0	21.55	22.42	22.48	22.41	23.00
Bandwidth	Modulation	RB size	RB offset	Channel 55340	Channel 55773	Channel 56207	Channel 56640	Tune up
20MHz	QPSK	1	0	22.51	22.57	22.16	22.22	23.00
		1	50	22.45	22.56	22.38	22.44	23.00
		1	99	22.60	**22.71**	22.21	22.30	23.00
		50	0	22.19	**22.77**	22.42	22.50	23.00
		50	25	21.50	22.47	22.35	22.43	23.00
		50	50	22.23	22.34	22.25	22.30	23.00
		100	0	22.65	22.30	22.44	22.52	23.00
	16QAM	1	0	22.11	22.32	22.07	22.15	23.00
		1	50	22.54	22.19	22.51	22.58	23.00
		1	99	22.39	22.43	22.23	22.31	23.00
		50	0	22.64	22.69	22.54	22.62	23.00
		50	25	22.16	22.31	22.52	22.58	23.00
		50	50	22.65	22.65	22.39	22.45	23.00
		100	0	21.24	22.54	22.09	22.20	23.00

LTE Band 53				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 60147	Channel 60198	Channel 60248	Tune up
1.4MHz	QPSK	1	0	20.44	20.52	20.30	21.00
		1	2	20.61	20.52	20.55	21.00
		1	5	20.03	20.15	20.47	21.00
		3	0	20.37	20.33	20.74	21.00
		3	1	20.53	20.71	20.41	21.00
		3	3	20.63	20.04	20.68	21.00
		6	0	19.33	20.10	20.51	21.00
	16QAM	1	0	20.50	20.79	20.57	21.00
		1	2	20.48	20.34	20.33	21.00
		1	5	20.15	20.61	20.17	21.00
		3	0	20.77	20.29	20.46	21.00
		3	1	19.43	20.37	20.59	21.00
		3	3	20.63	20.35	20.42	21.00
		6	0	20.20	20.14	20.41	21.00
Bandwidth	Modulation	RB size	RB offset	Channel 60155	Channel 60198	Channel 60240	Tune up
3MHz	QPSK	1	0	20.42	20.76	20.18	21.00
		1	7	20.51	20.56	20.00	21.00
		1	14	20.46	20.19	20.28	21.00
		8	0	20.57	20.68	20.19	21.00
		8	4	20.20	20.77	19.64	21.00
		8	7	20.52	20.32	19.64	21.00
		15	0	19.46	20.42	19.90	21.00
	16QAM	1	0	20.64	20.09	19.84	21.00
		1	7	20.69	20.80	20.21	21.00
		1	14	20.09	20.76	20.67	21.00
		8	0	20.27	20.43	20.23	21.00
		8	4	19.05	20.69	20.37	21.00
		8	7	20.52	20.05	20.07	21.00
		15	0	20.23	20.35	20.47	21.00

Bandwidth	Modulation	RB size	RB offset	Channel 60165	Channel 60198	Channel 60230	Tune up
5MHz	QPSK	1	0	20.35	20.60	20.26	21.00
		1	13	20.51	20.36	20.46	21.00
		1	24	20.57	20.70	20.73	21.00
		12	0	20.79	20.83	20.71	21.00
		12	6	20.09	20.23	20.60	21.00
		12	13	20.60	20.22	20.59	21.00
		25	0	19.77	20.28	20.80	21.00
	16QAM	1	0	20.45	20.60	20.34	21.00
		1	13	20.45	20.80	20.77	21.00
		1	24	20.71	20.36	20.61	21.00
		12	0	20.20	20.48	20.61	21.00
		12	6	19.14	20.29	20.31	21.00
		12	13	20.49	20.03	20.25	21.00
		25	0	20.52	20.17	20.67	21.00
Bandwidth	Modulation	RB size	RB offset	Channel 60190	Channel 60198	Channel 60205	Tune up
10MHz	QPSK	1	0	**20.61**	20.17	20.33	21.00
		1	25	20.53	**20.61**	**20.42**	21.00
		1	49	20.33	20.37	20.21	21.00
		25	0	20.51	20.21	19.96	21.00
		25	13	20.58	**20.66**	20.22	21.00
		25	25	20.39	20.40	19.88	21.00
		50	0	19.63	**20.11**	19.95	21.00
	16QAM	1	0	20.43	20.52	20.05	21.00
		1	25	20.34	20.07	20.16	21.00
		1	49	20.40	20.01	20.59	21.00
		25	0	20.07	20.54	19.96	21.00
		25	13	19.36	20.33	20.10	21.00
		25	25	20.56	20.46	19.96	21.00
		50	0	20.47	20.59	20.28	21.00

