FCC SAR Test Report

Report No.	:	**PSU-QSU2206080111SA02**
Applicant	:	**JACS Solutions, Inc.**
Address	:	**809 Pinnacle Drive, Suite R, Linthicum Heights, MD 21090**
Product	:	**TD191-B**
FCC ID	:	**2AGCDJACSTD191-B**
Brand	:	**JACS**
Model No.	:	**TD191-B**
Standards	:	**FCC 47 CFR Part 2 (2.1093) / IEEE C95.1:1992 / IEEE 1528:2013 KDB 865664 D01 v01r04 / KDB 865664 D02 v01r02/ KDB 447498 D04 v01 KDB 447498 D02 / KDB 941225 D01 v03r01 / KDB 941225 D05 v02r05**
Sample Received Date	:	**Jun. 29, 2022**
Date of Testing	:	**Jul. 02, 2022 ~ Jul. 18, 2022**
FCC Designation No.	:	**CN1325 FCC Site Registration No. : 434559**
ISSUED BY	:	**Huarui 7layers High Technology (Suzhou) Co., Ltd.**
ADDRESS	:	**Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province China**

CERTIFICATION: The above equipment have been tested by **Huarui 7layers High Technology (Suzhou) Co., Ltd.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by A2LA or any government agencies.

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Peibo Sun/ Manager

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Release Control Record

Report No.	Reason for Change	Date Issued
PSU-QSU2206080111SA02	Initial release	Jul. 20, 2022

1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest Reported Body SAR_{1g} (0.5 cm Gap) (W/kg)
PCB	GSM850	0.66
	GSM1900	1.19
	WCDMA II	1.02
	WCDMA IV	0.85
	WCDMA V	0.85
	LTE 2	0.43
	LTE 5	0.70
	LTE 7	1.18
	LTE 12 / 17	0.81
	LTE 13	0.95
	LTE 41	1.19
	LTE 66 / 4	0.63
	LTE 71	0.75

Note:

1. The SAR limit **(Head & Body: SAR_{1g} 1.6 W/kg, Extremity: SAR_{10g} 4.0 W/kg)** for general population / uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

2. Description of Equipment Under Test

EUT Type	TD191-B
FCC ID	2AGCDJACSTD191-B
Brand Name	JACS
Model Name	TD191-B
HW Version	TD191-B-1.0.0
SW Version	TD191-B_JACS_V1.0.0
Tx Frequency Bands (Unit: MHz)	GSM850 : 824 ~ 849 GSM1900 : 1850 ~ 1910 WCDMA Band II : 1850 ~ 1910 WCDMA Band IV : 1719 ~ 1755 WCDMA Band V : 824 ~ 849 LTE Band 2 : 1850 ~ 1910 LTE Band 4 : 1710 ~ 1755 LTE Band 5 : 824 ~ 849 LTE Band 7 : 2500 ~ 2570 LTE Band 12 : 699 ~ 716 LTE Band 13 : 777 ~ 787 LTE Band 17 : 704 ~ 716 LTE Band 41 : 2496 ~ 2690 LTE Band 66 : 1710 ~ 1780 LTE Band 71 : 663 ~ 698
Uplink Modulations	GPRS & EDGE : GMSK, 8PSK WCDMA : BPSK, QPSK LTE : QPSK, 16QAM
Maximum Tune-up Conducted Power (Unit: dBm)	Please refer to section 4.5.1 of this report.
Antenna Type	WWAN: Fixed Internal Antenna
EUT Stage	Production Unit

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.
2. This device supports both LTE B4/17 and B66/12. Since the supported frequency span for LTE B4/17 falls completely within the LTE B66/12, they have the same target power, and share the same transmission path, therefore SAR was only assessed for B66/12.
3. For WWAN Antenna, when the p-sensor is detect close to the body sate, power reduction will be activated to limit the maximum power. Proximity sensor triggering distances please refer to section 4.1 of this report.

3. SAR Measurement System

3.1 Definition of Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$\mathrm{SAR} = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dv}\right)$$

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be related to the electrical field in the tissue by

$$\mathrm{SAR} = \frac{\sigma |E|^2}{\rho}$$

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

3.2 SPEAG DASY System

DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY5 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

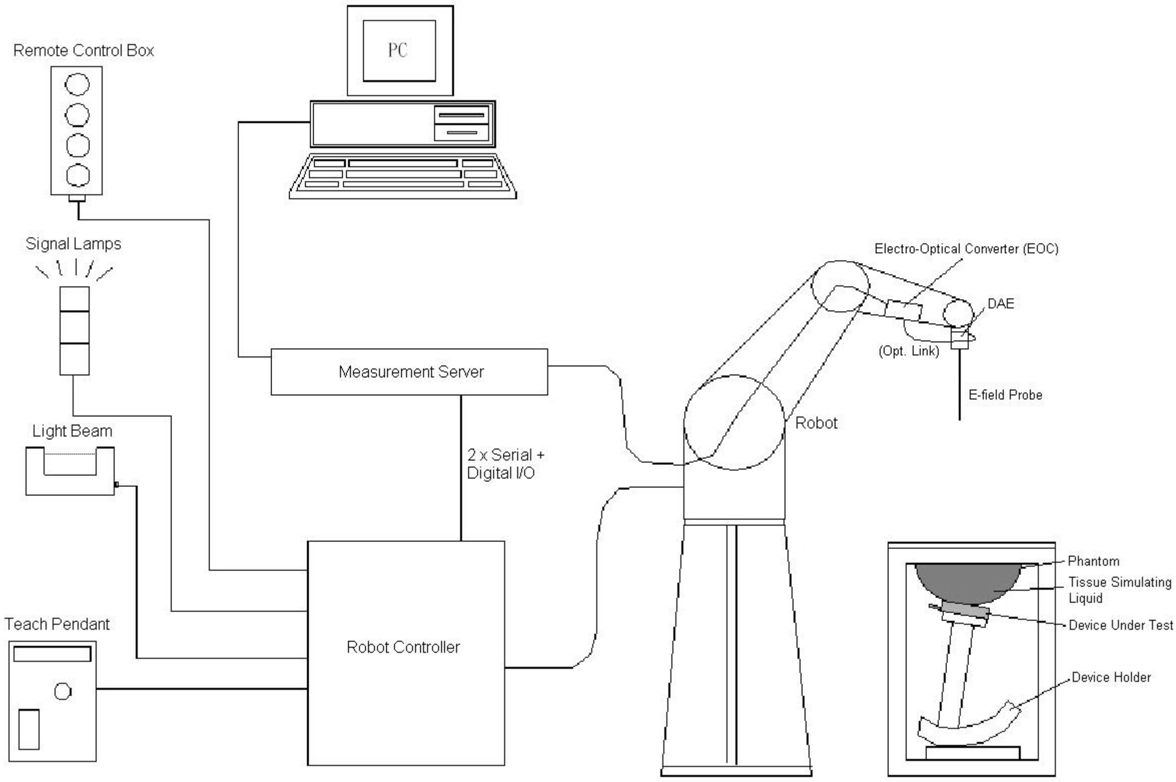


Fig-3.1 DASY System Setup

3.2.1 Robot

The DASY6 system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY6 : CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

Fig-3.2 DASY6

3.2.2 Probes

The SAR measurement is conducted with the dosimetric probe. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

Model	EX3DV4
Construction	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (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

Model	ES3DV3
Construction	Symmetrical design with triangular core. Interleaved sensors. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	10 MHz to 4 GHz Linearity: ± 0.2 dB
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 µW/g to 100 mW/g Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm

3.2.3 Data Acquisition Electronics (DAE)

Model	DAE3, DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY 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 fA
Dimensions	60 x 60 x 68 mm

3.2.4 Phantoms

Model	Twin SAM	
Construction	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.	
Material	Vinylester, glass fiber reinforced (VE-GF)	
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)	
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet	
Filling Volume	approx. 25 liters	

Model	ELI	
Construction	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.	
Material	Vinylester, glass fiber reinforced (VE-GF)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	

3.2.5 Device Holder

Model	Mounting Device	
Construction	In combination with the Twin SAM Phantom or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).	
Material	POM	

Model	Laptop Extensions Kit	
Construction	Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner.	
Material	POM, Acrylic glass, Foam	

3.2.6 System Validation Dipoles

Model	D-Serial	
Construction	Symmetrical dipole with l/4 balun. Enables measurement of feed point impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.	
Frequency	750 MHz to 5800 MHz	
Return Loss	> 20 dB	
Power Capability	> 100 W (f < 1GHz), > 40 W (f > 1GHz)	

3.2.7 Tissue Simulating Liquids

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in Table-3.1.

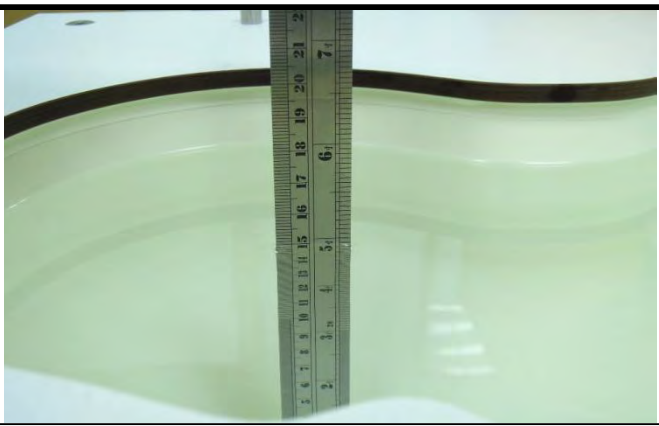
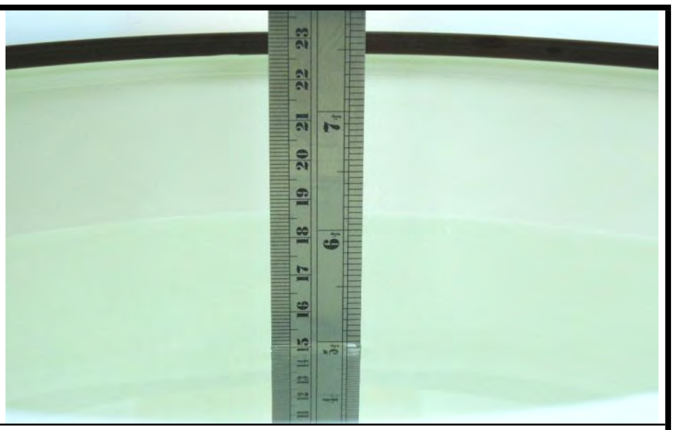
	

Photo of Liquid Height for Head Position	**Photo of Liquid Height for Body Position**

The dielectric properties of the head tissue simulating liquids are defined in IEEE 1528, and KDB 865664 D01 Appendix A. For the body tissue simulating liquids, the dielectric properties are defined in KDB 865664 D01 Appendix A. The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using a dielectric assessment kit and a network analyzer.

Table-3.1 Targets of Tissue Simulating Liquid

Frequency (MHz)	Target Permittivity	Range of ±5%	Target Conductivity	Range of ±5%
For Head				
750	41.9	39.8 ~ 44.0	0.89	0.85 ~ 0.93
835	41.5	39.4 ~ 43.6	0.90	0.86 ~ 0.95
900	41.5	39.4 ~ 43.6	0.97	0.92 ~ 1.02
1450	40.5	38.5 ~ 42.5	1.20	1.14 ~ 1.26
1640	40.3	38.3 ~ 42.3	1.29	1.23 ~ 1.35
1750	40.1	38.1 ~ 42.1	1.37	1.30 ~ 1.44
1800	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
1900	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
2000	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
2300	39.5	37.5 ~ 41.5	1.67	1.59 ~ 1.75
2450	39.2	37.2 ~ 41.2	1.80	1.71 ~ 1.89
2600	39.0	37.1 ~ 41.0	1.96	1.86 ~ 2.06
3500	37.9	36.0 ~ 39.8	2.91	2.76 ~ 3.06
5200	36.0	34.2 ~ 37.8	4.66	4.43 ~ 4.89
5300	35.9	34.1 ~ 37.7	4.76	4.52 ~ 5.00
5500	35.6	33.8 ~ 37.4	4.96	4.71 ~ 5.21
5600	35.5	33.7 ~ 37.3	5.07	4.82 ~ 5.32
5800	35.3	33.5 ~ 37.1	5.27	5.01 ~ 5.53

The following table gives the recipes for tissue simulating liquids.

Table-3.2 Recipes of Tissue Simulating Liquid

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
H750	0.2	-	0.2	1.5	56.0	-	42.1	-
H835	0.2	-	0.2	1.5	57.0	-	41.1	-
H900	0.2	-	0.2	1.4	58.0	-	40.2	-
H1450	-	43.3	-	0.6	-	-	56.1	-
H1640	-	45.8	-	0.5	-	-	53.7	-
H1750	-	47.0	-	0.4	-	-	52.6	-
H1800	-	44.5	-	0.3	-	-	55.2	-
H1900	-	44.5	-	0.2	-	-	55.3	-
H2000	-	44.5	-	0.1	-	-	55.4	-
H2300	-	44.9	-	0.1	-	-	55.0	-
H2450	-	45.0	-	0.1	-	-	54.9	-
H2600	-	45.1	-	0.1	-	-	54.8	-
H3500	-	28.0	-	0.2	-	20.0	71.8	-
H5G	-	-	-	-	-	17.2	65.5	17.3

3.3 SAR System Verification

The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below.

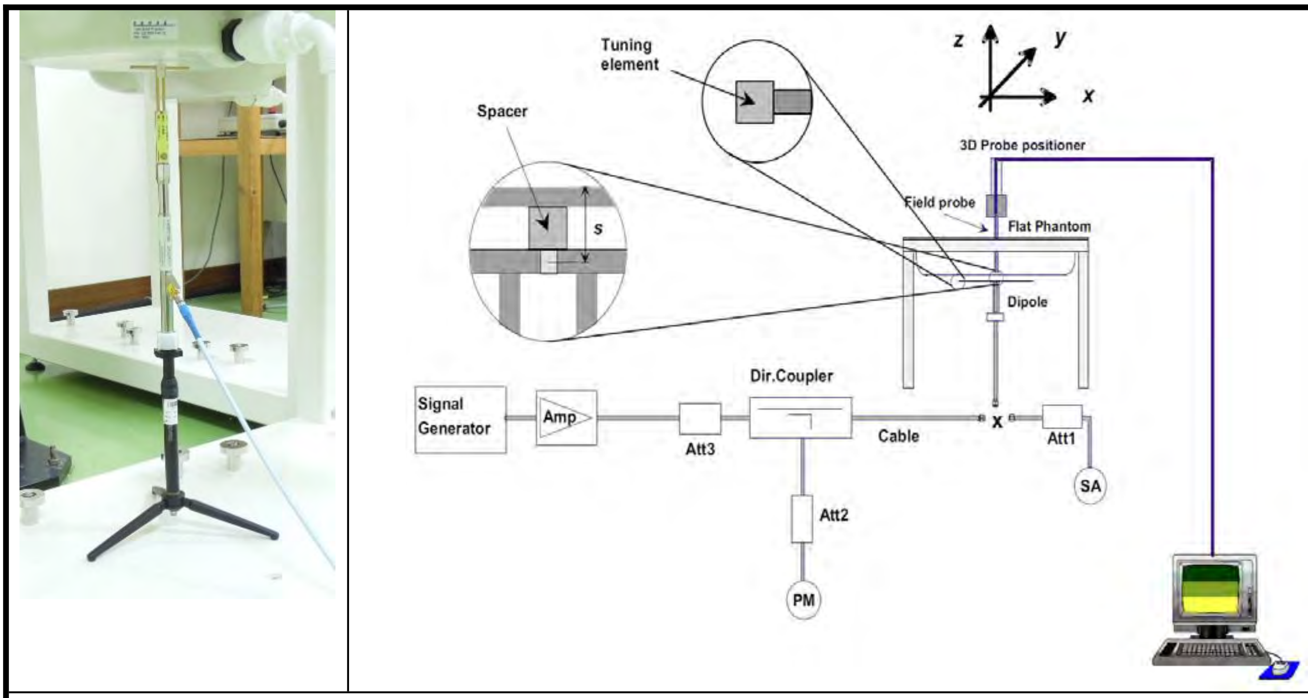


Fig-3.4 System Verification Setup

The validation dipole is placed beneath the flat phantom with the specific spacer in place. The distance spacer is touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The spectrum analyzer measures the forward power at the location of the system check dipole connector. The signal generator is adjusted for the desired forward power (250 mW is used for 700 MHz to 3 GHz, 100 mW is used for 3.5 GHz to 6 GHz) at the dipole connector and the power meter is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter.

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.

3.4 SAR Measurement Procedure

According to the SAR test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

The SAR measurement procedures for each of test conditions are as follows:

(a) Make EUT to transmit maximum output power
(b) Measure conducted output power through RF cable
(c) Place the EUT in the specific position of phantom
(d) Perform SAR testing steps on the DASY system
(e) Record the SAR value

3.4.1 Area & Zoom Scan Procedure

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. According to KDB 865664 D01, the resolution for Area and Zoom scan is specified in the table below.

