



SAR TEST REPORT

For

South Surveying & Mapping Technology Co., Ltd.

Handheld 3D Laser Scanner brochure

Test Model: RobotSLAM

Additional Model No.: Please Refer to Page 8

Prepared for : South Surveying & Mapping Technology Co., Ltd.
Address : No.39, Sicheng Road, Tianhe District, Guangzhou, China

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
Address : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park
Yabianxueziwei, Shajing Street, Baoan District, Shenzhen,
518000, China
Tel : (86)755-82591330
Fax : (86)755-82591332
Web : www.LCS-cert.com
Mail : webmaster@LCS-cert.com

Date of receipt of test sample : January 23, 2024
Number of tested samples : 1
Sample number : A240121085-1
Serial number : Prototype
Date of Test : January 23, 2024 ~ April 03, 2024
Date of Report : April 09, 2024



**SAR TEST REPORT**Report Reference No.....: **LCSA01224260EB**

Date Of Issue.....: April 09, 2024

Testing Laboratory Name.....: Shenzhen LCS Compliance Testing Laboratory Ltd.

Address.....: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Testing Location/ Procedure.....: Full application of Harmonised standards ☒
Partial application of Harmonised standards ☐
Other standard testing method ☐**Applicant's Name.....: South Surveying & Mapping Technology Co., Ltd.**

Address.....: No.39, Sicheng Road, Tianhe District, Guangzhou, China

Test Specification:

Standard.....: FCC 47CFR §2.1093, ANSI/IEEE C95.1-2019, IEEE 1528-2013

Test Report Form No.....: LCSEMC-1.0

TRF Originator.....: Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF.....: Dated 2014-09

Shenzhen LCS Compliance Testing Laboratory Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen LCS Compliance Testing Laboratory Ltd. is acknowledged as copyright owner and source of the material. Shenzhen LCS Compliance Testing Laboratory Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test Item Description.....: Handheld 3D Laser Scanner brochure

Trade Mark.....: SOUTH, KOLIDA, RUIDE, SANDING, TIANYU, LASDOT

Model/Type Reference.....: RobotSLAM

Ratings.....: For AC Adapter: Input:100-240V~, 50/60Hz, 1.8A
Output: 5V = 3A or 9V = 3A or 12V = 3A or 15V = 3A or 20V=3.25A,**Result: Positive****Compiled by:**

Jay Zhan

Jay Zhan/ File administrators

Supervised by:

Cary Luo

Cary Luo / Technique principal

Approved by:

Gavin Liang

Gavin Liang/ Manager





SAR -- TEST REPORT

Test Report No. :	LCSA01224260EB	<u>April 09, 2024</u> Date of issue
EUT..... : Handheld 3D Laser Scanner brochure		
Type/Model : RobotSLAM		
Applicant..... : South Surveying & Mapping Technology Co., Ltd. Address..... : No.39, Sicheng Road, Tianhe District, Guangzhou, China Telephone..... : / Fax..... : /		
Manufacturer..... : South Surveying & Mapping Technology Co., Ltd. Address..... : No.39, Sicheng Road, Tianhe District, Guangzhou, China Telephone..... : / Fax..... : /		
Factory..... : South Surveying & Mapping Technology Co., Ltd. Address..... : No.39, Sicheng Road, Tianhe District, Guangzhou, China Telephone..... : / Fax..... : /		

Test Result	Positive
-------------	----------

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.





Revision History

Revision	Issue Date	Revision Content	Revised By
000	April 09, 2024	Initial Issue	---





TABLE OF CONTENTS

1. TEST STANDARDS AND TEST DESCRIPTION	6
1.1. STATEMENT OF COMPLIANCE	6
1.2. TEST LOCATION	7
1.3. TEST FACILITY	7
1.4. TEST LABORATORY ENVIRONMENT	7
1.5. PRODUCT DESCRIPTION	8
1.6. DUT ANTENNA LOCATIONS(REAR VIEW)	9
1.7. TEST SPECIFICATION	10
1.8. RF EXPOSURE LIMITS	11
1.9. EQUIPMENT LIST	12
2. SAR MEASUREMENTS SYSTEM CONFIGURATION	13
2.1. SAR MEASUREMENT SYSTEM	13
2.2. ISOTROPIC E-FIELD PROBE EX3DV4	15
2.3. DATA ACQUISITION ELECTRONICS (DAE)	16
2.4. SAM TWIN PHANTOM	16
2.5. ELI PHANTOM	17
2.6. DEVICE HOLDER FOR TRANSMITTERS	18
2.7. MEASUREMENT PROCEDURE	19
3. SAR MEASUREMENT VARIABILITY AND UNCERTAINTY	23
3.1. SAR MEASUREMENT VARIABILITY	23
3.2. SAR MEASUREMENT UNCERTAINTY	23
4. DESCRIPTION OF TEST POSITION	24
4.1. BODY EXPOSURE CONDITION	24
4.2. EXTREMITY EXPOSURE CONDITIONS	25
5. SAR SYSTEM VERIFICATION PROCEDURE	26
5.1. TISSUE SIMULATE LIQUID	26
5.2. SAR SYSTEM CHECK	28
6. SAR MEASUREMENT PROCEDURE	30
6.1. CONDUCTED POWER MEASUREMENT	30
6.2. GSM TEST CONFIGURATION	30
6.3. UMTS TEST CONFIGURATION	30
6.4. LTE TEST CONFIGURATION	32
6.5. POWER REDUCTION	32
6.6. POWER DRIFT	32
7. TEST CONDITIONS AND RESULTS	33
7.1. CONDUCTED POWER RESULTS	33
7.2. SAR MEASUREMENT RESULTS	44
7.3. MULTIPLE TRANSMITTER EVALUATION	47
7.4. MEASUREMENT UNCERTAINTY	48
APPENDIX A: DETAILED SYSTEM CHECK RESULTS	49
APPENDIX B: DETAILED TEST RESULTS	50
APPENDIX C: CALIBRATION CERTIFICATE	51
APPENDIX D: PHOTOGRAPHS	52





1. TEST STANDARDS AND TEST DESCRIPTION

1.1. Statement of Compliance

The maximum of results of SAR found during testing for RobotSLAM are follows:

<Highest Reported standalone SAR Summary>

Classment Class	Frequency Band	Body (Report SAR1-g (W/kg)
		(Separation Distance 0mm)
PCB	LTE Band 5	0.707
	LTE Band 41	0.404
DTS	WIFI2.4G	0.332

Note

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-2005, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.

<Highest Reported simultaneous SAR Summary>

Exposure Position	Classment Class	(Report SAR1-g (W/kg)	Highest Reported Simultaneous Transmission SAR1-g (W/kg)
Bdoy	PCB	0.707	1.039
	DTS	0.332	





1.2. Test Location

Company: Shenzhen LCS Compliance Testing Laboratory Ltd.
Address: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China
Telephone: (86)755-82591330
Fax: (86)755-82591330
Web: www.LCS-cert.com
E-mail: webmaster@LCS-cert.com

1.3. Test Facility

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

Site Description						
SAR Lab.	:	NVLAP	Accreditation	Code	is	600167-0.
		FCC	Designation	Number	is	CN5024.
		CAB	identifier		is	CN0071.
		CNAS Registration Number is L4595.				
		Test Firm Registration Number: 254912.				

1.4. Test Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5
Atmospheric pressure:	950-1050mbar
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.	