Table 5： Conducted Power of LTE

8.2 Measurement of SAR Data

8.2.1 SAR Result of LTE Band 43

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	SAR (W/kg)10-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Body Test data with Ant close(Separate 5mm 1RB)												
Front side	20	QPSK 1RB_99	44590/3700	1:1.58	0.651	0.204	0.04	20.85	21.00	1.035	0.674	22.1
Back side	20	QPSK 1RB_99	44590/3700	1:1.58	0.041	0.014	0.08	20.85	21.00	1.035	0.042	22.1
Left side	20	QPSK 1RB_99	44590/3700	1:1.58	0.185	0.061	-0.06	20.85	21.00	1.035	0.192	22.1
Right side	20	QPSK 1RB_99	44590/3700	1:1.58	0.063	0.021	0.06	20.85	21.00	1.035	0.065	22.1
Top side	20	QPSK 1RB_99	44590/3700	1:1.58	0.054	0.018	0.04	20.85	21.00	1.035	0.056	22.1
Front side	20	QPSK 1RB_0	43690/3610	1:1.58	0.342	0.114	-0.04	20.33	21.00	1.167	0.399	22.1
Front side	20	QPSK 1RB_99	44140/3655	1:1.58	0.501	0.162	0.03	20.68	21.00	1.076	0.539	22.1
Front side	20	QPSK 1RB_99	45040/3745	1:1.58	0.622	0.191	0.02	20.75	21.00	1.059	0.659	22.1
Front side	20	QPSK 1RB_99	45490/3790	1:1.58	0.787	0.270	0.06	20.67	21.00	1.079	**0.849**	22.1
Body Test data with Ant close (Separate 5mm 50%RB)												
Front side	20	QPSK 50RB_50	44590/3700	1:1.58	0.534	0.187	0.01	20.75	21.00	1.059	0.566	22.1
Back side	20	QPSK 50RB_50	44590/3700	1:1.58	0.038	0.011	0.07	20.75	21.00	1.059	0.040	22.1
Left side	20	QPSK 50RB_50	44590/3700	1:1.58	0.166	0.051	-0.01	20.75	21.00	1.059	0.176	22.1
Right side	20	QPSK 50RB_50	44590/3700	1:1.58	0.059	0.020	0.09	20.75	21.00	1.059	0.063	22.1
Top side	20	QPSK 50RB_50	44590/3700	1:1.58	0.050	0.016	-0.02	20.75	21.00	1.059	0.053	22.1
Front side	20	QPSK 50RB_50	43690/3610	1:1.58	0.395	0.126	0.05	20.26	21.00	1.186	0.468	22.1
Front side	20	QPSK 50RB_50	44140/3655	1:1.58	0.413	0.164	0.11	20.67	21.00	1.079	0.446	22.1
Front side	20	QPSK 50RB_50	45040/3745	1:1.58	0.553	0.225	-0.03	20.65	21.00	1.084	0.599	22.1
Front side	20	QPSK 50RB_50	45490/3790	1:1.58	0.621	0.193	0.09	20.66	21.00	1.081	0.672	22.1
Body Test data with Ant close (Separate 5mm 100%RB)												
Front side	20	QPSK 100RB_0	44590/3700	1:1.58	0.600	0.190	0.02	20.78	21.00	1.052	0.631	22.1
Body Test data at the worst case with Antenna open 180° (Separate 5mm 1RB)												