Items	<= 2 GHz	2-3 GHz	3-4 GHz	4-5 GHz	5-6 GHz
Area Scan (Δx, Δy)	<= 15 mm	<= 12 mm	<= 12 mm	<= 10 mm	<= 10 mm
Zoom Scan (Δx, Δy)	<= 8 mm	<= 5 mm	<= 5 mm	<= 4 mm	<= 4 mm
Zoom Scan (Δz)	<= 5 mm	<= 5 mm	<= 4 mm	<= 3 mm	<= 2 mm
Zoom Scan Volume	>= 30 mm	>= 30 mm	>= 28 mm	>= 25 mm	>= 22 mm

Note:
When zoom scan is required and report SAR is <= 1.4 W/kg, the zoom scan resolution of Δx / Δy (2-3GHz: <= 8 mm, 3-4GHz: <= 7 mm, 4-6GHz: <= 5 mm) may be applied.

3.4.2 Volume Scan Procedure

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

3.4.3 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drift more than 5%, the SAR will be retested.

3.4.4 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form the measurement grid to the high-resolution grid
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
(f) Calculation of the averaged SAR within masses of 1g and 10g

3.4.5 SAR Averaged Methods

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

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

4. SAR Measurement Evaluation

4.1 EUT Configuration and Setting

<Connections between EUT and System Simulator>

For WWAN SAR testing, the EUT was linked and controlled by base station emulator (CMW500 is used for GSM/WCDMA, and LTE). Communication between the EUT and the emulator was established by air link. The distance between the EUT and the communicating antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT. The EUT was set from the emulator to radiate maximum output power during SAR testing.

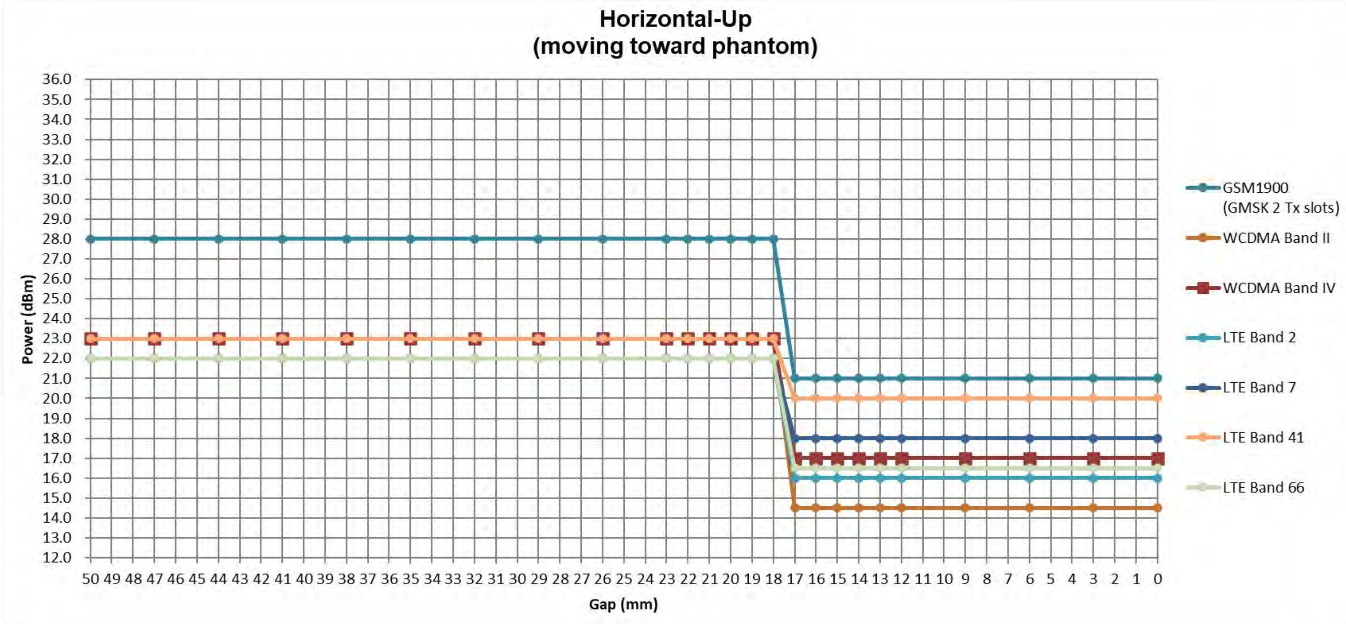
< Proximity Sensor Triggering Distances >

The proximity sensor triggering distance was determined per KDB 616217 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed.

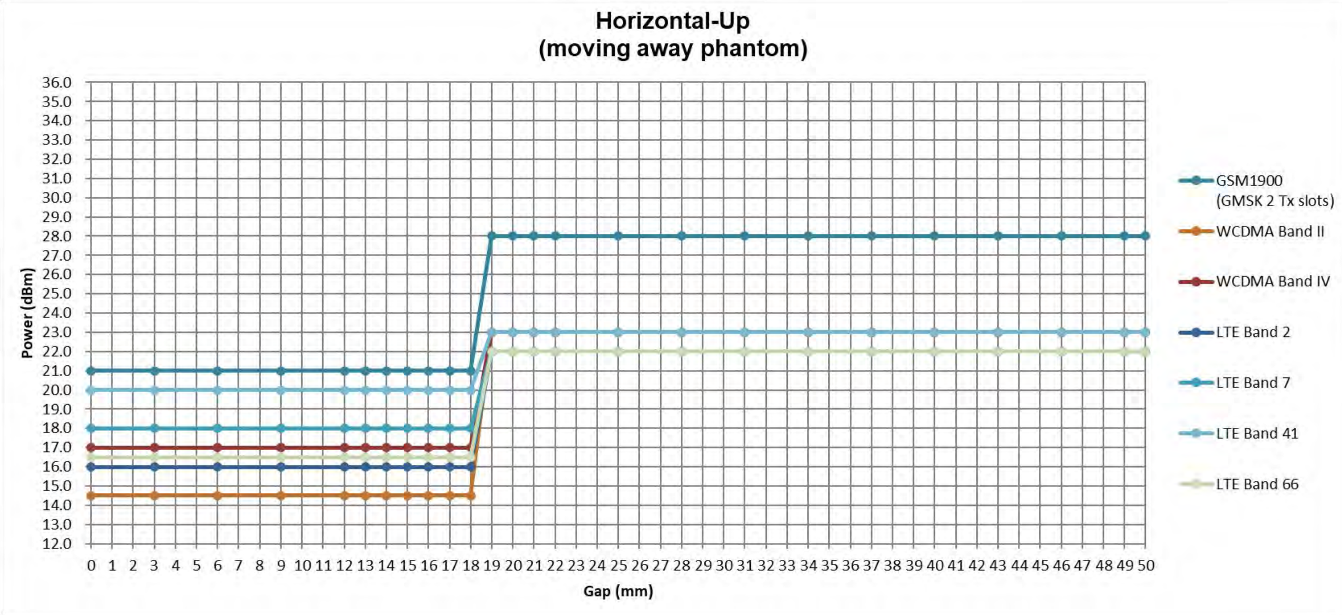
In the preliminary triggering distance testing, the tissue-equivalent medium for different frequency bands were used for verification; no other frequency bands tissue-equivalent medium was found to result in shortest triggering than that for 5700MHz, and the tissue-equivalent medium for 5700MHz was used for formal proximity sensor triggering testing.

Summary for power verification per distance was tabulated in the below table.

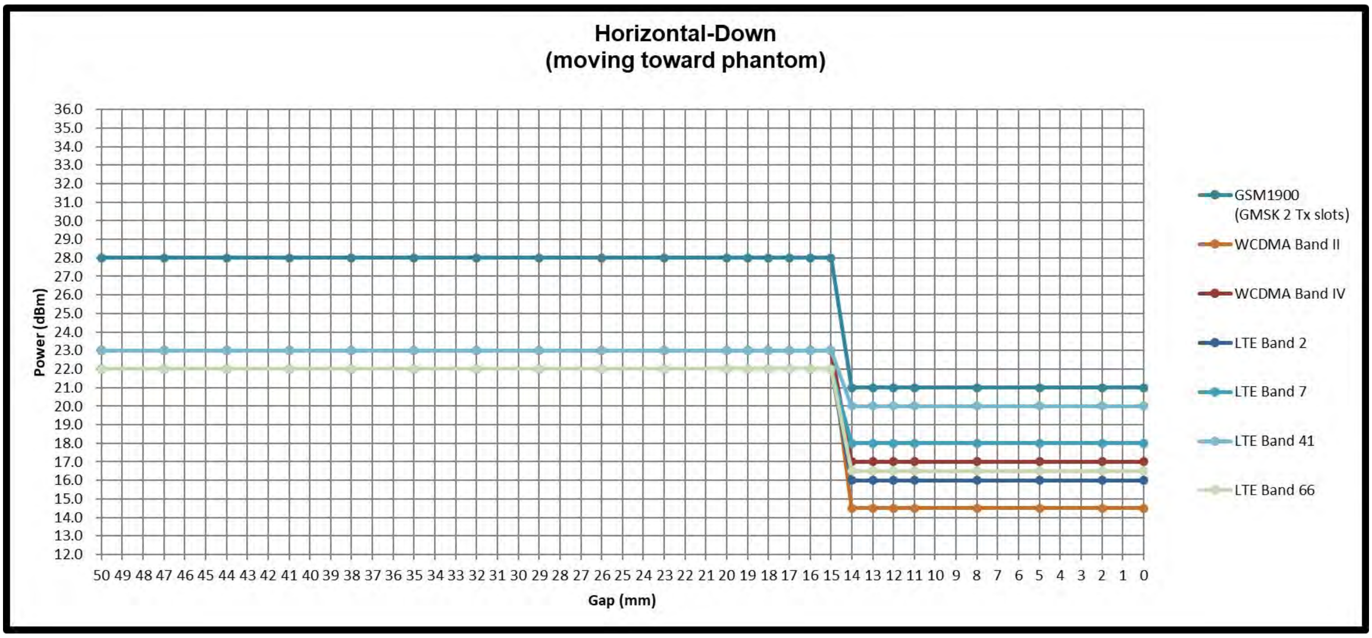
Output Power Verification in dBm for EUT Horizontal-Up (moving toward phantom)											
Distance (mm)	22	21	20	19	18	17	16	15	14	13	12
GSM1900	28.0	28.0	28.0	28.0	28.0	21.0	21.0	21.0	21.0	21.0	21.0
WCDMA II	23.0	23.0	23.0	23.0	23.0	14.5	14.5	14.5	14.5	14.5	14.5
WCDMA IV	23.0	23.0	23.0	23.0	23.0	17.0	17.0	17.0	17.0	17.0	17.0
LTE 2	22.0	22.0	22.0	22.0	22.0	16.0	16.0	16.0	16.0	16.0	16.0
LTE 7	22.0	22.0	22.0	22.0	22.0	18.0	18.0	18.0	18.0	18.0	18.0
LTE 41	23.0	23.0	23.0	23.0	23.0	20.0	20.0	20.0	20.0	20.0	20.0
LTE 66 / 4	22.0	22.0	22.0	22.0	22.0	16.5	16.5	16.5	16.5	16.5	16.5



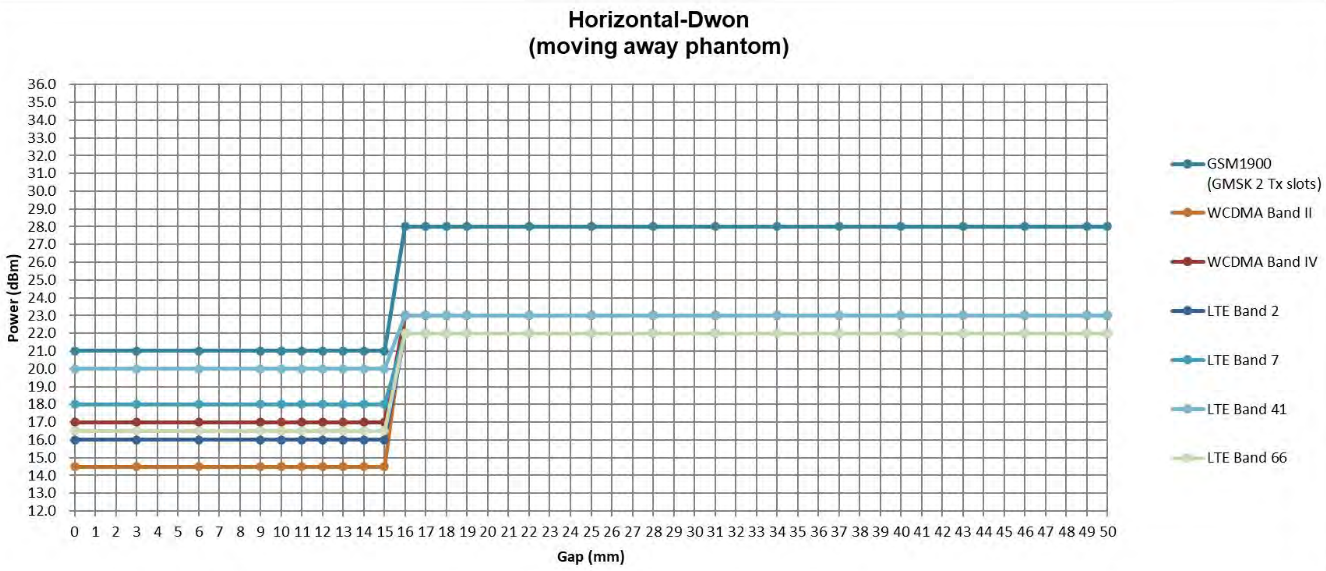
Output Power Verification in dBm for EUT Horizontal-Up (moving away phantom)											
Distance (mm)	12	13	14	15	16	17	18	19	20	21	22
GSM1900	21.0	21.0	21.0	21.0	21.0	21.0	21.0	28.0	28.0	28.0	28.0
WCDMA II	14.5	14.5	14.5	14.5	14.5	14.5	14.5	23.0	23.0	23.0	23.0
WCDMA IV	17.0	17.0	17.0	17.0	17.0	17.0	17.0	23.0	23.0	23.0	23.0
LTE 2	16.0	16.0	16.0	16.0	16.0	16.0	16.0	22.0	22.0	22.0	22.0
LTE 7	18.0	18.0	18.0	18.0	18.0	18.0	18.0	22.0	22.0	22.0	22.0
LTE 41	20.0	20.0	20.0	20.0	20.0	20.0	20.0	23.0	23.0	23.0	23.0
LTE 66 / 4	16.5	16.5	16.5	16.5	16.5	16.5	16.5	22.0	22.0	22.0	22.0



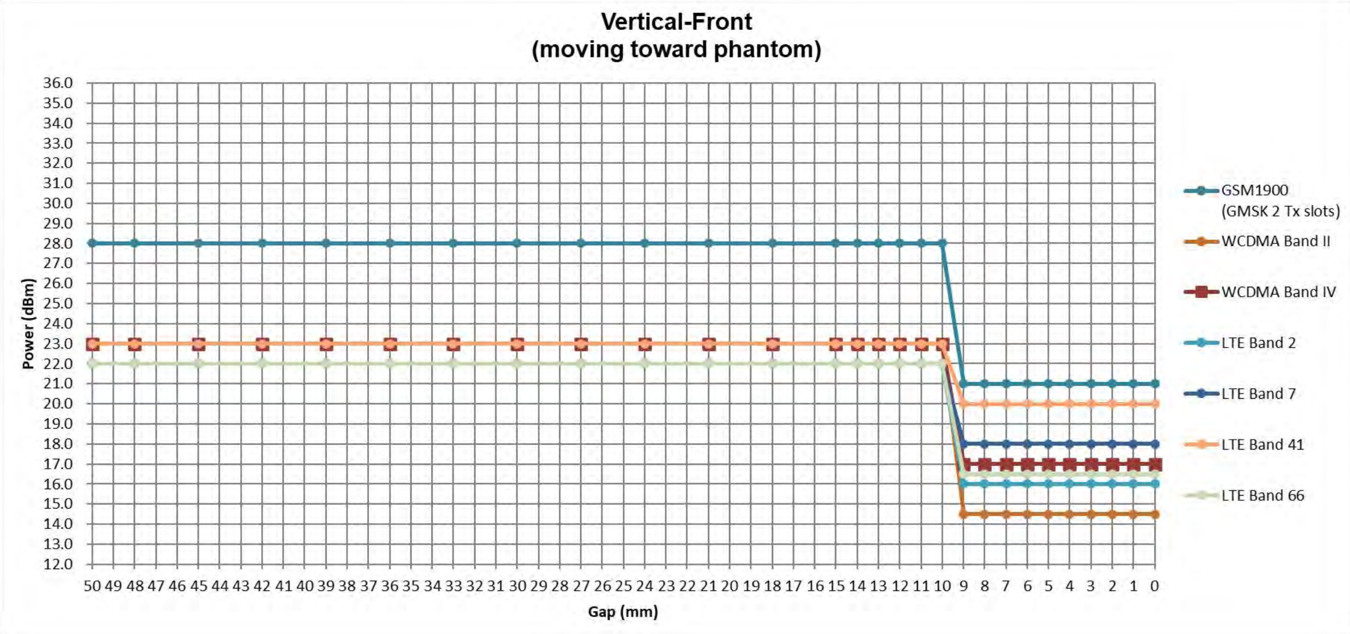
Output Power Verification in dBm for EUT Horizontal-Down (moving toward phantom)											
Distance (mm)	19	18	17	16	15	14	13	12	11	10	11
GSM1900	28.0	28.0	28.0	28.0	28.0	21.0	21.0	21.0	21.0	21.0	21.0
WCDMA II	23.0	23.0	23.0	23.0	23.0	14.5	14.5	14.5	14.5	14.5	14.5
WCDMA IV	23.0	23.0	23.0	23.0	23.0	17.0	17.0	17.0	17.0	17.0	17.0
LTE 2	22.0	22.0	22.0	22.0	22.0	16.0	16.0	16.0	16.0	16.0	16.0
LTE 7	22.0	22.0	22.0	22.0	22.0	18.0	18.0	18.0	18.0	18.0	18.0
LTE 41	23.0	23.0	23.0	23.0	23.0	20.0	20.0	20.0	20.0	20.0	20.0
LTE 66 / 4	22.0	22.0	22.0	22.0	22.0	16.5	16.5	16.5	16.5	16.5	16.5