1.5. Product Description

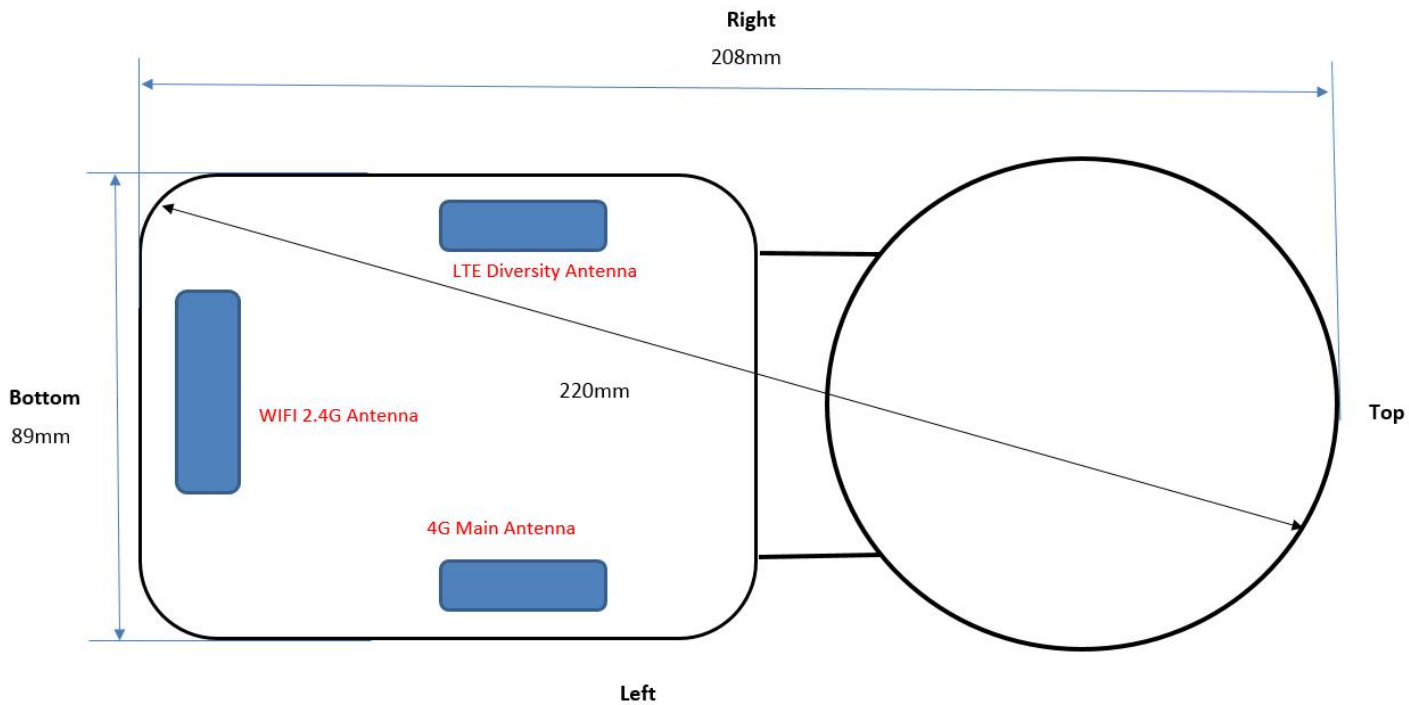
The **South Surveying & Mapping Technology Co., Ltd.** 's Model: **RobotSLAM** or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

EUT	: Handheld 3D Laser Scanner brochure
Test Model	: RobotSLAM
Additional Model No.	RobotSLAM Plus, RobotSLAM Ultra, RobotSLAM Lite, RobotSLAM Lite-DS, RobotSLAM Lite-V, RT-SLAM, RT-SLAM Pro, RT-SLAM Ultra, Anypoint Pro, Anypoint Plus, Anydot Pro, Anydot Plus, DigiDot Pro, DigiDot Plus, Wonder Pro, Wonder Plus, Prime Pro, Prime Plus, Infini Pro, Infini Plus, J alas Pro, J alas Plus, Evolas Pro, Evolas Plus, K120, K120 Plus, K100, K100 Pro, K100 Max, K200, K200 Pro, K200 Max, SLAM K120, SLAM K120 Plus, SLAM K120S, SLAM K120S-DS, SLAM K120S-V, Yolo Pro, Yolo Plus, Doto Pro, Doto Plus, Feliz Pro, Feliz Plus, Juno Pro, Juno Plus, Hapi Pro, Hapi Plus, Punto Pro, Punto Plus, Silver Pro, Silver Plus, Dotlas Pro, Dotlas Plus, Cute Pro, Cute Plus, Kara Pro, Kara Plus, Loria Pro, Loria Plus, StaSLAM Pro, StaSLAM Plus, OmegaSLAM
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Power Supply	: For AC Adapter: Input:100-240V~, 50/60Hz, 1.8A Output: 5V=3A or 9V=3A or 12V=3A or 15V=3A or 20V=3.25A,
Hardware Version	: /
Software Version	: /
WIFI(2.4G Band)	:
Frequency Range	: 2412MHz~2462MHz
Channel Spacing	: 5MHz
Channel Number	: 11 Channels for 20MHz bandwidth (2412~2462MHz) 7 Channels for 40MHz bandwidth (2422~2452MHz)
Modulation Type	: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: FPC Antenna, 3dBi(max.)
LTE	:
Support Band	: ☒ E-UTRA Band 5(U.S.-Band) ☒ E-UTRA Band 41(U.S.-Band)
LTE Release Version	: R12
Type Of Modulation	: QPSK/16QAM
Antenna Description	: FPC Antenna 5dBi(max.) For E-UTRA Band 5 5dBi(max.) For E-UTRA Band 41
Power Class	: Class 3
Exposure category	: Uncontrolled Environment General Population





1.6. DUT Antenna Locations(Rear view)



Note:

- 1) Main Antenna: LTE Band 5/41, the Div ant only for Rx.





1.7. Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
ANSI/IEEE C95.1-2019	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 D05	SAR for LTE Devices v02r05
KDB 248227 D01	SAR Guidance for IEEE 802 11 Wi-Fi SAR v02r02
KDB 447498 D01	General RF Exposure Guidance v06
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





1.8. 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.)





1.9. Equipment list

Test Platform		SPEAG DASY5 Professional				
Description		SAR Test System (Frequency range 300MHz-6GHz)				
Software Reference		DASY52; SEMCAD X				
Hardware Reference						
Equipment		Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	PC	Lenovo	NA	NA	NA	NA
☒	Twin Phantom	SPEAG	SAM V5.0	1850	NCR	NCR
☒	ELI Phantom	SPEAG	ELI V6.0	2010	NCR	NCR
☒	DAE	SPEAG	DAE3	419	2023/6/20	2024/6/19
☒	E-Field Probe	SPEAG	EX3DV4	3805	2023/11/23	2024/11/22
☒	Validation Kits	SPEAG	D835V2	4d124	2023/10/24	2026/10/23
☒	Validation Kits	SPEAG	D2450V2	808	2023/10/23	2026/10/22
☒	Validation Kits	SPEAG	D2600V2	1071	2023/6/20	2026/6/19
☒	Agilent Network Analyzer	Agilent	8753E	SU38432944	2023/6/9	2024/6/8
☒	Dielectric Probe Kit	SPEAG	DAK3.5	1425	NCR	NCR
☒	Universal Radio Communication Tester	R&S	CMW500	42115	2023/10/29	2024/10/28
☒	Directional Coupler	MCLI/USA	4426-20	03746	2023/6/9	2024/6/8
☒	Power meter	Agilent	E4419B	MY45104493	2023/10/29	2024/10/28
☒	Power meter	Agilent	E4419B	MY45100308	2023/10/29	2024/10/28
☒	Power sensor	Agilent	E9301H	MY41495616	2023/10/29	2024/10/28
☒	Power sensor	Agilent	E9301H	MY41495234	2023/10/29	2024/10/28
☒	Signal Generator	Agilent	E4438C	MY49072627	2023/6/9	2024/6/8
☒	Broadband Preamplifier	/	BP-01M18G	P190501	2023/6/15	2024/6/14
☒	DC POWER SUPPLY	I-SHENG	SP-504	NA	NCR	NCR
☒	Speed reading thermometer	HTC-1	NA	LCS-E-138	2023/6/13	2024/6/12

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



2. SAR MEASUREMENTS SYSTEM CONFIGURATION

2.1. 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 $SAR = \sigma (|E|^2) / \rho$ where σ and ρ are the conductivity and mass density of the tissue-Simulate.

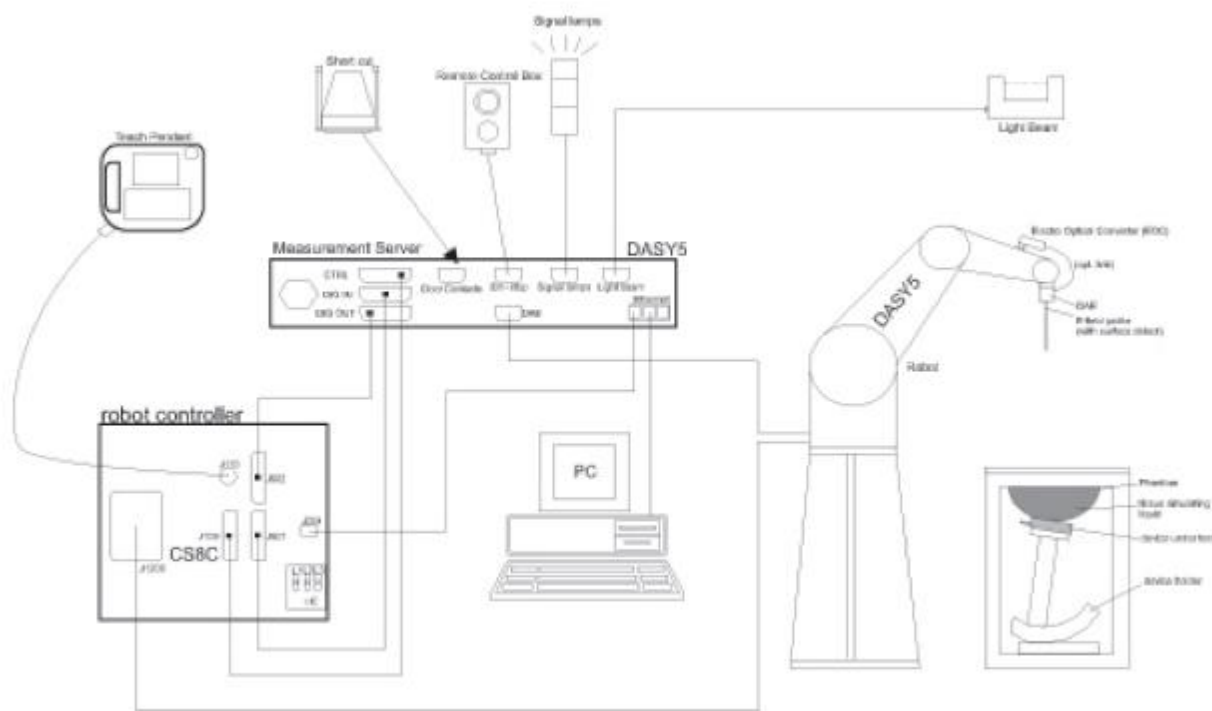
The DASY5 system for performing compliance tests consists of the following items:

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.