Front side	20	QPSK 1RB_99	44590/3700	1:1.58	0.553	0.223	-0.09	20.85	21.00	1.035	0.572	22.1
Back side	20	QPSK 1RB_99	44590/3700	1:1.58	0.527	0.206	0.03	20.85	21.00	1.035	0.546	22.1
Left side	20	QPSK 1RB_99	44590/3700	1:1.58	0.248	0.095	0.17	20.85	21.00	1.035	0.257	22.1
Right side	20	QPSK 1RB_99	44590/3700	1:1.58	0.280	0.012	0.03	20.85	21.00	1.035	0.290	22.1
Top side	20	QPSK 1RB_99	44590/3700	1:1.58	0.051	0.018	-0.07	20.85	21.00	1.035	0.052	22.1
Front side	20	QPSK 1RB_0	43690/3610	1:1.58	0.413	0.165	0.13	20.33	21.00	1.167	0.482	22.1
Front side	20	QPSK 1RB_99	44140/3655	1:1.58	0.442	0.173	0.01	20.68	21.00	1.076	0.476	22.1
Front side	20	QPSK 1RB_99	45040/3745	1:1.58	0.535	0.186	0.09	20.75	21.00	1.059	0.567	22.1
Front side	20	QPSK 1RB_99	45490/3790	1:1.58	0.601	0.194	-0.16	20.67	21.00	1.079	0.648	22.1
Back side	20	QPSK 1RB_0	43690/3610	1:1.58	0.402	0.161	0.03	20.33	21.00	1.167	0.469	22.1
Back side	20	QPSK 1RB_99	44140/3655	1:1.58	0.437	0.165	0.17	20.68	21.00	1.076	0.470	22.1
Back side	20	QPSK 1RB_99	45040/3745	1:1.58	0.517	0.172	-0.11	20.75	21.00	1.059	0.548	22.1
Back side	20	QPSK 1RB_99	45490/3790	1:1.58	0.531	0.201	0.04	20.67	21.00	1.079	0.573	22.1
Body Test data at the worst case with Antenna open 180° (Separate 5mm 50%RB)												
Front side	20	QPSK 50RB_50	44590/3700	1:1.58	0.468	0.175	0.05	20.75	21.00	1.059	0.496	22.1
Back side	20	QPSK 50RB_50	44590/3700	1:1.58	0.410	0.163	0.03	20.75	21.00	1.059	0.434	22.1
Left side	20	QPSK 50RB_50	44590/3700	1:1.58	0.219	0.084	-0.18	20.75	21.00	1.059	0.232	22.1
Right side	20	QPSK 50RB_50	44590/3700	1:1.58	0.023	0.011	0.07	20.75	21.00	1.059	0.024	22.1
Top side	20	QPSK 50RB_50	44590/3700	1:1.58	0.043	0.015	0.09	20.75	21.00	1.059	0.045	22.1
Front side	20	QPSK 50RB_50	43690/3610	1:1.58	0.372	0.109	-0.17	20.26	21.00	1.186	0.441	22.1
Front side	20	QPSK 50RB_50	44140/3655	1:1.58	0.396	0.155	0.06	20.67	21.00	1.079	0.427	22.1
Front side	20	QPSK 50RB_50	45040/3745	1:1.58	0.517	0.124	-0.14	20.65	21.00	1.084	0.560	22.1
Front side	20	QPSK 50RB_50	45490/3790	1:1.58	0.537	0.181	0.06	20.66	21.00	1.081	0.581	22.1
Back side	20	QPSK 50RB_50	43690/3610	1:1.58	0.355	0.149	0.01	20.26	21.00	1.186	0.421	22.1