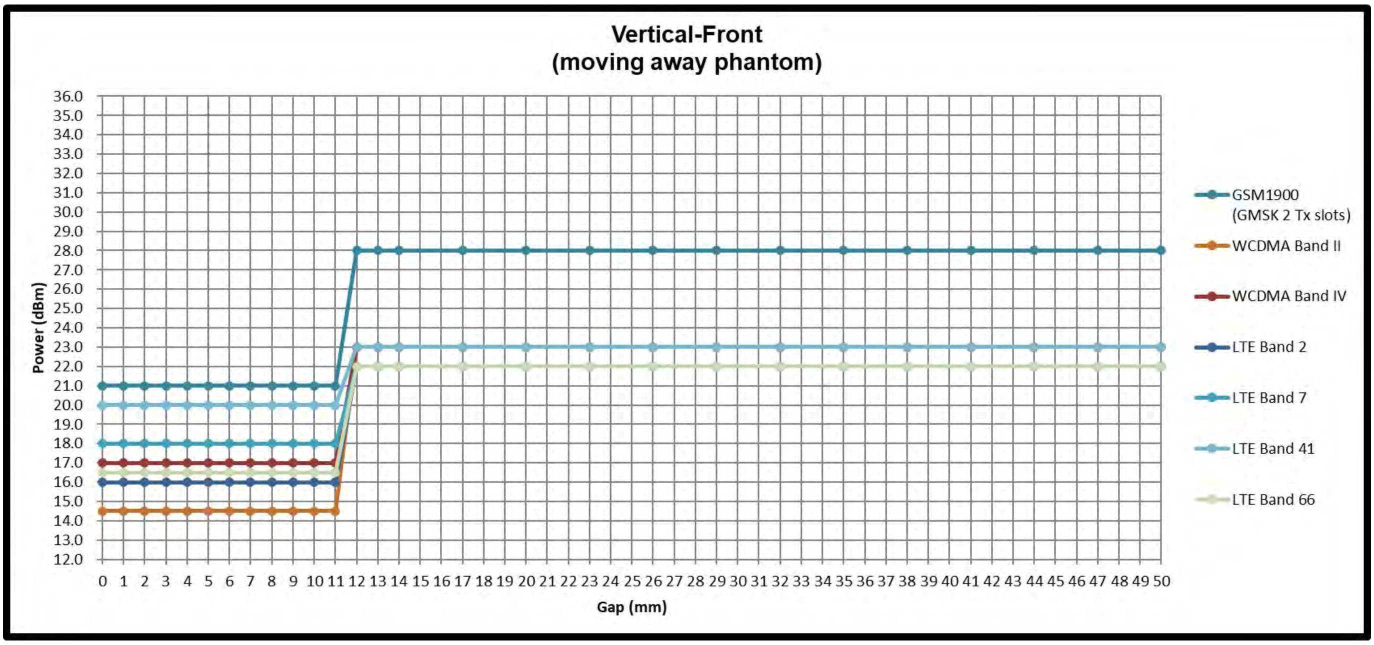
Output Power Verification in dBm for EUT Horizontal-Down (moving away phantom)											
Distance (mm)	9	10	11	12	13	14	15	16	17	18	19
GSM1900	21.0	21.0	21.0	21.0	21.0	21.0	21.0	28.0	28.0	28.0	28.0
WCDMA II	14.5	14.5	14.5	14.5	14.5	14.5	14.5	23.0	23.0	23.0	23.0
WCDMA IV	17.0	17.0	17.0	17.0	17.0	17.0	17.0	23.0	23.0	23.0	23.0
LTE 2	16.0	16.0	16.0	16.0	16.0	16.0	16.0	22.0	22.0	22.0	22.0
LTE 7	18.0	18.0	18.0	18.0	18.0	18.0	18.0	22.0	22.0	22.0	22.0
LTE 41	20.0	20.0	20.0	20.0	20.0	20.0	20.0	23.0	23.0	23.0	23.0
LTE 66 / 4	16.5	16.5	16.5	16.5	16.5	16.5	16.5	22.0	22.0	22.0	22.0



Output Power Verification in dBm for EUT Vertical-Front (moving toward phantom)											
Distance (mm)	14	13	12	11	10	9	8	7	6	5	4
GSM1900	28.0	28.0	28.0	28.0	28.0	21.0	21.0	21.0	21.0	21.0	21.0
WCDMA II	23.0	23.0	23.0	23.0	23.0	14.5	14.5	14.5	14.5	14.5	14.5
WCDMA IV	23.0	23.0	23.0	23.0	23.0	17.0	17.0	17.0	17.0	17.0	17.0
LTE 2	22.0	22.0	22.0	22.0	22.0	16.0	16.0	16.0	16.0	16.0	16.0
LTE 7	22.0	22.0	22.0	22.0	22.0	18.0	18.0	18.0	18.0	18.0	18.0
LTE 41	23.0	23.0	23.0	23.0	23.0	20.0	20.0	20.0	20.0	20.0	20.0
LTE 66 / 4	22.0	22.0	22.0	22.0	22.0	16.5	16.5	16.5	16.5	16.5	16.5



Output Power Verification in dBm for EUT Vertical-Front (moving away phantom)											
Distance (mm)	4	5	6	7	8	9	10	11	12	13	14
GSM1900	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	28.0	28.0	28.0
WCDMA II	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	23.0	23.0	23.0
WCDMA IV	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	23.0	23.0	23.0
LTE 2	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	22.0	22.0	22.0
LTE 7	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	22.0	22.0	22.0
LTE 41	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	23.0	23.0	23.0
LTE 66 / 4	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	22.0	22.0	22.0

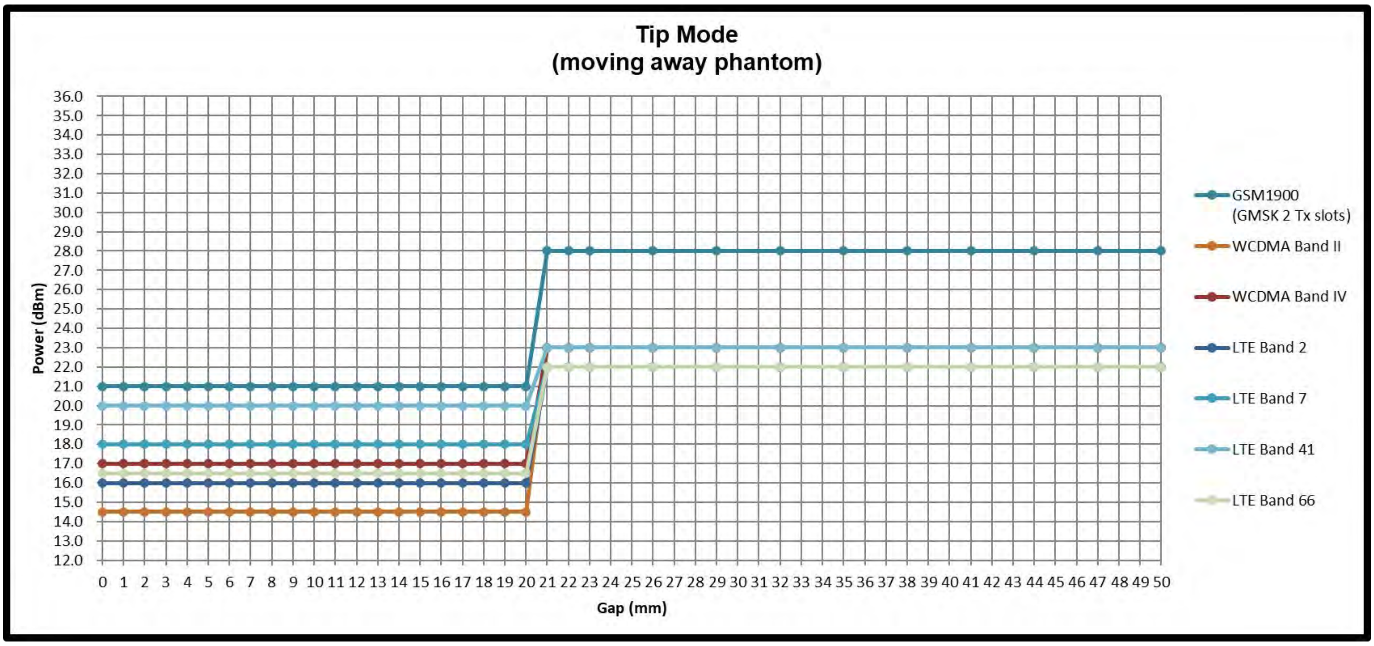


Output Power Verification in dBm for EUT Vertical-Back (moving toward phantom)											
Distance (mm)	18	17	16	15	14	13	12	11	10	9	8
GSM1900	28.0	28.0	28.0	28.0	28.0	21.0	21.0	21.0	21.0	21.0	21.0
WCDMA II	23.0	23.0	23.0	23.0	23.0	14.5	14.5	14.5	14.5	14.5	14.5
WCDMA IV	23.0	23.0	23.0	23.0	23.0	17.0	17.0	17.0	17.0	17.0	17.0
LTE 2	22.0	22.0	22.0	22.0	22.0	16.0	16.0	16.0	16.0	16.0	16.0
LTE 7	22.0	22.0	22.0	22.0	22.0	18.0	18.0	18.0	18.0	18.0	18.0
LTE 41	23.0	23.0	23.0	23.0	23.0	20.0	20.0	20.0	20.0	20.0	20.0
LTE 66 / 4	22.0	22.0	22.0	22.0	22.0	16.5	16.5	16.5	16.5	16.5	16.5

Output Power Verification in dBm for EUT Vertical-Back (moving away phantom)											
Distance (mm)	8	9	10	11	12	13	14	15	16	17	18
GSM1900	21.0	21.0	21.0	21.0	21.0	21.0	21.0	28.0	28.0	28.0	28.0
WCDMA II	14.5	14.5	14.5	14.5	14.5	14.5	14.5	23.0	23.0	23.0	23.0
WCDMA IV	17.0	17.0	17.0	17.0	17.0	17.0	17.0	23.0	23.0	23.0	23.0
LTE 2	16.0	16.0	16.0	16.0	16.0	16.0	16.0	22.0	22.0	22.0	22.0
LTE 7	18.0	18.0	18.0	18.0	18.0	18.0	18.0	22.0	22.0	22.0	22.0
LTE 41	20.0	20.0	20.0	20.0	20.0	20.0	20.0	23.0	23.0	23.0	23.0
LTE 66 / 4	16.5	16.5	16.5	16.5	16.5	16.5	16.5	22.0	22.0	22.0	22.0

Output Power Verification in dBm for EUT Tip Mode (moving toward phantom)											
Distance (mm)	23	22	21	20	19	18	17	16	15	14	13
GSM1900	28.0	28.0	28.0	28.0	28.0	21.0	21.0	21.0	21.0	21.0	21.0
WCDMA II	23.0	23.0	23.0	23.0	23.0	14.5	14.5	14.5	14.5	14.5	14.5
WCDMA IV	23.0	23.0	23.0	23.0	23.0	17.0	17.0	17.0	17.0	17.0	17.0
LTE 2	22.0	22.0	22.0	22.0	22.0	16.0	16.0	16.0	16.0	16.0	16.0
LTE 7	22.0	22.0	22.0	22.0	22.0	18.0	18.0	18.0	18.0	18.0	18.0
LTE 41	23.0	23.0	23.0	23.0	23.0	20.0	20.0	20.0	20.0	20.0	20.0
LTE 66 / 4	22.0	22.0	22.0	22.0	22.0	16.5	16.5	16.5	16.5	16.5	16.5

Output Power Verification in dBm for EUT Tip Mode (moving away phantom)											
Distance (mm)	13	14	15	16	17	18	19	20	21	22	23
GSM1900	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	28.0	28.0	28.0
WCDMA II	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	23.0	23.0	23.0
WCDMA IV	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	23.0	23.0	23.0
LTE 2	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	22.0	22.0	22.0
LTE 7	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	22.0	22.0	22.0
LTE 41	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	23.0	23.0	23.0
LTE 66 / 4	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	22.0	22.0	22.0



< Proximity Sensor Coverage >

In KDB 616217 section 6.3, if a sensor is spatially offset from the antenna(s), it is necessary to verify sensor triggering for conditions where the antenna is next to the user but the sensor is laterally further away to ensure sensor coverage is sufficient for reducing the power to maintain compliance. For p-sensor coverage testing, the device is moved and “along the direction of maximum antenna and sensor offset”.

However, this device uses a capacitive proximity sensor that is same metallic component as the transmitting antenna to facilitate triggering in any condition the user may use the device in proximity of the antenna in the device.

Therefore, no further sensor coverage assessments were required.

<Summary for Proximity Sensor Triggering Test>

According to the procedures noticed in KDB 616217 D04,

The WWAN for proximity sensor triggering distance is 17 mm for EUT Horizontal-Up, 14 mm for EUT Horizontal-Down, 9 mm for EUT Vertical-Front,13 mm for EUT Vertical-Back,18 mm for EUT Tip. The conservation triggering distances based on the separation distance for the sensor trigger / not triggered as EUT with power reduction at 0 mm, and EUT without power reduction at 16 mm for EUT Horizontal-Up, 13 mm for EUT Horizontal-Down, 8 mm for EUT Vertical-Front,12 mm for EUT Vertical-Back,17 mm for EUT Tip were used to test SAR.

The power reduction is depends on the proximity sensor input. For a steady SAR test, the power reduction was enabled or disabled manually by engineering software during SAR testing.

WWAN Proximity Sensor Trigger Distance (mm)					
Position	Horizontal-Up	Horizontal-Down	Vertical-Front	Vertical-Back	Tip Mode
Minimum	17	14	9	13	18

<Considerations Related to GPRS / EDGE for Setup and Testing>

The maximum multi-slot capability supported by this device is as below.

1. This EUT is class B device
2. This EUT supports GPRS multi-slot class 10 (max. uplink: 2, max. downlink: 4, total timeslots: 5)
3. This EUT supports EDGE multi-slot class 12 (max. uplink: 4, max. downlink: 4, total timeslots: 5)

For GSM850 frequency band, the power control level is set to 5 for GPRS (GMSK: CS1), and set to 8 for EDGE (GMSK: MCS1, 8PSK: MCS9). For GSM1900 frequency band, the power control level is set to 0 for GSM mode and GPRS (GMSK: CS1), and set to 2 for EDGE (GMSK: MCS1, 8PSK: MCS9).

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.

<Considerations Related to WCDMA for Setup and Testing>

WCDMA Body SAR

SAR for body-worn 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 $DPDCH_n$ configurations supported by the handset with 12.2 kbps RMC as the primary mode.

Release 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body-worn 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”, for the highest reported SAR body-worn exposure configuration in 12.2 kbps RMC. Handsets with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

Release 6 HSUPA

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body-worn 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”, for the highest reported body-worn 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 measurements is tested for next to the ear head exposure.

Release 5 HSDPA Data Devices

The 3G SAR test reduction procedure is applied to body SAR with 12.2 kbps RMC as the primary mode. Otherwise, body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, for the highest reported SAR configuration in 12.2 kbps RMC without HSDPA. HSDPA is configured according to the applicable UE category of a test device. The number of HS-DSCH / HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms and a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors (β_c, β_d), and HS-DPCCH power offset parameters (Δ_{ACK}, Δ_{NACK}, Δ_{CQI}) are set according to values indicated in below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{hs} (1)	CM (dB)(2)	MPR
1	2 / 15	15 / 15	64	2 / 15	4 / 15	0.0	0
2	12 / 15 (3)	15 / 15 (3)	64	12 / 15 (3)	24 / 15	1.0	0
3	15 / 15	8 / 15	64	15 / 8	30 / 15	1.5	0.5
4	15 / 15	4 / 15	64	15 / 4	30 / 15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs} / \beta_c = 30 / 15$ ⇔ $\beta_{hs} = 30 / 15 * \beta_c$.
Note 2: CM = 1 for $\beta_c / \beta_d = 12 / 15$, $\beta_{hs} / \beta_c = 24 / 15$.
Note 3: 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 (TF1, TF1) to $\beta_c = 11 / 15$ and $\beta_d = 15 / 15$.