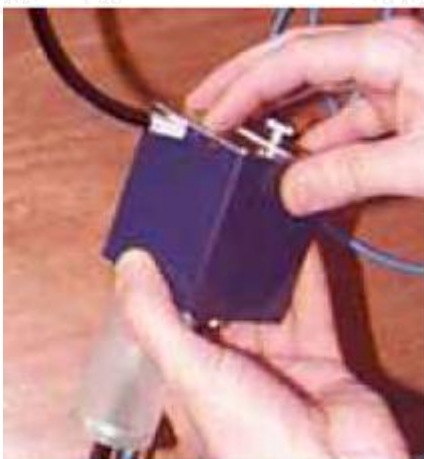


2.2. Isotropic E-field Probe EX3DV4

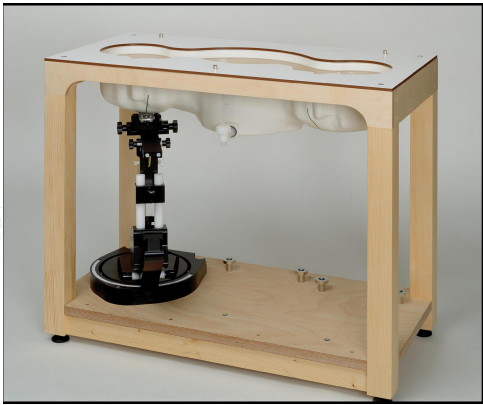
	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/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	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	

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 $\epsilon=3$ and loss tangent $\delta=0.02$. 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 32mm*32mm*30mm ($f \leq 2\text{GHz}$), 30mm*30mm*30mm (f for 2-3GHz) and 24mm*24mm*22mm (f for 5-6GHz) was assessed by measuring 5x5x7 points ($f \leq 2\text{GHz}$), 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.





		≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location		$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
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 $\leq$ 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 1 st two points closest to phantom surface $\Delta z_{Zoom}(n>1)$: between subsequent points	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z	≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

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. $\pm 5\%$

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 “.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.





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:

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

With V_i = compensated signal of channel i ($i = x, y, z$)

U_i = input signal of channel i ($i = x, y, z$)

cf = crest factor of exciting field (DASY parameter)

dcpi = 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 V_i = compensated signal of channel i ($i = x, y, z$)

Norm $_i$ = sensor sensitivity of channel i ($i = x, y, z$)

[mV/(V/m)²] for E-field Probes

ConvF = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = 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.

$$SAR = (E_{tot}^2 \cdot \sigma) / (\epsilon \cdot 1000)$$

with SAR = local specific absorption rate in mW/g

E_{tot} = 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.

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

with P_{pwe} = equivalent power density of a plane wave in mW/cm²

E_{tot} = total electric field strength in V/m

H_{tot} = total magnetic field strength in A/m



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



3. SAR measurement variability and uncertainty

3.1. 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 ($\sim 10\%$ 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.

3.2. 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.



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity

4. Description of Test Position

4.1. Body Exposure Condition

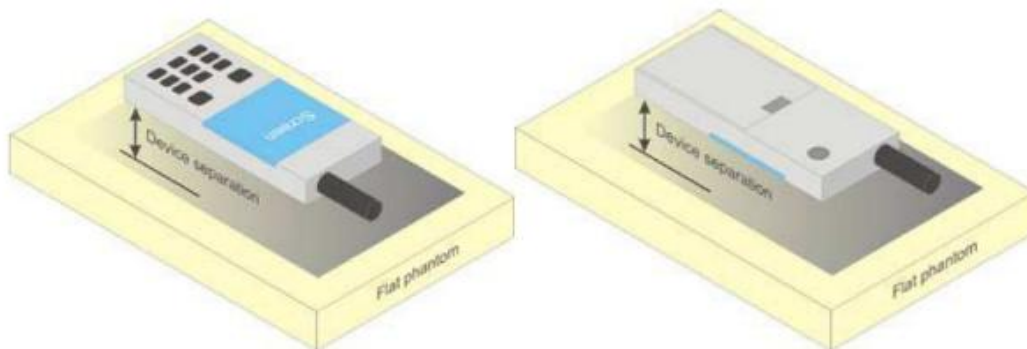
4.1.1. Body-worn accessory exposure conditions

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-1. Test positions for body-worn devices





4.1.2. 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 ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) 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.

4.2. Extremity exposure conditions

Per FCC KDB 648474D04, for smart phones with a display diagonal dimension $> 15.0 \text{ cm}$ or an overall diagonal dimension $> 16.0 \text{ cm}$ that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the device is marketed as "Phablet".

The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at $\leq 25 \text{ mm}$ from that surface or edge, in direct contact with a flat phantom, for Product Specific 10-g SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR $> 1.2 \text{ W/kg}$; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

Due to the SAR result, the Main antenna frequency bands are not required to test with 0mm for the Product Specific 10 g SAR.





5. SAR System Verification Procedure

5.1. Tissue Simulate Liquid

5.1.1. Recipes for Tissue Simulate Liquid

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

Ingredients (% by weight)	Frequency (MHz)				
	450	700-900	1750-2000	2300-2500	2500-2700
Water	38.56	40.30	55.24	55.00	54.92
Salt (NaCl)	3.95	1.38	0.31	0.2	0.23
Sucrose	56.32	57.90	0	0	0
HEC	0.98	0.24	0	0	0
Bactericide	0.19	0.18	0	0	0
Tween	0	0	44.45	44.80	44.85
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 1: Recipe of Tissue Simulate Liquid





5.1.2. Measurement for Tissue Simulate Liquid

The dielectric properties for this Tissue Simulate Liquids were measured by using the DAKS. 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 $22\pm 2^{\circ}\text{C}$.

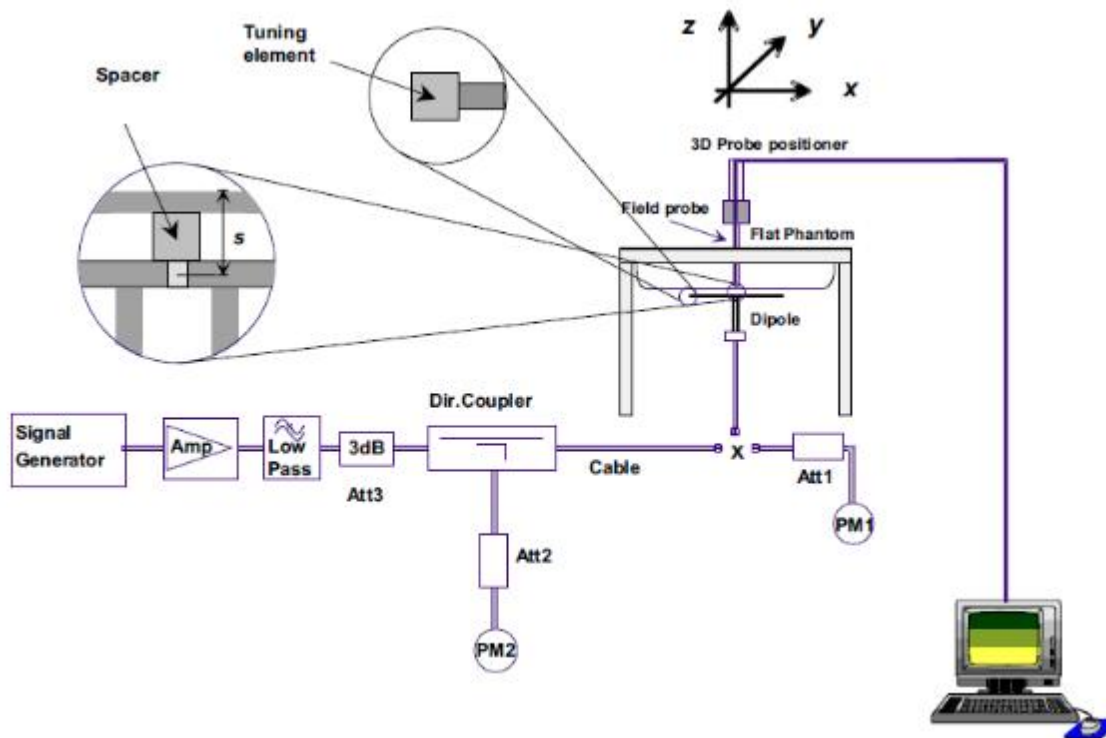
Tissue Type	Measured Frequency (MHz)	Target Tissue ($\pm 5\%$)		Measured Tissue		Liquid Temp. ($^{\circ}\text{C}$)	Measured Date
		ϵ_r	$\sigma(\text{S/m})$	ϵ_r	$\sigma(\text{S/m})$		
835 Head	835	41.5 (39.43~43.58)	0.9 (0.86~0.95)	41.120	0.895	22.4	January 23, 2024
2450 Head	2450	39.2 (37.24~41.16)	1.8 (1.71~1.89)	39.124	1.784	22.6	April 02, 2024
2600 Head	2600	39 (37.05~40.95)	1.96 (1.86~2.06)	39.202	1.996	22.6	April 03, 2024