Back side	20	QPSK 50RB_50	44140/3655	1:1.58	0.381	0.113	0.07	20.67	21.00	1.079	0.411	22.1
Back side	20	QPSK 50RB_50	45040/3745	1:1.58	0.423	0.171	-0.03	20.65	21.00	1.084	0.459	22.1
Back side	20	QPSK 50RB_50	45490/3790	1:1.58	0.489	0.183	-0.11	20.66	21.00	1.081	0.529	22.1
Body Test data with Ant close (Separate 5mm 100%RB)												
Front side	20	QPSK 100RB_0	44590/3700	1:1.58	0.483	0.199	0.18	20.78	21.00	1.052	0.508	22.1
Back side	20	QPSK 100RB_0	44590/3700	1:1.58	0.443	0.165	-0.06	20.78	21.00	1.052	0.466	22.1
Body Test data at the worst case with Antenna open 90° (Separate 5mm 1RB)												
Front side	20	QPSK 1RB_99	45490/3790	1:1.58	0.572	0.214	-0.09	20.67	21.00	1.079	0.617	22.1
Body Test data at the worst case with Antenna open 90° (Separate 5mm 50%RB)												
Front side	20	QPSK 50RB_50	44590/3700	1:1.58	0.501	0.202	-0.12	20.75	21.00	1.059	0.531	22.1

Table 6： SAR of LTE Band 43 for Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.
2) Per KDB447498 D01, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8W/kg for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is ≤ 100MHz.
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz.

8.2.2 SAR Result of LTE Band 48

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	SAR (W/kg)10-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Body Test data with Ant close(Separate 5mm 1RB)												
Front side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.159	0.065	0.03	22.71	23.00	1.069	0.170	22.1
Back side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.036	0.013	0.03	22.71	23.00	1.069	0.039	22.1
Left side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.049	0.014	0.09	22.71	23.00	1.069	0.052	22.1
Right side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.017	0.008	0.06	22.71	23.00	1.069	0.018	22.1
Top side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.036	0.014	-0.05	22.71	23.00	1.069	0.039	22.1
Body Test data with Ant close (Separate 5mm 50%RB)												
Front side	20	QPSK 50RB_0	55773/3603.3	1:1.58	0.161	0.064	-0.06	22.77	23.00	1.054	0.170	22.1
Back side	20	QPSK 50RB_0	55773/3603.3	1:1.58	0.021	0.008	0.08	22.77	23.00	1.054	0.022	22.1
Left side	20	QPSK 50RB_0	55773/3603.3	1:1.58	0.046	0.018	0.06	22.77	23.00	1.054	0.049	22.1
Right side	20	QPSK 50RB_0	55773/3603.3	1:1.58	0.020	0.009	0.04	22.77	23.00	1.054	0.021	22.1
Top side	20	QPSK 50RB_0	55773/3603.3	1:1.58	0.028	0.012	0.06	22.77	23.00	1.054	0.030	22.1
Body Test data at the worst case with Antenna open 180° (Separate 5mm 1RB)												
Front side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.311	0.130	0.06	22.71	23.00	1.069	0.332	22.1
Back side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.314	0.128	0.08	22.71	23.00	1.069	**0.336**	22.1
Left side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.051	0.026	0.09	22.71	23.00	1.069	0.054	22.1
Right side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.020	0.010	0.03	22.71	23.00	1.069	0.021	22.1
Top side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.028	0.013	0.13	22.71	23.00	1.069	0.030	22.1
Body Test data at the worst case with Antenna open 180° (Separate 5mm 50%RB)												
Front side	20	QPSK 50RB_0	55773/3603.3	1:1.58	0.290	0.120	-0.18	22.77	23.00	1.054	0.306	22.1
Back side	20	QPSK 50RB_0	55773/3603.3	1:1.58	0.289	0.118	0.03	22.77	23.00	1.054	0.305	22.1
Left side	20	QPSK 50RB_0	55773/3603.3	1:1.58	0.048	0.022	0.03	22.77	23.00	1.054	0.051	22.1
Right side	20	QPSK 50RB_0	55773/3603.3	1:1.58	0.019	0.009	0.07	22.77	23.00	1.054	0.020	22.1
Top side	20	QPSK 50RB_0	55773/3603.3	1:1.58	0.021	0.011	0.06	22.77	23.00	1.054	0.022	22.1
Body Test data at the worst case with Antenna open 90° (Separate 5mm 1RB)												
Back side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.272	0.100	-0.03	22.71	23.00	1.069	0.291	22.1
Body Test data at the worst case with Antenna open 90° (Separate 5mm 50%RB)												
Back side	20	QPSK 1RB_99	55773/3603.3	1:1.58	0.245	0.091	0.01	22.77	23.00	1.054	0.258	22.1

Table 7： SAR of LTE Band 48 for Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.
2) Per KDB447498 D01, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8W/kg for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is ≤ 100MHz.
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz.