Release 6 HSUPA Data Devices

The 3G SAR test reduction procedure is applied to body SAR with 12.2 kbps RMC as the primary mode. Otherwise, body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA. When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode. Otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing. 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 below.

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{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 Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs} / \beta_c = 30 / 15$ ⇔ $\beta_{hs} = 30 / 15 * \beta_c$.
Note 2: CM = 1 for $\beta_c / \beta_d = 12 / 15$, $\beta_{hs} / \beta_c = 24 / 15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c / β_d ratio of 11 / 15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the 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 Table 5.1g.
Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

HSPA+ SAR Guidance

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

DC-HSDPA SAR Guidance

The 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Otherwise, when SAR is required for Rel. 5 HSDPA, SAR is required for Rel. 8 DC-HSDPA. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

<Considerations Related to LTE for Setup and Testing>

This device contains LTE transmitter which follows 3GPP standards, supports both QPSK and 16QAM modulations, and supported LTE band and channel bandwidth is listed in below. The output power was tested per 3GPP TS 36.521-1 maximum transmit procedures for both QPSK and 16QAM modulation. The results please refer to section 4.6 of this report.

EUT Supported LTE Band and Channel Bandwidth						
LTE Band	BW 1.4 MHz	BW 3 MHz	BW 5 MHz	BW 10 MHz	BW 15 MHz	BW 20 MHz
2	V	V	V	V	V	V
4	V	V	V	V	V	V
5	V	V	V	V		
7			V	V	V	V
12	V	V	V	V		
13			V	V		
17			V	V		
41			V	V	V	V
66	V	V	V	V	V	V
71			V	V	V	V

The LTE maximum power reduction (MPR) in accordance with 3GPP TS 36.101 is active all times during LTE operation. The allowed MPR for the maximum output power is specified in below.

Modulation	Channel Bandwidth / RB Configurations						LTE MPR Setting (dB)
	BW 1.4 MHz	BW 3 MHz	BW 5 MHz	BW 10 MHz	BW 15 MHz	BW 20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1
16QAM	<= 5	<= 4	<= 8	<= 12	<= 16	<= 18	1
16QAM	> 5	> 4	> 8	> 12	> 16	> 18	2

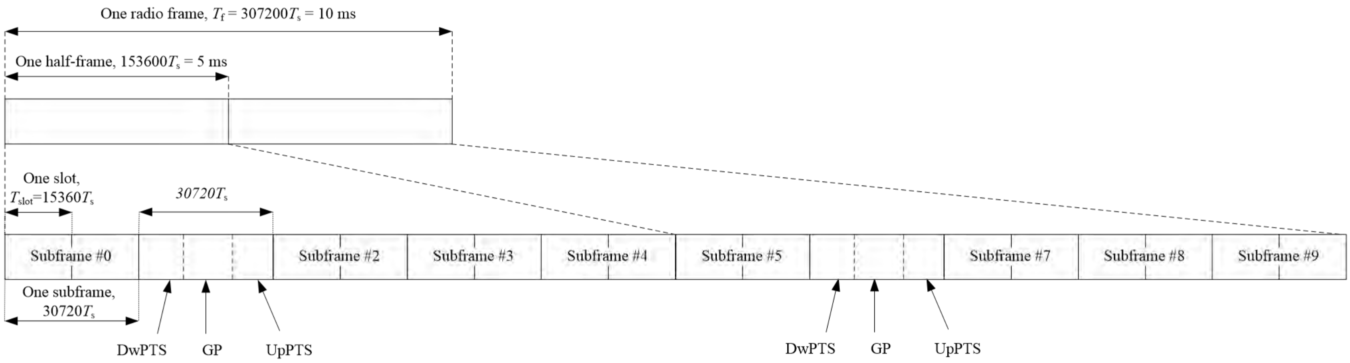
Note: MPR is according to the standard and implemented in the circuit (mandatory).

In addition, the device is compliant with additional maximum power reduction (A-MPR) requirements defined in 3GPP TS 36.101 section 6.2.4 that was disabled for all FCC compliance testing.

During LTE SAR testing, the related parameters of operating band, channel bandwidth, uplink channel number, modulation type, and RB was set in base station simulator. When the EUT has registered and communicated to base station simulator, the simulator set to make EUT transmitting the maximum radiated power.

TDD-LTE Setup Configurations

According to KDB 941225 D05, SAR testing for TDD-LTE device 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 TDD-LTE configurations. The TDD-LTE of this device supports frame structure type 2 defined in 3GPP TS 36.211 section 4.2, and the frame structure configuration can be referred to below.



3GPP TS 36.211 Figure 4.2-1: Frame Structure Type 2

Special Subframe Configuration	Normal Cyclic Prefix in Downlink			Extended Cyclic Prefix in Downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal Cyclic Prefix in Uplink	Extended Cyclic Prefix in Uplink		Normal Cyclic Prefix in Uplink	Extended Cyclic Prefix in Uplink
0	6592·Ts			7680·Ts		
1	19760·Ts			20480·Ts	2192·Ts	2560·Ts
2	21952·Ts	2192·Ts	2560·Ts	23040·Ts		
3	24144·Ts			25600·Ts		
4	26336·Ts			7680·Ts		
5	6592·Ts			20480·Ts	4384·Ts	5120·Ts
6	19760·Ts			23040·Ts		
7	21952·Ts	4384·Ts	5120·Ts	12800·Ts		
8	24144·Ts			-	-	-
9	13168·Ts			-	-	-

3GPP TS 36.211 Table 4.2-1: Configuration of Special Subframe

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

3GPP TS 36.211 Table 4.2-2: Uplink-Downlink Configurations

The variety of different TD-LTE uplink-downlink configurations allows a network operator to allocate the network's capacity between uplink and downlink traffic to meet the needs of the network. The uplink duty cycle of these seven configurations can readily be computed and shown in below.

UL-DL Configuration	0	1	2	3	4	5	6
Highest Duty-Cycle	63.33%	43.33%	23.33%	31.67%	21.67%	11.67%	53.33%

Considering the highest transmission duty cycle, TDD-LTE was tested using Uplink-Downlink Configuration 0 with 6 uplink subframe and 2 special subframe. The special subframe was set to special subframe configuration 7 using extended cyclic prefix uplink. Therefore, SAR testing for TDD-LTE was performed at the maximum output power with highest transmission duty cycle of 63.33%.

4.2 EUT Testing Position

4.2.1 Body Exposure Conditions

<Simple Dongle Procedures>

For USB dongle transmitter, according to KDB 447498 D02, SAR evaluation is required for all USB orientations illustrated as below with a device-to-phantom separation distance of 5 mm or less. The typical Horizontal-Up USB connection, found in the majority of host computers, must be tested using an appropriate host computer. A host computer with either Vertical-Front or Vertical-Back USB connection should be used to test one of the vertical USB orientations. If a suitable host computer is not available for testing the Horizontal-Down or the remaining Vertical USB orientation, a high quality USB cable, 12 inches or less, may be used for testing these other orientations.

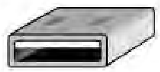
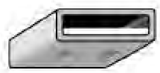
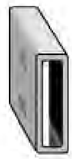
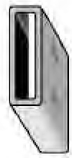
			
USB Orientation 1 (Horizontal-Up)	**USB Orientation 2 (Horizontal-Down)**	**USB Orientation 3 (Vertical-Front)**	**USB Orientation 4 (Vertical-Back)**

Fig-4.1 Illustration for USB Connector Orientations

4.3 Tissue Verification

The measuring results for tissue simulating liquid are shown as below.

Test Date	Tissue Type	Frequency (MHz)	Liquid Temp. (℃)	Measured Conductivity (σ)	Measured Permittivity (ε_r)	Target Conductivity (σ)	Target Permittivity (ε_r)	Conductivity Deviation (%)	Permittivity Deviation (%)
Jul.14,2022	HSL	750	22.4	0.916	42.778	0.89	41.90	2.92	2.10
Jul.13,2022	HSL	835	22.7	0.912	42.787	0.90	41.50	1.33	3.10
Jul.15,2022	HSL	1750	22.8	1.339	41.477	1.37	40.10	-2.26	3.43
Jul.16,2022	HSL	1950	22.2	1.432	38.763	1.40	40.00	2.29	-3.09
Jul.17,2022	HSL	2600	22.6	2.056	37.589	1.96	39.00	4.90	-3.62

Note:

The dielectric properties of the tissue simulating liquid must be measured within 24 hours before the SAR testing and within ±5% of the target values. Liquid temperature during the SAR testing must be within ±2 ℃.

4.4 System Verification

The measuring result for system verification is tabulated as below.

Test Date	Mode	Frequency (MHz)	1W Target SAR-1g (W/kg)	Measured SAR-1g (W/kg)	Normalized to 1W SAR-1g (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
Jul.14,2022	Head	750	8.45	2.22	8.88	5.09%	1200	3268	1288
Jul.13,2022	Head	835	9.6	2.43	9.72	1.25%	4d265	3268	1288
Jul.15,2022	Head	1750	36.6	8.56	34.24	-6.45%	1176	3268	1288
Jul.16,2022	Head	1950	40.3	10.4	41.60	3.23%	1229	3268	1288
Jul.17,2022	Head	2600	55.8	14.7	58.80	5.38%	1110	3268	1288

Note:

Comparing to the reference SAR value provided by SPEAG, the validation data should be within its specification of 10 %. The result indicates the system check can meet the variation criterion and the plots can be referred to Appendix A of this report.

4.5 Maximum Output Power

4.5.1 Maximum Conducted Power

The maximum conducted average power (Unit: dBm) including tune-up tolerance is shown as below.

Mode	GSM850		GSM1900	
	Full	Reduce	Full	Reduce
GPRS (GMSK, 1Tx-slot)	33.00	-	30.00	21.00
GPRS (GMSK, 2Tx-slot)	30.00	-	28.00	21.00
EDGE (8PSK, 1Tx-slot)	27.00	-	27.00	21.00
EDGE (8PSK, 2Tx-slot)	26.00	-	25.00	20.50
EDGE (8PSK, 3Tx-slot)	24.00	-	22.50	20.00
EDGE (8PSK, 4Tx-slot)	22.50	-	21.00	20.00

Mode	WCDMA Band II		WCDMA Band IV		WCDMA Band V	
	Full	Reduce	Full	Reduce	Full	Reduce
RMC 12.2K	23.00	14.50	23.00	17.00	23.00	-
HSDPA	22.00	13.50	22.00	16.00	22.00	-
DC-HSDPA	22.00	13.50	22.00	16.00	22.00	-
HSUPA	22.00	13.50	22.00	16.00	22.00	-

Mode	LTE 2		LTE 4		LTE 5		LTE 7	
	Full	Reduce	Full	Reduce	Full	Reduce	Full	Reduce
QPSK	22.00	16.00	22.00	16.50	23.00	-	22.00	18.00
16QAM	21.00	16.00	21.00	16.50	22.00	-	21.00	18.00

Mode	LTE 12		LTE 13		LTE 17		LTE 41	
	Full	Reduce	Full	Reduce	Full	Reduce	Full	Reduce
QPSK	23.00	-	23.00	-	23.00	-	23.00	20.00
16QAM	22.00	-	22.00	-	22.00	-	22.00	20.00

Mode	LTE 66		LTE 71	
	Full	Reduce	Full	Reduce
QPSK	22.00	16.50	22.00	-
16QAM	21.00	16.50	21.00	-

4.5.2 Measured Conducted Power Result

The measuring conducted average power (Unit: dBm) is shown as below.

<Full Power>

Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
Maximum Burst-Averaged Output Power						
GPRS (GMSK, 1Tx-slot)	32.40	32.56	32.57	29.25	29.34	29.68
GPRS (GMSK, 2Tx-slot)	29.57	29.51	29.44	26.74	26.46	27.05
EDGE (8PSK, 1Tx-slot)	26.47	26.41	26.57	25.56	25.71	25.91
EDGE (8PSK, 2Tx-slot)	25.40	25.22	25.39	23.92	23.83	24.30
EDGE (8PSK, 3Tx-slot)	23.58	23.60	23.51	21.81	21.87	22.19
EDGE (8PSK, 4Tx-slot)	21.84	21.95	21.78	20.04	20.02	20.43
Maximum Frame-Averaged Output Power						
GPRS (GMSK, 1Tx-slot)	23.40	23.56	23.57	20.25	20.34	20.68
GPRS (GMSK, 2Tx-slot)	23.57	23.51	23.44	20.74	20.46	21.05
EDGE (8PSK, 1Tx-slot)	17.47	17.41	17.57	16.56	16.71	16.91
EDGE (8PSK, 2Tx-slot)	19.40	19.22	19.39	17.92	17.83	18.30
EDGE (8PSK, 3Tx-slot)	19.32	19.34	19.25	17.55	17.61	17.93
EDGE (8PSK, 4Tx-slot)	18.84	18.95	18.78	17.04	17.02	17.43

Note:

1. SAR testing was performed on the maximum frame-averaged power mode.
2. The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:
   Frame-averaged power = 10 x log (Burst-averaged power mW x Slot used / 8)

Band	WCDMA Band II			WCDMA Band IV			WCDMA Band V			3GPP MPR (dB)
Channel	9262	9400	9538	1312	1413	1513	4132	4182	4233	
Frequency (MHz)	1852.4	1880.0	1907.6	1712.4	1732.6	1752.6	826.4	836.4	846.6	
RMC 12.2K	22.36	22.70	22.32	21.67	21.74	22.27	22.84	22.76	22.77	-
HSDPA Subtest-1	21.37	21.58	21.42	20.85	20.63	21.10	21.84	21.77	21.86	0
HSDPA Subtest-2	21.36	21.64	21.34	20.76	20.59	21.10	21.83	21.73	21.93	0
HSDPA Subtest-3	20.78	21.16	20.88	20.09	19.98	20.87	21.33	21.33	21.42	0.5
HSDPA Subtest-4	20.95	21.30	20.90	20.18	20.03	20.68	21.38	21.30	21.46	0.5
DC-HSDPA Subtest-1	21.28	21.47	21.41	20.75	20.60	21.01	21.76	21.75	21.85	0
DC-HSDPA Subtest-2	21.33	21.53	21.33	20.73	20.55	21.12	21.77	21.73	21.99	0
DC-HSDPA Subtest-3	20.73	21.16	20.78	20.02	19.95	20.79	21.28	21.34	21.46	0.5
DC-HSDPA Subtest-4	20.95	21.33	20.95	20.20	20.03	20.76	21.41	21.32	21.39	0.5
HSUPA Subtest-1	21.38	21.65	21.47	20.86	20.67	21.13	21.87	21.84	21.89	0
HSUPA Subtest-2	19.31	19.63	19.33	18.65	18.65	19.25	19.75	19.70	19.72	2
HSUPA Subtest-3	20.22	20.62	20.29	19.65	19.70	20.22	20.69	20.75	20.66	1
HSUPA Subtest-4	19.36	19.69	19.42	18.72	18.75	19.39	19.82	19.86	19.75	2
HSUPA Subtest-5	21.29	21.56	21.25	20.64	20.60	21.05	21.76	21.68	21.82	0