Table 2: Measurement result of Tissue electric parameters



5.2. SAR System Check

The microwave circuit arrangement for system Check is sketched in F-1. 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 $\pm 10\%$ 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 $22\pm 2^{\circ}\text{C}$, 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-1. the microwave circuit arrangement used for SAR system check

5.2.1. 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.

- There is no physical damage on the dipole;
- System check with specific dipole is within 10% of calibrated value;
- Return-loss is within 20% of calibrated measurement;
- 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.





5.2.2. 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. (°C)	Measured Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)		
D835V2	Head	2.58	1.60	10.32	6.40	9.59 (8.63~10.55)	6.37 (5.73~7.01)	22.4	January 23, 2024
D2450V2	Head	12.85	5.66	51.40	22.64	53.5 (48.15~58.85)	24.8 (22.32~27.28)	22.6	April 02, 2024
D2600V2	Head	13.32	6.58	53.28	26.32	56.80 (51.12~62.48)	25.5 (22.95~28.05)	22.6	April 03, 2024

Table 3: Please see the Appendix A





6. SAR measurement procedure

The measurement procedures are as follows:

6.1. Conducted power measurement

- For WWAN power measurement, use base station simulator connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- Read the WWAN RF power level from the base station simulator.
- For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously Transmission, at maximum RF power in each supported wireless interface and frequency band.
- Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power.

6.2. GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a System Simulator (SS) by air link. Using CMU200 the power level is set to "5" for GSM 850, set to "0" for GSM 1900. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 4. the EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 4.

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. GSM voice and GPRS data use GMSK, which is a constant amplitude modulation with minimal peak to average power difference within the time-slot burst. For EDGE, GMSK is used for MCS 1 – MCS 4 and 8-PSK is used for MCS 5 – MCS 9; where 8-PSK has an inherently higher peak-to-average power ratio. The GMSK and 8-PSK EDGE configurations are considered separately for SAR compliance. The GMSK EDGE configurations are grouped with GPRS and considered with respect to time-averaged maximum output power to determine compliance. The 3G SAR test reduction procedure is applied to 8-PSK EDGE with GMSK GPRS/EDGE as the primary mode.

6.3. UMTS Test Configuration

3G SAR Test Reduction Procedure

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 $\leq \frac{1}{4}$ 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.

Output power Verification

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.

Head SAR

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.

1) Body-Worn Accessory SAR

SAR for body-worn accessory 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 spreading 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.

2) Handsets with Release 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body-worn accessory configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSDPA using the HSDPA body SAR procedures in the "Release 5 HSDPA Data Devices" section of this document, for the highest reported SAR body-worn accessory exposure configuration in 12.2 kbps RMC. Handsets with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

HSDPA should be configured according to the UE category of a test device. The number of HSDSCH/ 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 with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors (β_c , β_d), and HS-DPCCH power offset parameters (Δ_{ACK} , Δ_{NACK} , Δ_{CQI}) should be set according to values indicated in the Table below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set

Table 2: Subtests for UMTS Release 5 HSDPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (note 1, note 2)	CM(dB) (note 3)	MPR(dB)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (note 4)	15/15 (note 4)	64	12/15 (note 4)	24/15	1.0	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: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$
Note2: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.
Note3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC (TFC1,TF1) to $\beta_c=11/15$ and $\beta_d=15/15$.

HSUPA Test Configuration

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body-worn accessory configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSPA using the HSPA body SAR procedures in the "Release 6 HSPA Data Devices" section of this document, for the highest reported body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When VOIP is applicable for next to the ear head exposure in HSPA, the 3G SAR test reduction procedure is applied to HSPA with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body-worn accessory measurements is tested for next to the ear head exposure.

Due to inner loop power control requirements in HSPA, a communication test set is required for output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSPA are configured according to the β values indicated in Table 2 and other applicable procedures described in the 'WCDMA Handset' and 'Release 5 HSDPA Data Devices' sections of this document

Table 3: Sub-Test 5 Setup for Release 6 HSUPA



Shenzhen LCS Compliance Testing Laboratory Ltd.
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China
Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com
Scan code to check authenticity



Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	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 $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

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 signaled 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 signaled 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

Figure 5.1g.

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

6.4. LTE Test Configuration

QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel.8 When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

QPSK with 50% RB allocation

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

QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in sections 4.2.1 and 4.2.2 are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

6.5.Power Reduction

The product without any power reduction.

6.6.Power Drift

To control the output power stability during the SAR test, SAR system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. This ensures that the power drift during one measurement is within ± 0.2 dB.





7. TEST CONDITIONS AND RESULTS

7.1. Conducted Power Results

According KDB 447498 D01 General RF Exposure Guidance v06 Section 4.1 2) states that “Unless it is specified differently in the published RF exposure KDB procedures, these requirements also apply to test reduction and test exclusion considerations. Time-averaged maximum conducted output power applies to SAR and, as required by § 2.1091(c), time-averaged ERP applies to MPE. When an antenna port is not available on the device to support conducted power measurement, such as FRS and certain Part 15 transmitters with built-in integral antennas, the maximum output power allowed for production units should be used to determine RF exposure test exclusion and compliance.”

7.1.1. Conducted Power Measurement Results(LTE Band 5)

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dBm)	Tune-up
Band5	1.4MHz	QPSK	20407	1RB#0	23.43	24.00
Band5	1.4MHz	16QAM	20407	1RB#0	22.27	23.00
Band5	1.4MHz	QPSK	20407	1RB#2	23.41	24.00
Band5	1.4MHz	16QAM	20407	1RB#2	22.34	23.00
Band5	1.4MHz	QPSK	20407	1RB#5	23.34	24.00
Band5	1.4MHz	16QAM	20407	1RB#5	22.25	23.00
Band5	1.4MHz	QPSK	20407	3RB#0	23.51	24.00
Band5	1.4MHz	16QAM	20407	3RB#0	22.30	23.00
Band5	1.4MHz	QPSK	20407	3RB#1	23.52	24.00
Band5	1.4MHz	16QAM	20407	3RB#1	22.27	23.00
Band5	1.4MHz	QPSK	20407	3RB#3	23.50	24.00
Band5	1.4MHz	16QAM	20407	3RB#3	22.27	23.00
Band5	1.4MHz	QPSK	20407	6RB#0	22.60	23.00
Band5	1.4MHz	16QAM	20407	6RB#0	21.63	22.00
Band5	1.4MHz	QPSK	20525	1RB#0	23.47	24.00
Band5	1.4MHz	16QAM	20525	1RB#0	22.34	23.00
Band5	1.4MHz	QPSK	20525	1RB#2	23.55	24.00
Band5	1.4MHz	16QAM	20525	1RB#2	22.31	23.00
Band5	1.4MHz	QPSK	20525	1RB#5	23.54	24.00
Band5	1.4MHz	16QAM	20525	1RB#5	22.29	23.00
Band5	1.4MHz	QPSK	20525	3RB#0	23.60	24.00
Band5	1.4MHz	16QAM	20525	3RB#0	22.40	23.00
Band5	1.4MHz	QPSK	20525	3RB#1	23.61	24.00
Band5	1.4MHz	16QAM	20525	3RB#1	22.42	23.00
Band5	1.4MHz	QPSK	20525	3RB#3	23.62	24.00
Band5	1.4MHz	16QAM	20525	3RB#3	22.37	23.00
Band5	1.4MHz	QPSK	20525	6RB#0	22.71	23.00
Band5	1.4MHz	16QAM	20525	6RB#0	21.67	22.00