8.2.3 SAR Result of LTE Band 53

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	SAR (W/kg)10-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Body Test data with Ant close(Separate 5mm 1RB)												
Front side	10	QPSK 1RB_25	60198/2489.3	1:1.58	0.382	0.138	0.05	20.61	21.00	1.094	0.418	22.1
Back side	10	QPSK 1RB_25	60198/2489.3	1:1.58	0.025	0.011	0.17	20.61	21.00	1.094	0.027	22.1
Left side	10	QPSK 1RB_25	60198/2489.3	1:1.58	0.045	0.017	0.01	20.61	21.00	1.094	0.049	22.1
Right side	10	QPSK 1RB_25	60198/2489.3	1:1.58	0.037	0.018	-0.03	20.61	21.00	1.094	0.041	22.1
Top side	10	QPSK 1RB_25	60198/2489.3	1:1.58	0.018	0.010	0.04	20.61	21.00	1.094	0.019	22.1
Body Test data with Ant close (Separate 5mm 50%RB)												
Front side	10	QPSK 25RB_13	60198/2489.3	1:1.58	0.369	0.133	0.03	20.66	21.00	1.081	0.399	22.1
Back side	10	QPSK 25RB_13	60198/2489.3	1:1.58	0.023	0.010	0.17	20.66	21.00	1.081	0.025	22.1
Left side	10	QPSK 25RB_13	60198/2489.3	1:1.58	0.042	0.015	-0.08	20.66	21.00	1.081	0.045	22.1
Right side	10	QPSK 25RB_13	60198/2489.3	1:1.58	0.028	0.011	0.02	20.66	21.00	1.081	0.030	22.1
Top side	10	QPSK 25RB_13	60198/2489.3	1:1.58	0.016	0.009	0.04	20.66	21.00	1.081	0.017	22.1
Body Test data at the worst case with Antenna open 180° (Separate 5mm 1RB)												
Front side	10	QPSK 1RB_25	60198/2489.3	1:1.58	0.764	0.308	-0.03	20.61	21.00	1.094	0.836	22.1
Back side	10	QPSK 1RB_25	60198/2489.3	1:1.58	0.735	0.311	0.07	20.61	21.00	1.094	0.804	22.1
Left side	10	QPSK 1RB_25	60198/2489.3	1:1.58	0.143	0.073	0.03	20.61	21.00	1.094	0.156	22.1
Right side	10	QPSK 1RB_25	60198/2489.3	1:1.58	0.017	0.009	-0.17	20.61	21.00	1.094	0.018	22.1
Top side	10	QPSK 1RB_25	60198/2489.3	1:1.58	0.033	0.019	0.04	20.61	21.00	1.094	0.036	22.1
Front side	10	QPSK 1RB_0	60190/2488.5	1:1.58	0.742	0.301	-0.02	20.61	21.00	1.094	0.812	22.1
Front side	10	QPSK 1RB_25	60205/2490	1:1.58	0.734	0.295	-0.07	20.42	21.00	1.143	0.839	22.1
Back side	10	QPSK 1RB_0	60190/2488.5	1:1.58	0.764	0.308	-0.03	20.61	21.00	1.094	0.836	22.1
Back side	10	QPSK 1RB_25	60205/2490	1:1.58	0.785	0.330	0.13	20.42	21.00	1.143	**0.897**	22.1
Body Test data at the worst case with Antenna open 180° (Separate 5mm 50%RB)												
Front side	10	QPSK 25RB_13	60198/2489.3	1:1.58	0.729	0.296	-0.04	20.66	21.00	1.081	0.788	22.1
Back side	10	QPSK 25RB_13	60198/2489.3	1:1.58	0.683	0.283	0.01	20.66	21.00	1.081	0.739	22.1
Left side	10	QPSK 25RB_13	60198/2489.3	1:1.58	0.133	0.069	0.07	20.66	21.00	1.081	0.144	22.1
Right side	10	QPSK 25RB_13	60198/2489.3	1:1.58	0.015	0.008	0.11	20.66	21.00	1.081	0.016	22.1
Top side	10	QPSK 25RB_13	60198/2489.3	1:1.58	0.034	0.019	0.07	20.66	21.00	1.081	0.036	22.1
Front side	10	QPSK 25RB_13	60190/2488.5	1:1.58	0.703	0.279	-0.07	20.58	21.00	1.102	0.774	22.1
Front side	10	QPSK 25RB_13	60205/2490	1:1.58	0.683	0.273	-0.07	20.22	21.00	1.197	0.817	22.1
Back side	10	QPSK 25RB_13	60190/2488.5	1:1.58	0.754	0.316	0.02	20.58	21.00	1.102	0.831	22.1
Back side	10	QPSK 25RB_13	60205/2490	1:1.58	0.681	0.280	0.03	20.22	21.00	1.197	0.815	22.1
Body Test data at the worst case with Antenna open 180° (Separate 5mm 100%RB)												
Front side	10	QPSK 50RB_0	60198/2489.3	1:1.58	0.689	0.282	-0.06	20.11	21.00	1.227	0.846	22.1
Back side	10	QPSK 50RB_0	60198/2489.3	1:1.58	0.602	0.263	0.03	20.11	21.00	1.227	0.739	22.1
Body Test data at the worst case with Antenna open 90° (Separate 5mm 1RB)												
Back side	10	QPSK 1RB_25	60205/2490	1:1.58	0.662	0.275	0.06	20.42	21.00	1.143	0.757	22.1
Body Test data at the worst case with Antenna open 90° (Separate 5mm 50%RB)												
Back side	10	QPSK 25RB_13	60198/2489.3	1:1.58	0.656	0.272	0.03	20.66	21.00	1.081	0.709	22.1