LTE Band 2							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18700	18900	19100	
		Frequency (MHz)		1860	1880	1900	
20M	QPSK	1	0	21.16	21.22	21.13	0
		1	50	21.38	21.17	21.29	0
		1	99	21.01	20.98	20.92	0
		50	0	19.86	19.72	19.80	1
		50	25	19.89	19.78	19.70	1
		50	50	19.95	19.76	19.84	1
		100	0	19.95	19.82	19.68	1
	16QAM	1	0	19.84	19.74	19.74	1
		1	50	20.00	19.82	19.90	1
		1	99	19.85	19.66	19.71	1
		50	0	18.87	18.76	18.82	2
		50	25	18.92	18.81	18.85	2
		50	50	18.74	18.75	18.71	2
		100	0	18.85	18.71	18.76	2
BW	MCS Index	Channel		18675	18900	19125	3GPP MPR
		Frequency (MHz)		1857.5	1880	1902.5	
15M	QPSK	1	0	21.08	21.18	21.08	0
		1	37	21.36	21.09	21.28	0
		1	74	20.93	20.94	20.87	0
		36	0	19.83	19.66	19.78	1
		36	19	19.87	19.71	19.65	1
		36	39	19.89	19.68	19.82	1
		75	0	19.94	19.80	19.60	1
	16QAM	1	0	19.77	19.66	19.68	1
		1	37	19.97	19.76	19.88	1
		1	74	19.83	19.59	19.66	1
		36	0	18.81	18.68	18.80	2
		36	19	18.90	18.73	18.84	2
		36	39	18.66	18.71	18.66	2
		75	0	18.83	18.63	18.75	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR
		Channel		18650	18900	19150	
		Frequency (MHz)		1855	1880	1905	
10M	QPSK	1	0	21.15	21.18	21.05	0
		1	24	21.34	21.14	21.23	0
		1	49	20.99	20.97	20.88	0
		25	0	19.80	19.67	19.79	1
		25	12	19.88	19.76	19.65	1
		25	25	19.87	19.69	19.82	1
		50	0	19.94	19.78	19.65	1
	16QAM	1	0	19.81	19.73	19.68	1
		1	24	19.96	19.77	19.88	1
		1	49	19.79	19.64	19.68	1
		25	0	18.85	18.68	18.81	2
		25	12	18.84	18.77	18.80	2
		25	25	18.71	18.69	18.69	2
		50	0	18.84	18.66	18.68	2
BW	MCS Index	Channel		18625	18900	19175	3GPP MPR
		Frequency (MHz)		1852.5	1880	1907.5	
5M	QPSK	1	0	21.10	21.20	21.07	0
		1	12	21.31	21.12	21.27	0
		1	24	20.95	20.91	20.87	0
		12	0	19.79	19.67	19.78	1
		12	6	19.81	19.76	19.64	1
		12	13	19.87	19.75	19.82	1
		25	0	19.91	19.77	19.60	1
	16QAM	1	0	19.76	19.73	19.72	1
		1	12	19.95	19.77	19.86	1
		1	24	19.83	19.58	19.70	1
		12	0	18.79	18.72	18.77	2
		12	6	18.89	18.75	18.83	2
		12	13	18.72	18.68	18.66	2
		25	0	18.79	18.63	18.74	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR
		Channel		18615	18900	19185	
		Frequency (MHz)		1851.5	1880	1908.5	
3M	QPSK	1	0	21.11	21.15	21.08	0
		1	7	21.36	21.09	21.27	0
		1	14	20.96	20.90	20.91	0
		8	0	19.82	19.67	19.75	1
		8	3	19.81	19.77	19.65	1
		8	7	19.91	19.71	19.83	1
		15	0	19.89	19.80	19.63	1
	16QAM	1	0	19.77	19.69	19.72	1
		1	7	19.92	19.80	19.85	1
		1	14	19.83	19.58	19.69	1
		8	0	18.79	18.70	18.74	2
		8	3	18.86	18.79	18.79	2
		8	7	18.67	18.70	18.69	2
		15	0	18.79	18.64	18.71	2
BW	MCS Index	Channel		18607	18900	19193	3GPP MPR
		Frequency (MHz)		1850.7	1880	1909.3	
1.4M	QPSK	1	0	21.08	21.18	21.08	0
		1	2	21.35	21.11	21.27	0
		1	5	20.99	20.91	20.87	0
		3	0	20.80	20.64	20.78	0
		3	1	20.88	20.76	20.62	0
		3	3	20.90	20.68	20.78	0
		6	0	19.94	19.76	19.66	1
	16QAM	1	0	19.79	19.67	19.69	1
		1	2	19.98	19.74	19.88	1
		1	5	19.80	19.58	19.70	1
		3	0	19.83	19.71	19.77	1
		3	1	19.84	19.80	19.80	1
		3	3	19.70	19.70	19.70	1
		6	0	18.79	18.69	18.71	2

LTE Band 4							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20050	20175	20300	
		Frequency (MHz)		1720	1732.5	1745	
20M	QPSK	1	0	21.36	21.68	21.85	0
		1	50	21.34	21.59	21.81	0
		1	99	21.21	21.44	21.78	0
		50	0	20.22	20.44	20.68	1
		50	25	19.96	20.23	20.51	1
		50	50	20.00	20.17	20.45	1
		100	0	20.09	20.34	20.52	1
	16QAM	1	0	19.99	20.21	20.53	1
		1	50	20.10	20.38	20.66	1
		1	99	19.96	20.07	20.52	1
		50	0	19.13	19.46	19.68	2
		50	25	18.92	19.19	19.47	2
		50	50	18.98	19.15	19.37	2
		100	0	19.06	19.42	19.61	2
BW	MCS Index	Channel		20025	20175	20325	3GPP MPR
		Frequency (MHz)		1717.5	1732.5	1747.5	
15M	QPSK	1	0	21.32	21.65	21.79	0
		1	37	21.32	21.58	21.77	0
		1	74	21.15	21.39	21.77	0
		36	0	20.21	20.42	20.63	1
		36	19	19.88	20.16	20.49	1
		36	39	19.99	20.13	20.42	1
		75	0	20.06	20.33	20.46	1
	16QAM	1	0	19.95	20.16	20.51	1
		1	37	20.04	20.36	20.63	1
		1	74	19.94	19.99	20.51	1
		36	0	19.05	19.42	19.63	2
		36	19	18.89	19.13	19.45	2
		36	39	18.97	19.10	19.29	2
		75	0	19.00	19.39	19.57	2

BW	MCS Index	Channel		20000	20175	20350	3GPP MPR
		Frequency (MHz)		1715	1732.5	1750	
10M	QPSK	1	0	21.28	21.64	21.80	0
		1	24	21.31	21.53	21.79	0
		1	49	21.19	21.37	21.73	0
		25	0	20.16	20.36	20.66	1
		25	12	19.95	20.21	20.43	1
		25	25	19.93	20.09	20.39	1
		50	0	20.06	20.28	20.50	1
	16QAM	1	0	19.97	20.14	20.48	1
		1	24	20.04	20.30	20.64	1
		1	49	19.94	19.99	20.51	1
		25	0	19.05	19.42	19.63	2
		25	12	18.90	19.11	19.46	2
		25	25	18.90	19.11	19.32	2
		50	0	19.03	19.36	19.59	2
BW	**MCS Index**	**Channel**		**19975**	**20175**	**20375**	**3GPP MPR**
		Frequency (MHz)		**1712.5**	**1732.5**	**1752.5**	
5M	QPSK	1	0	21.31	21.60	21.84	0
		1	12	21.30	21.54	21.76	0
		1	24	21.13	21.43	21.73	0
		12	0	20.18	20.39	20.67	1
		12	6	19.90	20.21	20.46	1
		12	13	19.93	20.12	20.43	1
		25	0	20.01	20.32	20.47	1
	16QAM	1	0	19.97	20.13	20.51	1
		1	12	20.02	20.32	20.58	1
		1	24	19.90	20.05	20.46	1
		12	0	19.06	19.41	19.66	2
		12	6	18.86	19.12	19.42	2
		12	13	18.91	19.10	19.35	2
		25	0	18.98	19.40	19.55	2

BW	MCS Index	Channel		19965	20175	20385	3GPP MPR
		Frequency (MHz)		1711.5	1732.5	1753.5	
3M	QPSK	1	0	21.30	21.61	21.80	0
		1	7	21.27	21.54	21.79	0
		1	14	21.13	21.42	21.72	0
		8	0	20.14	20.43	20.66	1
		8	3	19.92	20.18	20.43	1
		8	7	19.92	20.16	20.43	1
		15	0	20.04	20.29	20.48	1
	16QAM	1	0	19.97	20.13	20.52	1
		1	7	20.02	20.34	20.61	1
		1	14	19.93	20.01	20.50	1
		8	0	19.11	19.39	19.63	2
		8	3	18.86	19.11	19.45	2
		8	7	18.97	19.13	19.29	2
		15	0	19.01	19.34	19.55	2
BW	MCS Index	Channel		19957	20175	20393	3GPP MPR
		Frequency (MHz)		1710.7	1732.5	1754.3	
1.4M	QPSK	1	0	21.28	21.64	21.80	0
		1	2	21.31	21.53	21.79	0
		1	5	21.19	21.37	21.73	0
		3	0	21.16	21.36	21.66	0
		3	1	20.95	21.21	21.43	0
		3	3	20.95	21.09	21.39	0
		6	0	20.08	20.28	20.50	1
	16QAM	1	0	19.94	20.14	20.48	1
		1	2	20.08	20.30	20.64	1
		1	5	19.91	19.99	20.51	1
		3	0	20.09	20.41	20.63	1
		3	1	19.84	20.18	20.42	1
		3	3	19.94	20.10	20.36	1
		6	0	19.00	19.40	19.56	2

LTE Band 5							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20450	20525	20600	
		Frequency (MHz)		829	836.5	844	
10M	QPSK	1	0	22.42	22.31	22.39	0
		1	24	22.53	22.61	22.62	0
		1	49	22.49	22.45	22.55	0
		25	0	21.23	21.30	21.29	1
		25	12	21.16	21.11	21.20	1
		25	25	21.22	21.31	21.33	1
		50	0	21.39	21.19	21.38	1
	16QAM	1	0	21.32	21.22	21.31	1
		1	24	21.13	21.17	21.14	1
		1	49	21.12	21.05	21.21	1
		25	0	20.35	20.20	20.32	2
		25	12	20.21	20.15	20.33	2
		25	25	20.48	20.51	20.43	2
		50	0	20.33	20.36	20.42	2
BW	MCS Index	Channel		20425	20525	20625	3GPP MPR
		Frequency (MHz)		826.5	836.5	846.5	
5M	QPSK	1	0	22.38	22.26	22.34	0
		1	12	22.45	22.60	22.57	0
		1	24	22.45	22.40	22.54	0
		12	0	21.17	21.28	21.24	1
		12	6	21.09	21.06	21.18	1
		12	13	21.14	21.29	21.28	1
		25	0	21.37	21.11	21.36	1
	16QAM	1	0	21.24	21.16	21.23	1
		1	12	21.07	21.15	21.08	1
		1	24	21.05	21.00	21.19	1
		12	0	20.29	20.13	20.27	2
		12	6	20.14	20.10	20.31	2
		12	13	20.40	20.49	20.37	2
		25	0	20.25	20.35	20.40	2

BW	MCS Index	Channel		20415	20525	20635	3GPP MPR
		Frequency (MHz)		825.5	836.5	847.5	
3M	QPSK	1	0	22.36	22.24	22.34	0
		1	7	22.46	22.56	22.60	0
		1	14	22.41	22.43	22.49	0
		8	0	21.15	21.29	21.27	1
		8	3	21.12	21.06	21.12	1
		8	7	21.14	21.30	21.31	1
		15	0	21.34	21.14	21.34	1
	16QAM	1	0	21.30	21.14	21.30	1
		1	7	21.05	21.13	21.09	1
		1	14	21.09	20.99	21.19	1
		8	0	20.33	20.13	20.27	2
		8	3	20.15	20.07	20.31	2
		8	7	20.47	20.49	20.35	2
		15	0	20.28	20.28	20.36	2
BW	MCS Index	Channel		20407	20525	20643	3GPP MPR
		Frequency (MHz)		824.7	836.5	848.3	
1.4M	QPSK	1	0	22.41	22.25	22.37	0
		1	2	22.48	22.54	22.57	0
		1	5	22.47	22.37	22.53	0
		3	0	22.18	22.22	22.28	0
		3	1	22.12	22.06	22.15	0
		3	3	22.14	22.30	22.28	0
		6	0	21.35	21.14	21.37	1
	16QAM	1	0	21.26	21.20	21.26	1
		1	2	21.06	21.12	21.12	1
		1	5	21.04	21.03	21.16	1
		3	0	21.33	21.12	21.30	1
		3	1	21.13	21.09	21.25	1
		3	3	21.42	21.49	21.37	1
		6	0	20.28	20.28	20.41	2

LTE Band 7							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20850	21100	21350	
		Frequency (MHz)		2510	2535	2560	
20M	QPSK	1	0	21.29	21.60	21.30	0
		1	50	21.51	21.74	21.64	0
		1	99	21.52	21.83	21.67	0
		50	0	20.02	20.28	20.13	1
		50	25	19.95	20.23	20.13	1
		50	50	19.90	20.14	20.08	1
		100	0	19.88	20.24	20.03	1
	16QAM	1	0	20.36	20.64	20.57	1
		1	50	20.12	20.38	20.27	1
		1	99	19.89	20.17	20.02	1
		50	0	18.99	19.30	19.10	2
		50	25	19.15	19.43	19.33	2
		50	50	19.01	19.25	18.99	2
		100	0	19.01	19.24	19.09	2
BW	MCS Index	Channel		20825	21100	21375	3GPP MPR
		Frequency (MHz)		2507.5	2535	2562.5	
15M	QPSK	1	0	21.28	21.58	21.22	0
		1	37	21.44	21.66	21.58	0
		1	74	21.49	21.77	21.65	0
		36	0	20.00	20.21	20.08	1
		36	19	19.89	20.15	20.11	1
		36	39	19.88	20.06	20.07	1
		75	0	19.80	20.20	19.98	1
	16QAM	1	0	20.34	20.56	20.56	1
		1	37	20.04	20.34	20.22	1
		1	74	19.86	20.11	20.00	1
		36	0	18.97	19.23	19.05	2
		36	19	19.09	19.35	19.31	2
		36	39	19.00	19.23	18.91	2
		75	0	18.96	19.16	19.03	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20800	21100	21400	
		Frequency (MHz)		2505	2535	2565	
10M	QPSK	1	0	21.23	21.52	21.28	0
		1	24	21.49	21.66	21.63	0
		1	49	21.44	21.79	21.62	0
		25	0	20.00	20.20	20.12	1
		25	12	19.87	20.19	20.08	1
		25	25	19.87	20.08	20.06	1
		50	0	19.86	20.17	19.98	1
	16QAM	1	0	20.30	20.56	20.55	1
		1	24	20.11	20.36	20.19	1
		1	49	19.84	20.09	19.96	1
		25	0	18.98	19.24	19.08	2
		25	12	19.13	19.35	19.32	2
		25	25	18.93	19.21	18.94	2
		50	0	18.99	19.16	19.08	2
BW	MCS Index	Channel		20775	21100	21425	3GPP MPR
		Frequency (MHz)		2502.5	2535	2567.5	
5M	QPSK	1	0	21.25	21.55	21.25	0
		1	12	21.43	21.73	21.59	0
		1	24	21.48	21.78	21.66	0
		12	0	19.96	20.26	20.08	1
		12	6	19.88	20.18	20.11	1
		12	13	19.82	20.12	20.03	1
		25	0	19.86	20.16	20.01	1
	16QAM	1	0	20.28	20.58	20.49	1
		1	12	20.06	20.36	20.21	1
		1	24	19.82	20.12	20.00	1
		12	0	18.93	19.23	19.05	2
		12	6	19.08	19.38	19.31	2
		12	13	18.93	19.23	18.93	2
		25	0	18.93	19.23	19.07	2

LTE Band 12							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23060	23095	23130	
		Frequency (MHz)		704	707.5	711	
10M	QPSK	1	0	22.43	22.39	22.69	0
		1	24	22.60	22.41	22.84	0
		1	49	22.20	22.05	22.48	0
		25	0	21.46	21.38	21.71	1
		25	12	21.42	21.51	21.64	1
		25	25	21.32	21.23	21.60	1
		50	0	21.38	21.37	21.62	1
	16QAM	1	0	21.09	21.07	21.42	1
		1	24	21.18	21.20	21.47	1
		1	49	21.06	20.87	21.33	1
		25	0	20.44	20.43	20.66	2
		25	12	20.42	20.53	20.68	2
		25	25	20.30	20.29	20.66	2
		50	0	20.47	20.45	20.73	2
BW	MCS Index	Channel		23035	23095	23155	3GPP MPR
		Frequency (MHz)		701.5	707.5	713.5	
5M	QPSK	1	0	22.38	22.32	22.64	0
		1	12	22.58	22.33	22.82	0
		1	24	22.15	21.97	22.47	0
		12	0	21.42	21.33	21.66	1
		12	6	21.34	21.50	21.59	1
		12	13	21.28	21.18	21.59	1
		25	0	21.32	21.35	21.57	1
	16QAM	1	0	21.02	21.02	21.40	1
		1	12	21.10	21.18	21.42	1
		1	24	21.04	20.79	21.31	1
		12	0	20.36	20.37	20.58	2
		12	6	20.36	20.51	20.62	2
		12	13	20.23	20.24	20.64	2
		25	0	20.41	20.38	20.68	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23025	23095	23165	
		Frequency (MHz)		700.5	707.5	714.5	
3M	QPSK	1	0	22.37	22.37	22.63	0
		1	7	22.53	22.36	22.82	0
		1	14	22.14	21.98	22.43	0
		8	0	21.39	21.33	21.69	1
		8	3	21.34	21.49	21.58	1
		8	7	21.24	21.22	21.58	1
		15	0	21.34	21.32	21.54	1
	16QAM	1	0	21.01	21.06	21.40	1
		1	7	21.13	21.15	21.43	1
		1	14	21.04	20.79	21.32	1
		8	0	20.36	20.39	20.61	2
		8	3	20.39	20.47	20.66	2
		8	7	20.28	20.22	20.61	2
		15	0	20.41	20.37	20.71	2
BW	MCS Index	Channel		23017	23095	23173	3GPP MPR
		Frequency (MHz)		699.7	707.5	715.3	
1.4M	QPSK	1	0	22.35	22.35	22.64	0
		1	2	22.57	22.35	22.82	0
		1	5	22.18	21.98	22.43	0
		3	0	22.40	22.30	22.69	0
		3	1	22.41	22.49	22.56	0
		3	3	22.27	22.15	22.54	0
		6	0	21.37	21.31	21.60	1
	16QAM	1	0	21.04	21.00	21.37	1
		1	2	21.16	21.12	21.45	1
		1	5	21.01	20.79	21.32	1
		3	0	21.40	21.38	21.61	1
		3	1	21.34	21.52	21.63	1
		3	3	21.26	21.24	21.65	1
		6	0	20.41	20.43	20.68	2