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



Band5	1.4MHz	QPSK	20643	1RB#0	23.50	24.00
Band5	1.4MHz	16QAM	20643	1RB#0	22.42	23.00
Band5	1.4MHz	QPSK	20643	1RB#2	23.50	24.00
Band5	1.4MHz	16QAM	20643	1RB#2	22.45	23.00
Band5	1.4MHz	QPSK	20643	1RB#5	23.48	24.00
Band5	1.4MHz	16QAM	20643	1RB#5	22.34	23.00
Band5	1.4MHz	QPSK	20643	3RB#0	23.61	24.00
Band5	1.4MHz	16QAM	20643	3RB#0	22.37	23.00
Band5	1.4MHz	QPSK	20643	3RB#1	23.60	24.00
Band5	1.4MHz	16QAM	20643	3RB#1	22.40	23.00
Band5	1.4MHz	QPSK	20643	3RB#3	23.56	24.00
Band5	1.4MHz	16QAM	20643	3RB#3	22.31	23.00
Band5	1.4MHz	QPSK	20643	6RB#0	22.69	23.00
Band5	1.4MHz	16QAM	20643	6RB#0	21.67	22.00
Band5	3MHz	QPSK	20415	1RB#0	23.21	24.00
Band5	3MHz	16QAM	20415	1RB#0	22.15	23.00
Band5	3MHz	QPSK	20415	1RB#8	23.29	24.00
Band5	3MHz	16QAM	20415	1RB#8	22.28	23.00
Band5	3MHz	QPSK	20415	1RB#14	23.13	24.00
Band5	3MHz	16QAM	20415	1RB#14	22.12	23.00
Band5	3MHz	QPSK	20415	8RB#0	22.37	23.00
Band5	3MHz	16QAM	20415	8RB#0	21.40	22.00
Band5	3MHz	QPSK	20415	8RB#4	22.40	23.00
Band5	3MHz	16QAM	20415	8RB#4	21.38	22.00
Band5	3MHz	QPSK	20415	8RB#7	22.42	23.00
Band5	3MHz	16QAM	20415	8RB#7	21.38	22.00
Band5	3MHz	QPSK	20415	15RB#0	22.37	23.00
Band5	3MHz	16QAM	20415	15RB#0	21.43	22.00
Band5	3MHz	QPSK	20525	1RB#0	23.34	24.00
Band5	3MHz	16QAM	20525	1RB#0	22.21	23.00
Band5	3MHz	QPSK	20525	1RB#8	23.52	24.00
Band5	3MHz	16QAM	20525	1RB#8	22.28	23.00
Band5	3MHz	QPSK	20525	1RB#14	23.38	24.00
Band5	3MHz	16QAM	20525	1RB#14	22.14	23.00
Band5	3MHz	QPSK	20525	8RB#0	22.52	23.00
Band5	3MHz	16QAM	20525	8RB#0	21.51	22.00
Band5	3MHz	QPSK	20525	8RB#4	22.49	23.00
Band5	3MHz	16QAM	20525	8RB#4	21.50	22.00





Band5	3MHz	QPSK	20525	8RB#7	22.48	23.00
Band5	3MHz	16QAM	20525	8RB#7	21.57	22.00
Band5	3MHz	QPSK	20525	15RB#0	22.55	23.00
Band5	3MHz	16QAM	20525	15RB#0	21.44	22.00
Band5	3MHz	QPSK	20635	1RB#0	23.32	24.00
Band5	3MHz	16QAM	20635	1RB#0	22.08	23.00
Band5	3MHz	QPSK	20635	1RB#8	23.49	24.00
Band5	3MHz	16QAM	20635	1RB#8	22.20	23.00
Band5	3MHz	QPSK	20635	1RB#14	23.31	24.00
Band5	3MHz	16QAM	20635	1RB#14	22.14	23.00
Band5	3MHz	QPSK	20635	8RB#0	22.60	23.00
Band5	3MHz	16QAM	20635	8RB#0	21.55	22.00
Band5	3MHz	QPSK	20635	8RB#4	22.62	23.00
Band5	3MHz	16QAM	20635	8RB#4	21.58	22.00
Band5	3MHz	QPSK	20635	8RB#7	22.56	23.00
Band5	3MHz	16QAM	20635	8RB#7	21.49	22.00
Band5	3MHz	QPSK	20635	15RB#0	22.57	23.00
Band5	3MHz	16QAM	20635	15RB#0	21.43	22.00
Band5	5MHz	QPSK	20425	1RB#0	23.54	24.00
Band5	5MHz	16QAM	20425	1RB#0	22.47	23.00
Band5	5MHz	QPSK	20425	1RB#12	23.62	24.00
Band5	5MHz	16QAM	20425	1RB#12	22.51	23.00
Band5	5MHz	QPSK	20425	1RB#24	23.50	24.00
Band5	5MHz	16QAM	20425	1RB#24	22.42	23.00
Band5	5MHz	QPSK	20425	12RB#0	22.41	23.00
Band5	5MHz	16QAM	20425	12RB#0	21.46	22.00
Band5	5MHz	QPSK	20425	12RB#6	22.47	23.00
Band5	5MHz	16QAM	20425	12RB#6	21.41	22.00
Band5	5MHz	QPSK	20425	12RB#13	22.49	23.00
Band5	5MHz	16QAM	20425	12RB#13	21.43	22.00
Band5	5MHz	QPSK	20425	25RB#0	22.46	23.00
Band5	5MHz	16QAM	20425	25RB#0	21.57	22.00
Band5	5MHz	QPSK	20525	1RB#0	23.65	24.00
Band5	5MHz	16QAM	20525	1RB#0	22.59	23.00
Band5	5MHz	QPSK	20525	1RB#12	23.76	24.00
Band5	5MHz	16QAM	20525	1RB#12	22.78	23.00
Band5	5MHz	QPSK	20525	1RB#24	23.70	24.00
Band5	5MHz	16QAM	20525	1RB#24	22.72	23.00





Band5	5MHz	QPSK	20525	12RB#0	22.66	23.00
Band5	5MHz	16QAM	20525	12RB#0	21.63	22.00
Band5	5MHz	QPSK	20525	12RB#6	22.63	23.00
Band5	5MHz	16QAM	20525	12RB#6	21.65	22.00
Band5	5MHz	QPSK	20525	12RB#13	22.63	23.00
Band5	5MHz	16QAM	20525	12RB#13	21.73	22.00
Band5	5MHz	QPSK	20525	25RB#0	22.66	23.00
Band5	5MHz	16QAM	20525	25RB#0	21.68	22.00
Band5	5MHz	QPSK	20625	1RB#0	23.68	24.00
Band5	5MHz	16QAM	20625	1RB#0	22.53	23.00
Band5	5MHz	QPSK	20625	1RB#12	23.83	24.00
Band5	5MHz	16QAM	20625	1RB#12	22.65	23.00
Band5	5MHz	QPSK	20625	1RB#24	23.64	24.00
Band5	5MHz	16QAM	20625	1RB#24	22.48	23.00
Band5	5MHz	QPSK	20625	12RB#0	22.71	23.00
Band5	5MHz	16QAM	20625	12RB#0	21.62	22.00
Band5	5MHz	QPSK	20625	12RB#6	22.61	23.00
Band5	5MHz	16QAM	20625	12RB#6	21.70	22.00
Band5	5MHz	QPSK	20625	12RB#13	22.56	23.00
Band5	5MHz	16QAM	20625	12RB#13	21.57	22.00
Band5	5MHz	QPSK	20625	25RB#0	22.69	23.00
Band5	5MHz	16QAM	20625	25RB#0	21.65	22.00
Band5	10MHz	QPSK	20450	1RB#0	23.57	24.00
Band5	10MHz	16QAM	20450	1RB#0	22.52	23.00
Band5	10MHz	QPSK	20450	1RB#24	23.54	24.00
Band5	10MHz	16QAM	20450	1RB#24	22.57	23.00
Band5	10MHz	QPSK	20450	1RB#49	23.59	24.00
Band5	10MHz	16QAM	20450	1RB#49	22.59	23.00
Band5	10MHz	QPSK	20450	25RB#0	22.37	23.00
Band5	10MHz	16QAM	20450	25RB#0	21.44	22.00
Band5	10MHz	QPSK	20450	25RB#12	22.40	23.00
Band5	10MHz	16QAM	20450	25RB#12	21.38	22.00
Band5	10MHz	QPSK	20450	25RB#25	22.49	23.00
Band5	10MHz	16QAM	20450	25RB#25	21.49	22.00
Band5	10MHz	QPSK	20450	50RB#0	22.51	23.00
Band5	10MHz	16QAM	20450	50RB#0	21.48	22.00
Band5	10MHz	QPSK	20525	1RB#0	23.64	24.00
Band5	10MHz	16QAM	20525	1RB#0	22.46	23.00