Table 8： SAR of LTE Band 53 for Body.

Note:

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

2) Per KDB447498 D01, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

- ≤ 0.8W/kg for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is ≤ 100MHz.
- ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.
- ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz.

9 Equipment list

Test Platform	SPEAG DASY5 Professional
Description	SAR Test System (Frequency range 300MHz-6GHz)
Software Reference	DASY52; SEMCAD

Hardware Reference

	Equipment	Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	Twin Phantom	SPEAG	SAM 3	1912	NCR	NCR
☒	DAE	SPEAG	DAE4	1428	2020-03-03	2021-03-02
☒	E-Field Probe	SPEAG	EX3DV4	3962	2020-04-01	2021-03-31
☒	Validation Kits	SPEAG	D2450V2	733	2019-12-17	2022-12-16
☒	Validation Kits	SPEAG	D3500V2	1082	2019-09-06	2022-09-05
☒	Validation Kits	SPEAG	D3700V2	1046	2019-09-06	2022-09-05
☒	Agilent Network Analyzer	Agilent	E5071C	MY46523591	2020-04-16	2021-04-15
☒	Dielectric Probe Kit	Agilent	85070E	US01440210	NCR	NCR
☒	Universal Radio Communication Tester	R&S	CMW500	111637	2020-04-16	2021-04-15
☒	Radio Communication Analyzer	Anritsu	MT8821C	6201502984	2020-06-11	2021-06-10
☒	RF Bi-Directional Coupler	Agilent	86205-60001	MY31400031	NCR	NCR
☒	Signal Generator	Agilent	N5171B	MY53050736	2020-04-15	2021-04-14
☒	Preamplifier	Mini-Circuits	ZHL-42W	15542	NCR	NCR
☒	Preamplifier	Compliance Directions Systems Inc.	AMP28-3W	073501433	NCR	NCR
☒	Power Meter	Agilent	E4416A	GB41292095	2020-04-15	2021-04-14
☒	Power Sensor	Agilent	8481H	MY41091234	2020-04-15	2021-04-14
☒	Power Sensor	R&S	NRP-Z92	100025	2020-04-16	2021-04-15
☒	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	2020-04-21	2021-04-20
☒	Humidity and Temperature Indicator	KIMTOKA	KIMTOKA	NA	2020-04-21	2021-04-20

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

10 Calibration certificate

Please see the Appendix C

11 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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