LTE Band 13							
BW	MCS Index	RB Size	RB Offset	-	Mid	-	3GPP MPR (dB)
		Channel		-	23230	-	
		Frequency (MHz)		-	782.0	-	
10M	QPSK	1	0	-	22.55	-	0
		1	24	-	22.70	-	0
		1	49	-	22.64	-	0
		25	0	-	21.60	-	1
		25	12	-	21.59	-	1
		25	25	-	21.42	-	1
		50	0	-	21.67	-	1
	16QAM	1	0	-	21.24	-	1
		1	24	-	21.45	-	1
		1	49	-	21.25	-	1
		25	0	-	20.50	-	2
		25	12	-	20.48	-	2
		25	25	-	20.32	-	2
		50	0	-	20.41	-	2
BW	MCS Index	Channel		23205	23230	23255	3GPP MPR
		Frequency (MHz)		779.5	782.0	784.5	
5M	QPSK	1	0	22.47	22.51	22.50	0
		1	12	22.68	22.62	22.69	0
		1	24	22.56	22.60	22.59	0
		12	0	21.57	21.54	21.58	1
		12	6	21.57	21.52	21.54	1
		12	13	21.36	21.34	21.40	1
		25	0	21.66	21.65	21.59	1
	16QAM	1	0	21.17	21.16	21.18	1
		1	12	21.42	21.39	21.43	1
		1	24	21.23	21.18	21.20	1
		12	0	20.44	20.42	20.48	2
		12	6	20.46	20.40	20.47	2
		12	13	20.24	20.28	20.27	2
		25	0	20.39	20.33	20.40	2

LTE Band 17							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23780	23790	23800	
		Frequency (MHz)		709	710	711	
10M	QPSK	1	0	21.97	21.85	21.85	0
		1	24	22.02	21.97	21.76	0
		1	49	21.81	21.76	21.73	0
		25	0	20.61	20.68	20.47	1
		25	12	20.82	20.53	20.59	1
		25	25	20.68	20.63	20.45	1
		50	0	20.60	20.58	20.36	1
	16QAM	1	0	20.66	20.61	20.58	1
		1	24	20.62	20.48	20.42	1
		1	49	20.63	20.58	20.55	1
		25	0	19.74	19.81	19.57	2
		25	12	19.68	19.78	19.63	2
		25	25	19.92	19.78	19.57	2
		50	0	19.65	19.75	19.60	2
BW	MCS Index	Channel		23755	23790	23825	3GPP MPR
		Frequency (MHz)		706.5	710	713.5	
5M	QPSK	1	0	21.93	21.80	21.84	0
		1	12	21.96	21.95	21.71	0
		1	24	21.74	21.71	21.71	0
		12	0	20.53	20.66	20.42	1
		12	6	20.80	20.45	20.57	1
		12	13	20.60	20.57	20.37	1
		25	0	20.54	20.56	20.30	1
	16QAM	1	0	20.59	20.56	20.56	1
		1	12	20.56	20.41	20.37	1
		1	24	20.56	20.53	20.53	1
		12	0	19.66	19.79	19.51	2
		12	6	19.60	19.77	19.61	2
		12	13	19.88	19.73	19.49	2
		25	0	19.57	19.74	19.58	2

LTE Band 41									
BW	MCS Index	RB Size	RB Offset	Low	Mid	Mid	Mid	High	3GPP MPR (dB)
		Channel		39750	40185	40620	41055	41490	
		Frequency (MHz)		2506	2549.5	2593	2636.5	2680	
20M	QPSK	1	0	21.93	21.71	21.82	21.71	22.17	0
		1	50	21.81	21.63	21.80	21.51	22.15	0
		1	99	21.96	21.81	21.99	21.65	22.22	0
		50	0	20.71	20.58	20.83	20.55	21.13	1
		50	25	20.80	20.71	20.78	20.62	21.03	1
		50	50	20.78	20.65	20.96	20.61	21.23	1
		100	0	20.85	20.69	20.85	20.59	21.16	1
	16QAM	1	0	21.01	20.93	21.03	20.72	21.40	1
		1	50	20.46	20.36	20.56	20.22	20.82	1
		1	99	20.36	20.24	20.45	20.18	20.72	1
		50	0	19.88	19.64	19.93	19.68	20.31	2
		50	25	19.81	19.79	19.90	19.65	20.23	2
		50	50	20.00	19.82	20.10	19.88	20.42	2
		100	0	19.97	19.74	19.87	19.64	20.27	2
BW	MCS Index	Channel		39725	40173	40620	41068	41515	3GPP MPR
		Frequency (MHz)		2503.5	2548.3	2593	2637.8	2682.5	
15M	QPSK	1	0	21.92	21.67	21.74	21.69	22.11	0
		1	37	21.77	21.60	21.74	21.43	22.13	0
		1	74	21.94	21.80	21.95	21.59	22.16	0
		36	0	20.65	20.53	20.82	20.51	21.12	1
		36	19	20.79	20.69	20.73	20.61	20.96	1
		36	39	20.70	20.58	20.94	20.56	21.21	1
		75	0	20.84	20.65	20.82	20.56	21.11	1
	16QAM	1	0	20.98	20.92	20.97	20.65	21.38	1
		1	37	20.42	20.31	20.54	20.14	20.75	1
		1	74	20.30	20.22	20.42	20.16	20.68	1
		36	0	19.86	19.56	19.92	19.64	20.30	2
		36	19	19.73	19.75	19.85	19.59	20.18	2
		36	39	19.97	19.76	20.08	19.86	20.40	2
		75	0	19.96	19.69	19.79	19.56	20.21	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	Mid	Mid	High	3GPP MPR (dB)
		Channel		39700	40160	40620	41080	41540	
		Frequency (MHz)		2501	2547	2593	2639	2685	
10M	QPSK	1	0	21.85	21.67	21.77	21.64	22.09	0
		1	24	21.79	21.55	21.79	21.43	22.13	0
		1	49	21.88	21.77	21.94	21.63	22.14	0
		25	0	20.68	20.52	20.81	20.47	21.10	1
		25	12	20.78	20.64	20.73	20.56	21.01	1
		25	25	20.72	20.57	20.94	20.60	21.18	1
		50	0	20.84	20.67	20.77	20.54	21.14	1
	16QAM	1	0	20.94	20.85	20.97	20.70	21.35	1
		1	24	20.43	20.30	20.54	20.17	20.80	1
		1	49	20.34	20.17	20.40	20.16	20.64	1
		25	0	19.82	19.56	19.91	19.60	20.25	2
		25	12	19.79	19.71	19.89	19.62	20.17	2
		25	25	19.92	19.78	20.05	19.86	20.35	2
		50	0	19.95	19.66	19.86	19.58	20.19	2
BW	MCS Index	Channel		39675	40148	40620	41093	41565	3GPP MPR
		Frequency (MHz)		2498.5	2545.8	2593	2640.3	2687.5	
5M	QPSK	1	0	21.88	21.64	21.77	21.66	22.11	0
		1	12	21.79	21.55	21.78	21.47	22.08	0
		1	24	21.91	21.73	21.98	21.57	22.16	0
		12	0	20.67	20.53	20.78	20.51	21.06	1
		12	6	20.72	20.70	20.73	20.56	20.95	1
		12	13	20.74	20.60	20.95	20.54	21.17	1
		25	0	20.79	20.67	20.80	20.51	21.14	1
	16QAM	1	0	20.94	20.88	21.01	20.64	21.35	1
		1	12	20.38	20.34	20.51	20.18	20.81	1
		1	24	20.34	20.16	20.43	20.10	20.67	1
		12	0	19.80	19.58	19.85	19.64	20.29	2
		12	6	19.75	19.77	19.84	19.59	20.18	2
		12	13	19.93	19.77	20.08	19.87	20.40	2
		25	0	19.91	19.67	19.82	19.59	20.26	2

LTE Band 66							
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		132072	132322	132572	
		Frequency (MHz)		1720	1745	1770	
20M	QPSK	1	0	20.47	21.05	21.20	0
		1	50	20.71	21.23	21.45	0
		1	99	20.46	20.94	21.22	0
		50	0	19.37	19.87	20.13	1
		50	25	19.44	20.07	20.15	1
		50	50	19.33	19.95	20.10	1
		100	0	19.48	19.99	20.11	1
	16QAM	1	0	19.42	19.99	20.23	1
		1	50	19.53	20.06	20.26	1
		1	99	19.29	19.63	20.00	1
		50	0	18.39	18.92	19.06	2
		50	25	18.62	19.08	19.34	2
		50	50	18.61	18.95	19.20	2
		100	0	18.54	18.97	19.34	2
BW	MCS Index	Channel		132047	132322	132597	3GPP MPR
		Frequency (MHz)		1717.5	1745	1772.5	
15M	QPSK	1	0	20.41	21.03	21.14	0
		1	37	20.64	21.18	21.43	0
		1	74	20.40	20.87	21.17	0
		36	0	19.30	19.82	20.11	1
		36	19	19.36	20.05	20.09	1
		36	39	19.25	19.94	20.08	1
		75	0	19.44	19.94	20.03	1
	16QAM	1	0	19.34	19.98	20.21	1
		1	37	19.48	20.01	20.22	1
		1	74	19.27	19.55	19.99	1
		36	0	18.31	18.88	19.01	2
		36	19	18.59	19.02	19.32	2
		36	39	18.59	18.88	19.15	2
		75	0	18.48	18.89	19.32	2

BW	MCS Index	Channel		132022	132322	132622	3GPP MPR
		Frequency (MHz)		1715	1745	1775	
10M	QPSK	1	0	20.39	21.01	21.15	0
		1	24	20.69	21.15	21.44	0
		1	49	20.38	20.90	21.17	0
		25	0	19.34	19.81	20.11	1
		25	12	19.42	20.00	20.10	1
		25	25	19.27	19.87	20.08	1
		50	0	19.47	19.97	20.03	1
	16QAM	1	0	19.35	19.91	20.17	1
		1	24	19.50	20.00	20.24	1
		1	49	19.27	19.56	19.95	1
		25	0	18.33	18.84	19.04	2
		25	12	18.60	19.00	19.33	2
		25	25	18.53	18.91	19.15	2
		50	0	18.52	18.89	19.33	2
BW	MCS Index	Channel		131997	132322	132647	3GPP MPR
		Frequency (MHz)		1712.5	1745	1777.5	
5M	QPSK	1	0	20.42	20.98	21.15	0
		1	12	20.69	21.15	21.43	0
		1	24	20.41	20.86	21.21	0
		12	0	19.33	19.82	20.08	1
		12	6	19.36	20.06	20.10	1
		12	13	19.29	19.90	20.09	1
		25	0	19.42	19.97	20.06	1
	16QAM	1	0	19.35	19.94	20.21	1
		1	12	19.45	20.04	20.21	1
		1	24	19.27	19.55	19.98	1
		12	0	18.31	18.86	18.98	2
		12	6	18.56	19.06	19.28	2
		12	13	18.54	18.90	19.18	2
		25	0	18.48	18.90	19.29	2

BW	MCS Index	Channel		131987	132322	132657	3GPP MPR
		Frequency (MHz)		1711.5	1745	1778.5	
3M	QPSK	1	0	20.41	21.00	21.19	0
		1	7	20.70	21.21	21.40	0
		1	14	20.38	20.87	21.20	0
		8	0	19.36	19.83	20.10	1
		8	3	19.41	20.06	20.09	1
		8	7	19.29	19.90	20.08	1
		15	0	19.42	19.97	20.08	1
	16QAM	1	0	19.40	19.91	20.22	1
		1	7	19.45	20.02	20.21	1
		1	14	19.26	19.57	19.98	1
		8	0	18.38	18.87	18.98	2
		8	3	18.56	19.05	19.30	2
		8	7	18.59	18.88	19.15	2
		15	0	18.48	18.89	19.32	2
BW	MCS Index	Channel		131979	132322	132665	3GPP MPR
		Frequency (MHz)		1710.7	1745	1779.3	
1.4M	QPSK	1	0	20.39	21.01	21.15	0
		1	2	20.68	21.17	21.43	0
		1	5	20.44	20.87	21.17	0
		3	0	20.31	20.79	21.11	0
		3	1	20.43	21.05	21.07	0
		3	3	20.28	20.87	21.04	0
		6	0	19.47	19.93	20.09	1
	16QAM	1	0	19.37	19.92	20.18	1
		1	2	19.51	19.98	20.24	1
		1	5	19.24	19.55	19.99	1
		3	0	19.35	19.87	20.01	1
		3	1	19.54	20.07	20.29	1
		3	3	19.57	19.90	20.19	1
		6	0	18.48	18.95	19.29	2

<table>
<tr><th colspan="8">LTE Band 71</th></tr>
<tr><th rowspan="3">BW</th><th rowspan="3">MCS Index</th><th>RB Size</th><th>RB Offset</th><th>Low</th><th>Mid</th><th>High</th><th rowspan="3">3GPP MPR (dB)</th></tr>
<tr><th colspan="2">Channel</th><th>133222</th><th>133322</th><th>133372</th></tr>
<tr><th colspan="2">Frequency (MHz)</th><th>673</th><th>683</th><th>688</th></tr>
<tr><td rowspan="14">20M</td><td rowspan="7">QPSK</td><td>1</td><td>0</td><td>21.16</td><td>21.07</td><td>21.23</td><td>0</td></tr>
<tr><td>1</td><td>50</td><td>21.68</td><td>21.51</td><td>21.57</td><td>0</td></tr>
<tr><td>1</td><td>99</td><td>20.92</td><td>20.82</td><td>21.05</td><td>0</td></tr>
<tr><td>50</td><td>0</td><td>20.29</td><td>20.13</td><td>20.21</td><td>1</td></tr>
<tr><td>50</td><td>25</td><td>20.22</td><td>20.24</td><td>20.16</td><td>1</td></tr>
<tr><td>50</td><td>50</td><td>20.18</td><td>20.06</td><td>20.22</td><td>1</td></tr>
<tr><td>100</td><td>0</td><td>20.27</td><td>20.26</td><td>20.23</td><td>1</td></tr>
<tr><td rowspan="7">16QAM</td><td>1</td><td>0</td><td>19.97</td><td>19.78</td><td>20.01</td><td>1</td></tr>
<tr><td>1</td><td>50</td><td>19.72</td><td>19.77</td><td>19.78</td><td>1</td></tr>
<tr><td>1</td><td>99</td><td>19.59</td><td>19.38</td><td>19.58</td><td>1</td></tr>
<tr><td>50</td><td>0</td><td>19.11</td><td>18.96</td><td>18.94</td><td>2</td></tr>
<tr><td>50</td><td>25</td><td>19.06</td><td>19.07</td><td>19.07</td><td>2</td></tr>
<tr><td>50</td><td>50</td><td>19.18</td><td>19.01</td><td>19.14</td><td>2</td></tr>
<tr><td>100</td><td>0</td><td>19.08</td><td>18.94</td><td>19.14</td><td>2</td></tr>
<tr><th rowspan="2">BW</th><th rowspan="2">MCS Index</th><th colspan="2">Channel</th><th>133197</th><th>133297</th><th>133397</th><th rowspan="2">3GPP MPR</th></tr>
<tr><th colspan="2">Frequency (MHz)</th><th>670.5</th><th>680.5</th><th>690.5</th></tr>
<tr><td rowspan="14">15M</td><td rowspan="7">QPSK</td><td>1</td><td>0</td><td>21.10</td><td>21.02</td><td>21.22</td><td>0</td></tr>
<tr><td>1</td><td>37</td><td>21.67</td><td>21.49</td><td>21.52</td><td>0</td></tr>
<tr><td>1</td><td>74</td><td>20.84</td><td>20.75</td><td>21.03</td><td>0</td></tr>
<tr><td>36</td><td>0</td><td>20.28</td><td>20.09</td><td>20.18</td><td>1</td></tr>
<tr><td>36</td><td>19</td><td>20.19</td><td>20.23</td><td>20.10</td><td>1</td></tr>
<tr><td>36</td><td>39</td><td>20.14</td><td>20.01</td><td>20.20</td><td>1</td></tr>
<tr><td>75</td><td>0</td><td>20.21</td><td>20.24</td><td>20.20</td><td>1</td></tr>
<tr><td rowspan="7">16QAM</td><td>1</td><td>0</td><td>19.95</td><td>19.70</td><td>20.00</td><td>1</td></tr>
<tr><td>1</td><td>37</td><td>19.64</td><td>19.73</td><td>19.73</td><td>1</td></tr>
<tr><td>1</td><td>74</td><td>19.56</td><td>19.32</td><td>19.56</td><td>1</td></tr>
<tr><td>36</td><td>0</td><td>19.10</td><td>18.91</td><td>18.86</td><td>2</td></tr>
<tr><td>36</td><td>19</td><td>19.00</td><td>19.04</td><td>19.03</td><td>2</td></tr>
<tr><td>36</td><td>39</td><td>19.16</td><td>18.94</td><td>19.09</td><td>2</td></tr>
<tr><td>75</td><td>0</td><td>19.02</td><td>18.86</td><td>19.12</td><td>2</td></tr>
</table>