Band5	10MHz	QPSK	20525	1RB#24	23.78	24.00
Band5	10MHz	16QAM	20525	1RB#24	22.58	23.00
Band5	10MHz	QPSK	20525	1RB#49	23.77	24.00
Band5	10MHz	16QAM	20525	1RB#49	22.54	23.00
Band5	10MHz	QPSK	20525	25RB#0	22.60	23.00
Band5	10MHz	16QAM	20525	25RB#0	21.63	22.00
Band5	10MHz	QPSK	20525	25RB#12	22.56	23.00
Band5	10MHz	16QAM	20525	25RB#12	21.62	22.00
Band5	10MHz	QPSK	20525	25RB#25	22.74	23.00
Band5	10MHz	16QAM	20525	25RB#25	21.67	22.00
Band5	10MHz	QPSK	20525	50RB#0	22.64	23.00
Band5	10MHz	16QAM	20525	50RB#0	21.73	22.00
Band5	10MHz	QPSK	20600	1RB#0	23.72	24.00
Band5	10MHz	16QAM	20600	1RB#0	22.51	23.00
Band5	10MHz	QPSK	20600	1RB#24	23.76	24.00
Band5	10MHz	16QAM	20600	1RB#24	22.47	23.00
Band5	10MHz	QPSK	20600	1RB#49	23.63	24.00
Band5	10MHz	16QAM	20600	1RB#49	22.40	23.00
Band5	10MHz	QPSK	20600	25RB#0	22.67	23.00
Band5	10MHz	16QAM	20600	25RB#0	21.64	22.00
Band5	10MHz	QPSK	20600	25RB#12	22.66	23.00
Band5	10MHz	16QAM	20600	25RB#12	21.65	22.00
Band5	10MHz	QPSK	20600	25RB#25	22.55	23.00
Band5	10MHz	16QAM	20600	25RB#25	21.68	22.00
Band5	10MHz	QPSK	20600	50RB#0	22.68	23.00
Band5	10MHz	16QAM	20600	50RB#0	21.69	22.00



**7.1.2. Conducted Power Measurement Results(LTE Band 41)**

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dBm)	Tune-up
Band41	5MHz	QPSK	39675	1RB#0	24.35	25.00
Band41	5MHz	16QAM	39675	1RB#0	23.63	24.00
Band41	5MHz	QPSK	39675	1RB#12	24.53	25.00
Band41	5MHz	16QAM	39675	1RB#12	23.78	24.00
Band41	5MHz	QPSK	39675	1RB#24	24.41	25.00
Band41	5MHz	16QAM	39675	1RB#24	23.72	24.00
Band41	5MHz	QPSK	39675	12RB#0	23.46	24.00
Band41	5MHz	16QAM	39675	12RB#0	22.40	23.00
Band41	5MHz	QPSK	39675	12RB#6	23.46	24.00
Band41	5MHz	16QAM	39675	12RB#6	22.41	23.00
Band41	5MHz	QPSK	39675	12RB#13	23.50	24.00
Band41	5MHz	16QAM	39675	12RB#13	22.44	23.00
Band41	5MHz	QPSK	39675	25RB#0	23.50	24.00
Band41	5MHz	16QAM	39675	25RB#0	22.48	23.00
Band41	5MHz	QPSK	40620	1RB#0	24.47	25.00
Band41	5MHz	16QAM	40620	1RB#24	23.73	24.00
Band41	5MHz	QPSK	40620	12RB#0	23.57	24.00
Band41	5MHz	16QAM	40620	12RB#0	22.55	23.00
Band41	5MHz	QPSK	40620	12RB#6	23.57	24.00
Band41	5MHz	16QAM	40620	12RB#6	22.52	23.00
Band41	5MHz	QPSK	40620	12RB#13	23.53	24.00
Band41	5MHz	16QAM	40620	12RB#13	22.51	23.00
Band41	5MHz	16QAM	40620	25RB#0	22.60	23.00
Band41	5MHz	QPSK	41565	1RB#0	23.93	24.00
Band41	5MHz	16QAM	41565	1RB#0	23.25	24.00
Band41	5MHz	16QAM	40620	1RB#0	23.79	24.00
Band41	5MHz	QPSK	40620	1RB#12	24.61	25.00
Band41	5MHz	QPSK	41565	1RB#12	24.03	25.00
Band41	5MHz	16QAM	41565	1RB#12	23.34	24.00
Band41	5MHz	QPSK	41565	1RB#24	23.87	24.00
Band41	5MHz	16QAM	41565	1RB#24	23.18	24.00
Band41	5MHz	QPSK	41565	12RB#0	23.02	24.00
Band41	5MHz	16QAM	41565	12RB#0	22.01	23.00
Band41	5MHz	16QAM	41565	12RB#6	21.98	22.00
Band41	5MHz	QPSK	41565	12RB#13	22.97	23.00



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



Band41	5MHz	16QAM	40620	1RB#12	23.91	24.00
Band41	5MHz	QPSK	40620	1RB#24	24.45	25.00
Band41	5MHz	QPSK	40620	25RB#0	23.56	24.00
Band41	5MHz	QPSK	41565	12RB#6	23.03	24.00
Band41	5MHz	16QAM	41565	12RB#13	21.93	22.00
Band41	5MHz	QPSK	41565	25RB#0	23.01	24.00
Band41	5MHz	16QAM	41565	25RB#0	22.04	23.00
Band41	10MHz	QPSK	39700	1RB#0	24.53	25.00
Band41	10MHz	16QAM	39700	1RB#0	23.63	24.00
Band41	10MHz	QPSK	39700	1RB#24	24.85	25.00
Band41	10MHz	16QAM	39700	1RB#24	23.97	24.00
Band41	10MHz	QPSK	39700	1RB#49	24.62	25.00
Band41	10MHz	16QAM	39700	1RB#49	23.75	24.00
Band41	10MHz	QPSK	39700	25RB#0	23.59	24.00
Band41	10MHz	16QAM	39700	25RB#0	22.64	23.00
Band41	10MHz	QPSK	39700	25RB#12	23.61	24.00
Band41	10MHz	16QAM	39700	25RB#12	22.65	23.00
Band41	10MHz	QPSK	39700	25RB#25	23.62	24.00
Band41	10MHz	16QAM	39700	25RB#25	22.70	23.00
Band41	10MHz	QPSK	39700	50RB#0	23.58	24.00
Band41	10MHz	16QAM	39700	50RB#0	22.58	23.00
Band41	10MHz	QPSK	40620	1RB#0	24.62	25.00
Band41	10MHz	16QAM	40620	1RB#0	23.77	24.00
Band41	10MHz	QPSK	40620	1RB#24	24.84	25.00
Band41	10MHz	16QAM	40620	1RB#24	23.98	24.00
Band41	10MHz	QPSK	40620	1RB#49	24.58	25.00
Band41	10MHz	16QAM	40620	1RB#49	23.73	24.00
Band41	10MHz	QPSK	40620	25RB#0	23.67	24.00
Band41	10MHz	16QAM	40620	25RB#0	22.74	23.00
Band41	10MHz	QPSK	40620	25RB#12	23.67	24.00
Band41	10MHz	16QAM	40620	25RB#12	22.77	23.00
Band41	10MHz	QPSK	40620	25RB#25	23.62	24.00
Band41	10MHz	16QAM	40620	25RB#25	22.69	23.00
Band41	10MHz	QPSK	40620	50RB#0	23.63	24.00
Band41	10MHz	16QAM	40620	50RB#0	22.67	23.00
Band41	10MHz	QPSK	41540	1RB#0	24.22	25.00
Band41	10MHz	16QAM	41540	1RB#0	23.39	24.00
Band41	10MHz	QPSK	41540	1RB#24	24.35	25.00



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



Band41	10MHz	16QAM	41540	1RB#24	23.49	24.00
Band41	10MHz	QPSK	41540	1RB#49	24.06	25.00
Band41	10MHz	16QAM	41540	1RB#49	23.18	24.00
Band41	10MHz	QPSK	41540	25RB#0	23.19	24.00
Band41	10MHz	16QAM	41540	25RB#0	22.30	23.00
Band41	10MHz	QPSK	41540	25RB#12	23.23	24.00
Band41	10MHz	16QAM	41540	25RB#12	22.34	23.00
Band41	10MHz	QPSK	41540	25RB#25	23.09	24.00
Band41	10MHz	16QAM	41540	25RB#25	22.16	23.00
Band41	10MHz	QPSK	41540	50RB#0	23.15	24.00
Band41	10MHz	16QAM	41540	50RB#0	22.19	23.00
Band41	15MHz	QPSK	39725	1RB#0	24.46	25.00
Band41	15MHz	16QAM	39725	1RB#0	23.55	24.00
Band41	15MHz	QPSK	39725	1RB#38	24.68	25.00
Band41	15MHz	16QAM	39725	1RB#38	23.76	24.00
Band41	15MHz	QPSK	39725	1RB#74	24.52	25.00
Band41	15MHz	16QAM	39725	1RB#74	23.66	24.00
Band41	15MHz	QPSK	39725	38RB#0	23.64	24.00
Band41	15MHz	16QAM	39725	38RB#0	23.66	24.00
Band41	15MHz	QPSK	39725	38RB#18	23.64	24.00
Band41	15MHz	16QAM	39725	38RB#18	23.64	24.00
Band41	15MHz	QPSK	39725	38RB#37	23.62	24.00
Band41	15MHz	16QAM	39725	38RB#37	23.66	24.00
Band41	15MHz	QPSK	39725	75RB#0	23.66	24.00
Band41	15MHz	16QAM	39725	75RB#0	22.63	23.00
Band41	15MHz	QPSK	40620	1RB#0	24.55	25.00
Band41	15MHz	16QAM	40620	1RB#0	23.73	24.00
Band41	15MHz	QPSK	40620	1RB#38	24.62	25.00
Band41	15MHz	16QAM	40620	1RB#38	23.79	24.00
Band41	15MHz	QPSK	40620	1RB#74	24.46	25.00
Band41	15MHz	16QAM	40620	1RB#74	23.61	24.00
Band41	15MHz	QPSK	40620	38RB#0	23.66	24.00
Band41	15MHz	16QAM	40620	38RB#0	23.68	24.00
Band41	15MHz	QPSK	40620	38RB#18	23.66	24.00
Band41	15MHz	16QAM	40620	38RB#18	23.68	24.00
Band41	15MHz	QPSK	40620	38RB#37	23.66	24.00
Band41	15MHz	16QAM	40620	38RB#37	23.70	24.00
Band41	15MHz	QPSK	40620	75RB#0	23.66	24.00



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



Band41	15MHz	16QAM	40620	75RB#0	22.65	23.00
Band41	15MHz	QPSK	41515	1RB#0	24.27	25.00
Band41	15MHz	16QAM	41515	1RB#0	23.43	24.00
Band41	15MHz	QPSK	41515	1RB#38	24.17	25.00
Band41	15MHz	16QAM	41515	1RB#38	23.33	24.00
Band41	15MHz	QPSK	41515	1RB#74	23.96	24.00
Band41	15MHz	16QAM	41515	1RB#74	23.12	24.00
Band41	15MHz	QPSK	41515	38RB#0	23.18	24.00
Band41	15MHz	16QAM	41515	38RB#0	23.17	24.00
Band41	15MHz	QPSK	41515	38RB#18	23.18	24.00
Band41	15MHz	16QAM	41515	38RB#18	23.18	24.00
Band41	15MHz	QPSK	41515	38RB#37	23.17	24.00
Band41	15MHz	16QAM	41515	38RB#37	23.22	24.00
Band41	15MHz	QPSK	41515	75RB#0	23.19	24.00
Band41	15MHz	16QAM	41515	75RB#0	22.17	23.00
Band41	20MHz	QPSK	39750	1RB#0	24.34	25.00
Band41	20MHz	16QAM	39750	1RB#0	23.30	24.00
Band41	20MHz	QPSK	39750	1RB#49	24.80	25.00
Band41	20MHz	16QAM	39750	1RB#49	23.77	24.00
Band41	20MHz	QPSK	39750	1RB#99	24.37	25.00
Band41	20MHz	16QAM	39750	1RB#99	23.33	24.00
Band41	20MHz	QPSK	39750	50RB#0	23.56	24.00
Band41	20MHz	16QAM	39750	50RB#0	22.55	23.00
Band41	20MHz	QPSK	39750	50RB#25	23.54	24.00
Band41	20MHz	16QAM	39750	50RB#25	22.55	23.00
Band41	20MHz	QPSK	39750	50RB#50	23.56	24.00
Band41	20MHz	16QAM	39750	50RB#50	22.57	23.00
Band41	20MHz	QPSK	39750	100RB#0	23.56	24.00
Band41	20MHz	16QAM	39750	100RB#0	22.55	23.00
Band41	20MHz	QPSK	40620	1RB#0	24.42	25.00
Band41	20MHz	16QAM	40620	1RB#0	23.42	24.00
Band41	20MHz	QPSK	40620	1RB#49	24.80	25.00
Band41	20MHz	16QAM	40620	1RB#49	23.77	24.00
Band41	20MHz	QPSK	40620	1RB#99	24.36	25.00
Band41	20MHz	16QAM	40620	1RB#99	23.34	24.00
Band41	20MHz	QPSK	40620	50RB#0	23.64	24.00
Band41	20MHz	16QAM	40620	50RB#0	22.65	23.00
Band41	20MHz	QPSK	40620	50RB#25	23.63	24.00



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



Band41	20MHz	16QAM	40620	50RB#25	22.65	23.00
Band41	20MHz	QPSK	40620	50RB#50	23.58	24.00
Band41	20MHz	16QAM	40620	50RB#50	22.61	23.00
Band41	20MHz	QPSK	40620	100RB#0	23.58	24.00
Band41	20MHz	16QAM	40620	100RB#0	22.61	23.00
Band41	20MHz	QPSK	41490	1RB#0	24.25	25.00
Band41	20MHz	16QAM	41490	1RB#0	23.25	24.00
Band41	20MHz	QPSK	41490	1RB#49	24.40	25.00
Band41	20MHz	16QAM	41490	1RB#49	23.38	24.00
Band41	20MHz	QPSK	41490	1RB#99	23.81	24.00
Band41	20MHz	16QAM	41490	1RB#99	22.80	23.00
Band41	20MHz	QPSK	41490	50RB#0	23.29	24.00
Band41	20MHz	16QAM	41490	50RB#0	22.35	23.00
Band41	20MHz	QPSK	41490	50RB#25	23.28	24.00
Band41	20MHz	16QAM	41490	50RB#25	22.33	23.00
Band41	20MHz	QPSK	41490	50RB#50	23.08	24.00
Band41	20MHz	16QAM	41490	50RB#50	22.10	23.00
Band41	20MHz	QPSK	41490	100RB#0	23.17	24.00
Band41	20MHz	16QAM	41490	100RB#0	22.22	23.0



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity

**7.1.3. Conducted Power Measurement Results(WIFI 2.4G)**

Condition	Mode	Frequency (MHz)	Antenna	Total Power (dBm)	Tune Up
NVNT	b	2412	Ant1	15.30	16.00
NVNT	b	2437	Ant1	15.22	16.00
NVNT	b	2462	Ant1	15.23	16.00
NVNT	g	2412	Ant1	14.15	15.00
NVNT	g	2437	Ant1	14.09	15.00
NVNT	g	2462	Ant1	14.53	15.00
NVNT	n20	2412	Ant1	13.24	14.00
NVNT	n20	2437	Ant1	13.43	14.00
NVNT	n20	2462	Ant1	13.36	14.00
NVNT	n40	2422	Ant1	12.23	13.00
NVNT	n40	2437	Ant1	12.17	13.00
NVNT	n40	2452	Ant1	12.12	13.00

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.

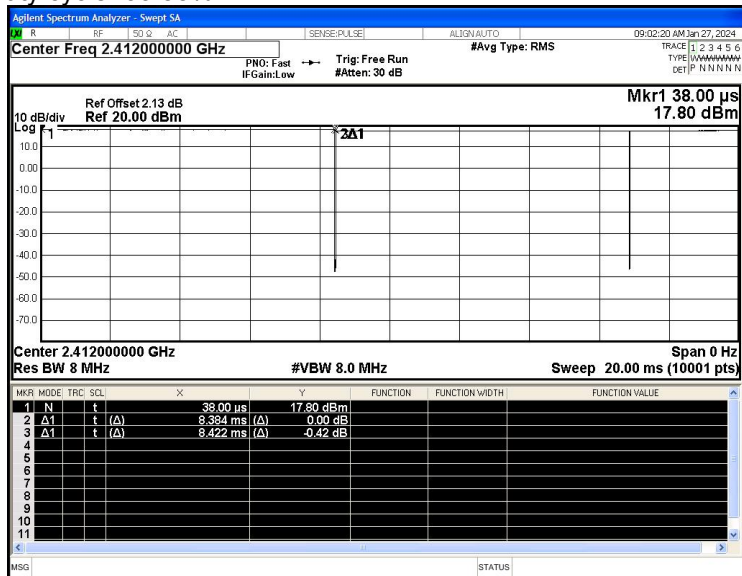
1) When the same highest maximum output power specification applies to multiple transmission modes, the largest channel bandwidth configuration with the lowest order modulation and lowest data rate is measured.

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.