BW	MCS Index	Channel		133172	133272	133422	3GPP MPR
		Frequency (MHz)		668	678	693	
10M	QPSK	1	0	21.08	21.03	21.18	0
		1	24	21.66	21.43	21.56	0
		1	49	20.84	20.78	21.00	0
		25	0	20.26	20.07	20.19	1
		25	12	20.20	20.17	20.11	1
		25	25	20.12	19.98	20.20	1
		50	0	20.26	20.24	20.15	1
	16QAM	1	0	19.90	19.70	19.95	1
		1	24	19.69	19.71	19.76	1
		1	49	19.57	19.31	19.53	1
		25	0	19.05	18.88	18.92	2
		25	12	19.04	18.99	19.06	2
		25	25	19.10	18.97	19.09	2
		50	0	19.06	18.86	19.13	2
BW	MCS Index	Channel		133147	133247	133447	3GPP MPR
		Frequency (MHz)		665.5	675.5	695.5	
5M	QPSK	1	0	21.11	21.00	21.18	0
		1	12	21.66	21.43	21.55	0
		1	24	20.87	20.74	21.04	0
		12	0	20.25	20.08	20.16	1
		12	6	20.14	20.23	20.11	1
		12	13	20.14	20.01	20.21	1
		25	0	20.21	20.24	20.18	1
	16QAM	1	0	19.90	19.73	19.99	1
		1	12	19.64	19.75	19.73	1
		1	24	19.57	19.30	19.56	1
		12	0	19.03	18.90	18.86	2
		12	6	19.00	19.05	19.01	2
		12	13	19.11	18.96	19.12	2
		25	0	19.02	18.87	19.09	2

<Reduced Power>

Band	GSM1900		
Channel	661	661	810
Frequency (MHz)	1880.0	1880.0	1909.8
Maximum Burst-Averaged Output Power			
GPRS (GMSK, 1Tx-slot)	20.39	20.39	20.65
GPRS (GMSK, 2Tx-slot)	20.21	20.21	20.53
EDGE (8PSK, 1Tx-slot)	19.88	19.89	20.14
EDGE (8PSK, 2Tx-slot)	19.72	19.77	20.09
EDGE (8PSK, 3Tx-slot)	19.64	19.67	19.93
EDGE (8PSK, 4Tx-slot)	19.55	19.51	19.86
Maximum Frame-Averaged Output Power			
GPRS (GMSK, 1Tx-slot)	11.39	11.39	11.65
GPRS (GMSK, 2Tx-slot)	14.21	14.21	14.53
EDGE (8PSK, 1Tx-slot)	10.88	10.89	11.14
EDGE (8PSK, 2Tx-slot)	13.72	13.77	14.09
EDGE (8PSK, 3Tx-slot)	15.38	15.41	15.67
EDGE (8PSK, 4Tx-slot)	16.55	16.51	16.86

Band	WCDMA Band II			WCDMA Band IV		
Channel	9262	9400	9538	1312	1413	1513
Frequency (MHz)	1852.4	1880.0	1907.6	1712.4	1732.6	1752.6
RMC 12.2K	12.98	13.37	13.02	16.41	16.32	16.43
HSDPA Subtest-1	12.11	12.28	11.82	15.45	15.19	15.51
HSDPA Subtest-2	12.01	12.25	11.85	15.42	15.23	15.41
HSDPA Subtest-3	11.38	11.65	11.59	14.88	14.79	14.92
HSDPA Subtest-4	11.42	11.64	11.46	15.00	14.90	14.98
DC-HSDPA Subtest-1	12.03	12.27	11.77	15.40	15.12	15.46
DC-HSDPA Subtest-2	11.97	12.20	11.84	15.38	15.15	15.39
DC-HSDPA Subtest-3	11.30	11.61	11.54	14.80	14.75	14.87
DC-HSDPA Subtest-4	11.45	11.70	11.48	15.03	14.96	15.00
HSUPA Subtest-1	12.14	12.34	11.84	15.48	15.25	15.53
HSUPA Subtest-2	9.92	10.29	10.00	13.37	13.29	13.37
HSUPA Subtest-3	10.96	11.30	10.97	14.34	14.24	14.37
HSUPA Subtest-4	9.99	10.39	10.10	13.43	13.33	13.47
HSUPA Subtest-5	11.93	12.21	11.80	15.34	15.19	15.36

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18700	18900	19100
		Frequency (MHz)		1860	1880	1900
20M	QPSK	1	0	14.91	14.65	14.86
		1	50	15.05	15.01	14.97
		1	99	14.85	14.64	14.67
		50	0	14.76	14.87	14.75
		50	25	14.70	14.89	14.70
		50	50	14.91	14.88	14.71
		100	0	14.89	14.87	14.71
	16QAM	1	0	14.85	14.68	14.74
		1	50	14.99	14.97	14.67
		1	99	14.76	14.74	13.81
		50	0	14.50	14.46	14.37
		50	25	14.52	14.43	14.40
		50	50	14.56	14.59	14.42
		100	0	14.51	14.61	14.46
BW	MCS Index	Channel		18675	18900	19125
		Frequency (MHz)		1857.5	1880	1902.5
15M	QPSK	1	0	14.90	14.61	14.78
		1	37	15.01	14.98	14.91
		1	74	14.83	14.63	14.63
		36	0	14.70	14.82	14.74
		36	19	14.69	14.87	14.65
		36	39	14.83	14.81	14.69
		75	0	14.88	14.83	14.68
	16QAM	1	0	14.82	14.67	14.68
		1	37	14.95	14.92	14.65
		1	74	14.70	14.72	13.78
		36	0	14.48	14.38	14.36
		36	19	14.44	14.39	14.35
		36	39	14.53	14.53	14.40
		75	0	14.50	14.56	14.38

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18650	18900	19150
		Frequency (MHz)		1855	1880	1905
10M	QPSK	1	0	14.83	14.61	14.81
		1	24	15.03	14.93	14.96
		1	49	14.77	14.60	14.62
		25	0	14.73	14.81	14.73
		25	12	14.68	14.82	14.65
		25	25	14.85	14.80	14.69
		50	0	14.88	14.85	14.63
	16QAM	1	0	14.78	14.60	14.68
		1	24	14.96	14.91	14.65
		1	49	14.74	14.67	13.76
		25	0	14.44	14.38	14.35
		25	12	14.50	14.35	14.39
		25	25	14.48	14.55	14.37
		50	0	14.49	14.53	14.45
BW	MCS Index	Channel		18625	18900	19175
		Frequency (MHz)		1852.5	1880	1907.5
5M	QPSK	1	0	14.86	14.58	14.81
		1	12	15.03	14.93	14.95
		1	24	14.80	14.56	14.66
		12	0	14.72	14.82	14.70
		12	6	14.62	14.88	14.65
		12	13	14.87	14.83	14.70
		25	0	14.83	14.85	14.66
	16QAM	1	0	14.78	14.63	14.72
		1	12	14.91	14.95	14.62
		1	24	14.74	14.66	13.79
		12	0	14.42	14.40	14.29
		12	6	14.46	14.41	14.34
		12	13	14.49	14.54	14.40
		25	0	14.45	14.54	14.41

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18615	18900	19185
		Frequency (MHz)		1851.5	1880	1908.5
3M	QPSK	1	0	14.85	14.63	14.80
		1	7	14.98	14.96	14.95
		1	14	14.79	14.57	14.62
		8	0	14.69	14.82	14.73
		8	3	14.62	14.87	14.64
		8	7	14.83	14.87	14.69
		15	0	14.85	14.82	14.63
	16QAM	1	0	14.77	14.67	14.72
		1	7	14.94	14.92	14.63
		1	14	14.74	14.66	13.80
		8	0	14.42	14.42	14.32
		8	3	14.49	14.37	14.38
		8	7	14.54	14.52	14.37
		15	0	14.45	14.53	14.44
BW	MCS Index	Channel		18607	18900	19193
		Frequency (MHz)		1850.7	1880	1909.3
1.4M	QPSK	1	0	14.83	14.61	14.81
		1	2	15.02	14.95	14.95
		1	5	14.83	14.57	14.62
		3	0	14.70	14.79	14.73
		3	1	14.69	14.87	14.62
		3	3	14.86	14.80	14.65
		6	0	14.88	14.81	14.69
	16QAM	1	0	14.80	14.61	14.69
		1	2	14.97	14.89	14.65
		1	5	14.71	14.66	13.80
		3	0	14.46	14.41	14.32
		3	1	14.44	14.42	14.35
		3	3	14.52	14.54	14.41
		6	0	14.45	14.59	14.41

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	15.50	15.95	16.12
		1	50	15.66	15.97	15.91
		1	99	15.35	15.91	15.62
		50	0	15.77	15.76	15.78
		50	25	15.75	15.70	15.67
		50	50	15.55	15.74	15.62
		100	0	15.71	15.76	15.79
	16QAM	1	0	15.79	15.88	15.61
		1	50	15.62	15.72	15.75
		1	99	15.53	15.47	15.90
		50	0	15.54	15.81	15.77
		50	25	15.61	15.70	15.72
		50	50	15.66	15.66	15.79
		100	0	15.69	15.52	15.64
BW	MCS Index	Channel		20025	20175	20325
		Frequency (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	15.49	15.91	16.04
		1	37	15.62	15.94	15.85
		1	74	15.33	15.90	15.58
		36	0	15.71	15.71	15.77
		36	19	15.74	15.68	15.62
		36	39	15.47	15.67	15.60
		75	0	15.70	15.72	15.76
	16QAM	1	0	15.76	15.87	15.55
		1	37	15.58	15.67	15.73
		1	74	15.47	15.45	15.87
		36	0	15.52	15.73	15.76
		36	19	15.53	15.66	15.67
		36	39	15.63	15.60	15.77
		75	0	15.68	15.47	15.56

BW	MCS Index	Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	15.42	15.91	16.07
		1	24	15.64	15.89	15.90
		1	49	15.27	15.87	15.57
		25	0	15.74	15.70	15.76
		25	12	15.73	15.63	15.62
		25	25	15.49	15.66	15.60
		50	0	15.70	15.74	15.71
	16QAM	1	0	15.72	15.80	15.55
		1	24	15.59	15.66	15.73
		1	49	15.51	15.40	15.85
		25	0	15.48	15.73	15.75
		25	12	15.59	15.62	15.71
		25	25	15.58	15.62	15.74
		50	0	15.67	15.44	15.63
BW	MCS Index	Channel		19975	20175	20375
		Frequency (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	15.45	15.88	16.07
		1	12	15.64	15.89	15.89
		1	24	15.30	15.83	15.61
		12	0	15.73	15.71	15.73
		12	6	15.67	15.69	15.62
		12	13	15.51	15.69	15.61
		25	0	15.65	15.74	15.74
	16QAM	1	0	15.72	15.83	15.59
		1	12	15.54	15.70	15.70
		1	24	15.51	15.39	15.88
		12	0	15.46	15.75	15.69
		12	6	15.55	15.68	15.66
		12	13	15.59	15.61	15.77
		25	0	15.63	15.45	15.59

BW	MCS Index	Channel		19965	20175	20385
		Frequency (MHz)		1711.5	1732.5	1753.5
3M	QPSK	1	0	15.44	15.93	16.06
		1	7	15.59	15.92	15.89
		1	14	15.29	15.84	15.57
		8	0	15.70	15.71	15.76
		8	3	15.67	15.68	15.61
		8	7	15.47	15.73	15.60
		15	0	15.67	15.71	15.71
	16QAM	1	0	15.71	15.87	15.59
		1	7	15.57	15.67	15.71
		1	14	15.51	15.39	15.89
		8	0	15.46	15.77	15.72
		8	3	15.58	15.64	15.70
		8	7	15.64	15.59	15.74
		15	0	15.63	15.44	15.62
BW	MCS Index	Channel		19957	20175	20393
		Frequency (MHz)		1710.7	1732.5	1754.3
1.4M	QPSK	1	0	15.42	15.91	16.07
		1	2	15.63	15.91	15.89
		1	5	15.33	15.84	15.57
		3	0	15.71	15.68	15.76
		3	1	15.74	15.68	15.59
		3	3	15.50	15.66	15.56
		6	0	15.70	15.70	15.77
	16QAM	1	0	15.74	15.81	15.56
		1	2	15.60	15.64	15.73
		1	5	15.48	15.39	15.89
		3	0	15.50	15.76	15.72
		3	1	15.53	15.69	15.67
		3	3	15.62	15.61	15.78
		6	0	15.63	15.50	15.59

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20850	21100	21350
		Frequency (MHz)		2510	2535	2560
20M	QPSK	1	0	17.01	16.44	16.79
		1	50	17.08	16.98	17.12
		1	99	16.99	17.17	17.07
		50	0	16.93	16.97	16.86
		50	25	16.77	16.62	16.84
		50	50	16.86	16.77	16.87
		100	0	16.88	16.95	16.81
	16QAM	1	0	16.93	16.86	16.70
		1	50	16.98	16.92	16.96
		1	99	16.91	16.79	16.81
		50	0	16.78	16.95	16.91
		50	25	16.62	16.99	16.97
		50	50	16.70	17.02	16.94
		100	0	16.77	17.00	16.86
BW	MCS Index	Channel		20825	21100	21375
		Frequency (MHz)		2507.5	2535	2562.5
15M	QPSK	1	0	17.00	16.40	16.71
		1	37	17.04	16.95	17.06
		1	74	16.97	17.16	17.03
		36	0	16.87	16.92	16.85
		36	19	16.76	16.60	16.79
		36	39	16.78	16.70	16.85
		75	0	16.87	16.91	16.78
	16QAM	1	0	16.90	16.85	16.64
		1	37	16.94	16.87	16.94
		1	74	16.85	16.77	16.78
		36	0	16.76	16.87	16.90
		36	19	16.54	16.95	16.92
		36	39	16.67	16.96	16.92
		75	0	16.76	16.95	16.78

BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20800	21100	21400
		Frequency (MHz)		2505	2535	2565
10M	QPSK	1	0	16.93	16.40	16.74
		1	24	17.06	16.90	17.11
		1	49	16.91	17.13	17.02
		25	0	16.90	16.91	16.84
		25	12	16.75	16.55	16.79
		25	25	16.80	16.69	16.85
		50	0	16.87	16.93	16.73
	16QAM	1	0	16.86	16.78	16.64
		1	24	16.95	16.86	16.94
		1	49	16.89	16.72	16.76
		25	0	16.72	16.87	16.89
		25	12	16.60	16.91	16.96
		25	25	16.62	16.98	16.89
		50	0	16.75	16.92	16.85
BW	MCS Index	Channel		20775	21100	21425
		Frequency (MHz)		2502.5	2535	2567.5
5M	QPSK	1	0	16.96	16.37	16.74
		1	12	17.06	16.90	17.10
		1	24	16.94	17.09	17.06
		12	0	16.89	16.92	16.81
		12	6	16.69	16.61	16.79
		12	13	16.82	16.72	16.86
		25	0	16.82	16.93	16.76
	16QAM	1	0	16.86	16.81	16.68
		1	12	16.90	16.90	16.91
		1	24	16.89	16.71	16.79
		12	0	16.70	16.89	16.83
		12	6	16.56	16.97	16.91
		12	13	16.63	16.97	16.92
		25	0	16.71	16.93	16.81