WIFI 2.4G (802.11b):

Duty cycle=99.55%



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



7.2.SAR Measurement Results

The calculated SAR is obtained by the following formula:

$$\text{Reported SAR} = \text{Measured SAR} \times 10^{(P_{\text{target}} - P_{\text{measured}})/10}$$

$$\text{Scaling factor} = 10^{(P_{\text{target}} - P_{\text{measured}})/10}$$

$$\text{Reported SAR} = \text{Measured SAR} \times \text{Scaling factor}$$

Where

P_{target} is the power of manufacturing upper limit;

P_{measured} is the measured power;

Measured SAR is measured SAR at measured power which including power drift)

Reported SAR which including Power Drift and Scaling factor

7.2.1.SAR Results [LTE Band 5]

SAR Values [LTE Band 5]									
Ch/ Freq. (MHz)	BW.	Channel Type	Test Position	Conducte d Power (dBm)	Maximum Allowed Power (dBm)	Power Drift (dB)	Scalin g Factor	SAR _{1-g} results(W/kg)	
								Measured	Reporte d
measured / reported SAR numbers - Body (Test data distance 0mm)<1RB>									
20525/836.5	10M	QPSK 1RB_24	Front side	23.78	24.00	-0.01	1.052	0.502	0.528
20525/836.5	10M	QPSK 1RB_24	Rear side	23.78	24.00	-0.11	1.052	0.672	0.707
20525/836.5	10M	QPSK 1RB_24	Left side	23.78	24.00	0.05	1.052	0.652	0.686
20525/836.5	10M	QPSK 1RB_24	Right side	23.78	24.00	-0.18	1.052	0.589	0.620
20525/836.5	10M	QPSK 1RB_24	Top side	23.78	24.00	0.15	1.052	0.466	0.490
20525/836.5	10M	QPSK 1RB_24	Bottom side	23.78	24.00	0.03	1.052	0.544	0.572
measured / reported SAR numbers - Body (Test data distance 0mm)<50%RB>									
20525/836.5	10M	QPSK 25RB_25	Front side	22.74	23.00	-0.05	1.062	0.481	0.511
20525/836.5	10M	QPSK 25RB_25	Rear side	22.74	23.00	-0.14	1.062	0.655	0.695
20525/836.5	10M	QPSK 25RB_25	Left side	22.74	23.00	0.08	1.062	0.624	0.662
20525/836.5	10M	QPSK 25RB_25	Right side	22.74	23.00	-0.12	1.062	0.542	0.575
20525/836.5	10M	QPSK 25RB_25	Top side	22.74	23.00	0.11	1.062	0.425	0.451
20525/836.5	10M	QPSK 25RB_25	Bottom side	22.74	23.00	0.17	1.062	0.511	0.543
measured / reported SAR numbers - Body (Test data distance 0mm)<1RB>support									
20525/836.5	10M	QPSK 1RB_24	Rear side	23.78	24.00	-0.15	1.052	0.041	0.043
measured / reported SAR numbers - Body (Test data distance 0mm)<50%RB>support									
20525/836.5	10M	QPSK 25RB_25	Rear side	22.74	23.00	0.09	1.062	0.026	0.028

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:
 - $\leq 0.8\text{W/kg}$ for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is $\leq 100\text{MHz}$.
 - $\leq 0.6\text{ W/kg}$ or 1.5 W/kg , for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.
 - $\leq 0.4\text{ W/kg}$ or 1.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\geq 200\text{ MHz}$.



**7.2.2.SAR Results [LTE Band 41]**

SAR Values [LTE Band 41]									
Ch/ Freq. (MHz)	BW.	Channel Type	Test Position	Conducte d Power (dBm)	Maximum Allowed Power (dBm)	Power Drift (dB)	Scaling Factor	SAR _{1-g} results(W/kg)	
								Measure d	Reported
measured / reported SAR numbers - Body (Test data distance 0mm)<1RB>									
40620/2593	20M	QPSK 1RB_49	Front side	24.80	25.00	-0.01	1.047	0.198	0.207
40620/2593	20M	QPSK 1RB_49	Rear side	24.80	25.00	-0.07	1.047	0.386	0.404
40620/2593	20M	QPSK 1RB_49	Left side	24.80	25.00	0.17	1.047	0.352	0.369
40620/2593	20M	QPSK 1RB_49	Right side	24.80	25.00	0.00	1.047	0.287	0.301
40620/2593	20M	QPSK 1RB_49	Top side	24.80	25.00	0.05	1.047	0.166	0.174
40620/2593	20M	QPSK 1RB_49	Bottom side	24.80	25.00	-0.11	1.047	0.241	0.252
measured / reported SAR numbers - Body (Test data distance 0mm)<50%RB>									
40620/2593	20M	QPSK 50RB_0	Front side	23.64	24.00	-0.03	1.086	0.161	0.175
40620/2593	20M	QPSK 50RB_0	Rear side	23.64	24.00	0.15	1.086	0.348	0.378
40620/2593	20M	QPSK 50RB_0	Left side	23.64	24.00	-0.18	1.086	0.322	0.350
40620/2593	20M	QPSK 50RB_0	Right side	23.64	24.00	-0.05	1.086	0.239	0.260
40620/2593	20M	QPSK 50RB_0	Top side	23.64	24.00	0.02	1.086	0.120	0.130
40620/2593	20M	QPSK 50RB_0	Bottom side	23.64	24.00	-0.11	1.086	0.201	0.218
measured / reported SAR numbers - Body (Test data distance 0mm)<1RB> support									
40620/2593	20M	QPSK 1RB_49	Rear side	24.80	25.00	-0.11	1.047	0.018	0.019
measured / reported SAR numbers - Body (Test data distance 0mm)<50%RB> support									
40620/2593	20M	QPSK 50RB_0	Rear side	23.64	24.00	-0.18	1.086	0.006	0.007

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:
 - $\leq 0.8\text{W/kg}$ for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is $\leq 100\text{MHz}$.
 - $\leq 0.6\text{ W/kg}$ or 1.5 W/kg , for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.
 - $\leq 0.4\text{ W/kg}$ or 1.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\geq 200\text{ MHz}$.





7.2.3.SAR Results [WIFI 2.4G]

SAR Values [WIFI 2.4G]									
Ch/ Freq. (MHz)	Channel Type	Test Position	Duty Cycle	Conducted Power (dBm)	Maximum Allowed Power (dBm)	Power Drift (dB)	Scaling Factor	SAR _{1-g} results(W/kg)	
								Measured	Reported
measured / reported SAR numbers - Body (Test data distance 0mm)									
1/2412	802.11b	Front side	1.005	15.30	16.00	-0.19	1.175	0.144	0.170
1/2412	802.11b	Rear side	1.005	15.30	16.00	0.15	1.175	0.281	0.332
1/2412	802.11b	Left side	1.005	15.30	16.00	0.05	1.175	0.246	0.290
1/2412	802.11b	Right side	1.005	15.30	16.00	-0.07	1.175	0.240	0.283
1/2412	802.11b	Top side	1.005	15.30	16.00	0.18	1.175	0.110	0.130
1/2412	802.11b	Bottom side	1.005	15.30	16.00	0.03	1.175	0.252	0.297
measured / reported SAR numbers - Body (Test data distance 0mm) support									
1/2412	802.11b	Rear side	1.005	15.30	16.00	0.04	1.175	0.004	0.005

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.
- 2) When the highest reported SAR for the initial test configuration 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 test for the other 802.11 modes are not required.
(802.11n40 Max Power / 802.11b Max Power) * 0.314 = (44.67mW / 39.81mW) * 0.314 W/kg = 0.352 W/kg
The result can be obtained from the above formula, SAR test for the 802.11n40 modes are not required.





7.3. Multiple Transmitter Evaluation

7.3.1. Simultaneous SAR SAR test evaluation

Simultaneous Transmission Possibilities

NO.	Simultaneous Tx Combination	Body
1	LTE + WiFi 2.4G	Yes





7.3.2.Simultaneous Transmission SAR Summation Scenario

Test position		Main Antenna SARmax (W/kg)		WiFi Antenna SARmax (W/kg)	Summed 1g SARmax (W/kg)
		LTE Band 5	LTE Band 41	WLAN 2.4G	
Bdoy	Front side	0.528	0.207	0.170	0.698
	Back side	0.707	0.404	0.332	1.039
	Left side	0.686	0.369	0.290	0.976
	Right side	0.620	0.301	0.283	0.903
	Top side	0.490	0.174	0.130	0.620
	Bottom side	0.572	0.252	0.297	0.869

7.4.Measurement Uncertainty

Not required as SAR measurement uncertainty analysis is required in SAR reports only when the highest measured SAR in a frequency band is ≥ 1.5 W/kg for 1-g SAR according to KDB865664D01.





APPENDIX A: DETAILED SYSTEM CHECK RESULTS





APPENDIX B: DETAILED TEST RESULTS





APPENDIX C: CALIBRATION CERTIFICATE



Shenzhen LCS Compliance Testing Laboratory Ltd.
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China
Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com
Scan code to check authenticity



APPENDIX D: PHOTOGRAPHS

.....The End of Test Report.....