LTE Band 41								
BW	MCS Index	RB Size	RB Offset	Low	Mid	Mid	Mid	High
		Channel		39750	40185	40620	41055	41490
		Frequency (MHz)		2506	2549.5	2593	2636.5	2680
20M	QPSK	1	0	18.31	18.78	18.72	18.57	18.53
		1	50	18.66	18.75	18.71	18.82	18.65
		1	99	18.35	18.73	18.66	18.63	18.83
		50	0	17.93	18.05	18.15	18.31	18.15
		50	25	18.04	18.01	18.11	18.35	18.17
		50	50	18.09	18.04	18.03	18.32	18.38
		100	0	18.03	17.97	18.14	18.17	18.31
	16QAM	1	0	18.21	18.37	18.29	18.63	18.15
		1	50	18.15	18.36	18.57	18.61	18.36
		1	99	18.36	18.41	18.36	18.74	18.17
		50	0	18.14	17.98	18.05	18.35	18.16
		50	25	18.07	17.99	18.04	18.37	18.21
		50	50	18.15	17.97	18.06	18.31	18.18
		100	0	18.04	17.88	17.85	18.35	18.13
BW	MCS Index	Channel		39725	40173	40620	41068	41515
		Frequency (MHz)		2503.5	2548.3	2593	2637.8	2682.5
15M	QPSK	1	0	18.30	18.74	18.68	18.49	18.45
		1	37	18.62	18.72	18.68	18.76	18.59
		1	74	18.33	18.72	18.65	18.59	18.79
		36	0	17.87	18.00	18.10	18.30	18.14
		36	19	18.03	17.99	18.09	18.30	18.12
		36	39	18.01	17.97	17.96	18.30	18.36
		75	0	18.02	17.93	18.10	18.14	18.28
	16QAM	1	0	18.18	18.36	18.28	18.57	18.09
		1	37	18.11	18.31	18.52	18.59	18.34
		1	74	18.30	18.39	18.34	18.71	18.14
		36	0	18.12	17.90	17.97	18.34	18.15
		36	19	17.99	17.95	18.00	18.32	18.16
		36	39	18.12	17.91	18.00	18.29	18.16
		75	0	18.03	17.83	17.80	18.27	18.05

BW	MCS Index	RB Size	RB Offset	Low	Mid	Mid	Mid	High
		Channel		39700	40160	40620	41080	41540
		Frequency (MHz)		2501	2547	2593	2639	2685
10M	QPSK	1	0	18.23	18.74	18.68	18.52	18.48
		1	24	18.64	18.67	18.63	18.81	18.64
		1	49	18.27	18.69	18.62	18.58	18.78
		25	0	17.90	17.99	18.09	18.29	18.13
		25	12	18.02	17.94	18.04	18.30	18.12
		25	25	18.03	17.96	17.95	18.30	18.36
		50	0	18.02	17.95	18.12	18.09	18.23
	16QAM	1	0	18.14	18.29	18.21	18.57	18.09
		1	24	18.12	18.30	18.51	18.59	18.34
		1	49	18.34	18.34	18.29	18.69	18.12
		25	0	18.08	17.90	17.97	18.33	18.14
		25	12	18.05	17.91	17.96	18.36	18.20
		25	25	18.07	17.93	18.02	18.26	18.13
		50	0	18.02	17.80	17.77	18.34	18.12
BW	MCS Index	Channel		39675	40148	40620	41093	41565
		Frequency (MHz)		2498.5	2545.8	2593	2640.3	2687.5
5M	QPSK	1	0	18.26	18.71	18.65	18.52	18.48
		1	12	18.64	18.67	18.63	18.80	18.63
		1	24	18.30	18.65	18.58	18.62	18.82
		12	0	17.89	18.00	18.10	18.26	18.10
		12	6	17.96	18.00	18.10	18.30	18.12
		12	13	18.05	17.99	17.98	18.31	18.37
		25	0	17.97	17.95	18.12	18.12	18.26
	16QAM	1	0	18.14	18.32	18.24	18.61	18.13
		1	12	18.07	18.34	18.55	18.56	18.31
		1	24	18.34	18.33	18.28	18.72	18.15
		12	0	18.06	17.92	17.99	18.27	18.08
		12	6	18.01	17.97	18.02	18.31	18.15
		12	13	18.08	17.92	18.01	18.29	18.16
		25	0	17.98	17.81	17.78	18.30	18.08

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132072	132322	132572
		Frequency (MHz)		1720	1745	1770
20M	QPSK	1	0	15.01	14.93	15.31
		1	50	15.03	15.16	15.67
		1	99	15.23	15.30	15.60
		50	0	14.91	14.71	15.29
		50	25	14.94	14.83	15.29
		50	50	14.96	14.86	15.25
		100	0	14.93	14.85	15.31
	16QAM	1	0	15.03	15.22	14.89
		1	50	15.11	15.13	15.02
		1	99	15.23	15.29	15.21
		50	0	14.83	14.96	15.30
		50	25	14.80	15.04	15.24
		50	50	14.82	14.97	15.35
		100	0	14.85	14.91	15.36
BW	MCS Index	Channel		132047	132322	132597
		Frequency (MHz)		1717.5	1745	1772.5
15M	QPSK	1	0	15.00	14.89	15.23
		1	37	14.99	15.13	15.61
		1	74	15.21	15.29	15.56
		36	0	14.85	14.66	15.28
		36	19	14.93	14.81	15.24
		36	39	14.88	14.79	15.23
		75	0	14.92	14.81	15.28
	16QAM	1	0	15.00	15.21	14.83
		1	37	15.07	15.08	15.00
		1	74	15.17	15.27	15.18
		36	0	14.81	14.88	15.29
		36	19	14.72	15.00	15.19
		36	39	14.79	14.91	15.33
		75	0	14.84	14.86	15.28

BW	MCS Index	Channel		132022	132322	132622
		Frequency (MHz)		1715	1745	1775
10M	QPSK	1	0	14.93	14.89	15.26
		1	24	15.01	15.08	15.63
		1	49	15.15	15.26	15.55
		25	0	14.88	14.65	15.27
		25	12	14.92	14.76	15.24
		25	25	14.90	14.78	15.23
		50	0	14.92	14.83	15.23
	16QAM	1	0	14.96	15.14	14.83
		1	24	15.08	15.07	15.00
		1	49	15.21	15.22	15.16
		25	0	14.77	14.88	15.28
		25	12	14.78	14.96	15.23
		25	25	14.74	14.93	15.30
		50	0	14.83	14.83	15.35
BW	MCS Index	Channel		131997	132322	132647
		Frequency (MHz)		1712.5	1745	1777.5
5M	QPSK	1	0	14.96	14.86	15.26
		1	12	15.01	15.08	15.59
		1	24	15.18	15.22	15.59
		12	0	14.87	14.66	15.24
		12	6	14.86	14.82	15.24
		12	13	14.92	14.81	15.24
		25	0	14.87	14.83	15.26
	16QAM	1	0	14.96	15.17	14.87
		1	12	15.03	15.11	14.97
		1	24	15.21	15.21	15.19
		12	0	14.75	14.90	15.22
		12	6	14.74	15.02	15.18
		12	13	14.75	14.92	15.33
		25	0	14.79	14.84	15.31

BW	MCS Index	Channel		131987	132322	132657
		Frequency (MHz)		1711.5	1745	1778.5
3M	QPSK	1	0	14.95	14.91	15.25
		1	7	14.96	15.11	15.65
		1	14	15.17	15.23	15.55
		8	0	14.84	14.66	15.27
		8	3	14.86	14.81	15.23
		8	7	14.88	14.85	15.23
		15	0	14.89	14.80	15.23
	16QAM	1	0	14.95	15.21	14.87
		1	7	15.06	15.08	14.98
		1	14	15.21	15.21	15.20
		8	0	14.75	14.92	15.25
		8	3	14.77	14.98	15.22
		8	7	14.80	14.90	15.30
		15	0	14.79	14.83	15.34
BW	MCS Index	Channel		131979	132322	132665
		Frequency (MHz)		1710.7	1745	1779.3
1.4M	QPSK	1	0	14.93	14.89	15.26
		1	2	15.00	15.10	15.63
		1	5	15.21	15.23	15.55
		3	0	14.85	14.63	15.27
		3	1	14.93	14.81	15.21
		3	3	14.91	14.78	15.19
		6	0	14.92	14.79	15.29
	16QAM	1	0	14.98	15.15	14.84
		1	2	15.09	15.05	15.00
		1	5	15.18	15.21	15.20
		3	0	14.79	14.91	15.25
		3	1	14.72	15.03	15.19
		3	3	14.78	14.92	15.34
		6	0	14.79	14.89	15.31

4.6 SAR Testing Results

4.6.1 SAR Test Reduction Considerations

<KDB 447498 D01, General RF Exposure Guidance>

Testing of other required channels within the operating mode of a frequency band is not required when the reported SAR for the mid-band or highest output power channel is:

(1) ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
(2) ≤ 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
(3) ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

<KDB 941225 D01, 3G SAR Measurement 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 ≤ 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.

<KDB 941225 D05, SAR Evaluation Considerations for LTE Devices>

(1) QPSK with 1 RB and 50% RB allocation

Start with the largest channel bandwidth and measure SAR, 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; 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 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 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.

(3) Higher order modulations

SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > 1/2 dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

(4) Other channel bandwidth

SAR is required when the highest maximum output power of the smaller channel bandwidth is > 1/2 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.

4.6.2 SAR Results for Body Exposure Condition (Separation Distance is 0.5 cm Gap)

<GSM / WCDMA>

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	Power Reduction	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	GSM850	GPRS(2Tx-slot)	Horizontal-Up	0.5	128	Full	30.0	29.57	-0.08	0.421	1.10	0.46
1	GSM850	GPRS(2Tx-slot)	Horizontal-Down	0.5	128	Full	30.0	29.57	-0.02	0.594	1.10	**0.66**
	GSM850	GPRS(2Tx-slot)	Vertical-Front	0.5	128	Full	30.0	29.57	-0.03	0.251	1.10	0.28
	GSM850	GPRS(2Tx-slot)	Vertical-Back	0.5	128	Full	30.0	29.57	-0.19	0.317	1.10	0.35
	GSM850	GPRS(2Tx-slot)	Tip Mode	0.5	128	Full	30.0	29.57	-0.02	0.107	1.10	0.12
	GSM1900	EDGE(4Tx-slot)	Horizontal-Up	0.5	810	Reduce	20.0	19.86	-0.05	0.833	1.03	0.86
	GSM1900	EDGE(4Tx-slot)	Horizontal-Down	0.5	810	Reduce	20.0	19.86	-0.14	0.739	1.03	0.76
	GSM1900	EDGE(4Tx-slot)	Vertical-Front	0.5	810	Reduce	20.0	19.86	-0.03	0.318	1.03	0.33
	GSM1900	EDGE(4Tx-slot)	Vertical-Back	0.5	810	Reduce	20.0	19.86	-0.06	0.45	1.03	0.46
	GSM1900	EDGE(4Tx-slot)	Tip Mode	0.5	810	Reduce	20.0	19.86	0.02	0.0993	1.03	0.10
	GSM1900	GPRS(2Tx-slot)	Horizontal-Up	1.6	810	Full	28.0	27.05	-0.03	0.712	1.24	0.89
2	GSM1900	GPRS(2Tx-slot)	Horizontal-Down	1.3	810	Full	28.0	27.05	0.02	0.958	1.24	**1.19**
	GSM1900	GPRS(2Tx-slot)	Vertical-Front	0.8	810	Full	28.0	27.05	-0.03	0.936	1.24	1.16
	GSM1900	GPRS(2Tx-slot)	Vertical-Back	1.2	810	Full	28.0	27.05	0.04	0.622	1.24	0.77
	GSM1900	GPRS(2Tx-slot)	Tip Mode	1.7	810	Full	28.0	27.05	0.02	0.215	1.24	0.27
	GSM1900	EDGE(4Tx-slot)	Horizontal-Up	0.5	512	Reduce	20.0	19.55	-0.03	0.563	1.11	0.62
	GSM1900	EDGE(4Tx-slot)	Horizontal-Up	0.5	661	Reduce	20.0	19.51	-0.05	0.61	1.12	0.68
	GSM1900	GPRS(2Tx-slot)	Horizontal-Up	1.6	512	Full	28.0	26.74	-0.06	0.568	1.34	0.76
	GSM1900	GPRS(2Tx-slot)	Horizontal-Up	1.6	661	Full	28.0	26.46	-0.02	0.559	1.43	0.80
	GSM1900	GPRS(2Tx-slot)	Horizontal-Down	1.3	512	Full	28.0	26.74	-0.05	0.873	1.34	1.17
	GSM1900	GPRS(2Tx-slot)	Horizontal-Down	1.3	661	Full	28.0	26.46	-0.04	0.826	1.43	1.18
	GSM1900	GPRS(2Tx-slot)	Vertical-Front	0.8	512	Full	28.0	26.74	-0.12	0.715	1.34	0.96
	GSM1900	GPRS(2Tx-slot)	Vertical-Front	0.8	661	Full	28.0	26.46	-0.17	0.767	1.43	1.09
	WCDMA II	RMC12.2K	Horizontal-Up	0.5	9400	Reduce	14.5	13.37	0.07	0.348	1.30	0.45
	WCDMA II	RMC12.2K	Horizontal-Down	0.5	9400	Reduce	14.5	13.37	0.01	0.403	1.30	0.52
	WCDMA II	RMC12.2K	Vertical-Front	0.5	9400	Reduce	14.5	13.37	-0.06	0.214	1.30	0.28
	WCDMA II	RMC12.2K	Vertical-Back	0.5	9400	Reduce	14.5	13.37	0.09	0.205	1.30	0.27
	WCDMA II	RMC12.2K	Tip-Mode	0.5	9400	Reduce	14.5	13.37	-0.06	0.049	1.30	0.06
	WCDMA II	RMC12.2K	Horizontal-Up	1.6	9400	Full	23.0	22.7	-0.09	0.659	1.07	0.71
	WCDMA II	RMC12.2K	Horizontal-Down	1.3	9400	Full	23.0	22.7	-0.08	0.866	1.07	0.93
3	WCDMA II	RMC12.2K	Vertical-Front	0.8	9400	Full	23.0	22.7	-0.06	0.956	1.07	**1.02**
	WCDMA II	RMC12.2K	Vertical-Back	1.2	9400	Full	23.0	22.7	0.02	0.579	1.07	0.62
	WCDMA II	RMC12.2K	Tip-Mode	1.7	9400	Full	23.0	22.7	0.16	0.219	1.07	0.23
	WCDMA II	RMC12.2K	Horizontal-Down	1.3	9262	Full	23.0	22.36	-0.06	0.683	1.16	0.79
	WCDMA II	RMC12.2K	Horizontal-Down	1.3	9538	Full	23.0	22.32	-0.17	0.792	1.17	0.93
	WCDMA II	RMC12.2K	Vertical-Front	0.8	9262	Full	23.0	22.36	-0.03	0.769	1.16	0.89
	WCDMA II	RMC12.2K	Vertical-Front	0.8	9538	Full	23.0	22.32	-0.02	0.763	1.17	0.89
	WCDMA IV	RMC12.2K	Horizontal-Up	0.5	1513	Reduce	17.0	16.43	0.02	0.662	1.14	0.75
4	WCDMA IV	RMC12.2K	Horizontal-Down	0.5	1513	Reduce	17.0	16.43	0.16	0.742	1.14	**0.85**
	WCDMA IV	RMC12.2K	Vertical-Front	0.5	1513	Reduce	17.0	16.43	-0.19	0.281	1.14	0.32
	WCDMA IV	RMC12.2K	Vertical-Back	0.5	1513	Reduce	17.0	16.43	-0.09	0.529	1.14	0.60
	WCDMA IV	RMC12.2K	Tip-Mode	0.5	1513	Reduce	17.0	16.43	0.09	0.164	1.14	0.19
	WCDMA IV	RMC12.2K	Horizontal-Up	1.6	1513	Full	23.0	22.27	-0.03	0.44	1.18	0.52
	WCDMA IV	RMC12.2K	Horizontal-Down	1.3	1513	Full	23.0	22.27	-0.08	0.464	1.18	0.55
	WCDMA IV	RMC12.2K	Vertical-Front	0.8	1513	Full	23.0	22.27	-0.06	0.611	1.18	0.72
	WCDMA IV	RMC12.2K	Vertical-Back	1.2	1513	Full	23.0	22.27	-0.08	0.501	1.18	0.59
	WCDMA IV	RMC12.2K	Tip-Mode	1.7	1513	Full	23.0	22.27	-0.03	0.156	1.18	0.18
	WCDMA IV	RMC12.2K	Horizontal-Down	0.5	1312	Reduce	17.0	16.41	0.09	0.532	1.15	0.61
	WCDMA IV	RMC12.2K	Horizontal-Down	0.5	1413	Reduce	17.0	16.32	-0.02	0.581	1.17	0.68
	WCDMA V	RMC12.2K	Horizontal-Up	0.5	4132	Full	23.0	22.84	0.07	0.658	1.04	0.68
	WCDMA V	RMC12.2K	Horizontal-Down	0.5	4132	Full	23.0	22.84	0.14	0.791	1.04	0.82
	WCDMA V	RMC12.2K	Vertical-Front	0.5	4132	Full	23.0	22.84	0.02	0.465	1.04	0.48

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	Power Reduction	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	WCDMA V	RMC12.2K	Vertical-Back	0.5	4132	Full	23.0	22.84	-0.01	0.427	1.04	0.44
	WCDMA V	RMC12.2K	Tip-Mode	0.5	4132	Full	23.0	22.84	0.16	0.176	1.04	0.18
5	WCDMA V	RMC12.2K	Horizontal-Down	0.5	4182	Full	23.0	22.76	0.01	0.801	1.06	**0.85**
	WCDMA V	RMC12.2K	Horizontal-Down	0.5	4233	Full	23.0	22.77	-0.05	0.739	1.05	0.78

<LTE-FDD>

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	RB#	RB Offset	Power Reduction	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	LTE 2	QPSK20M	Horizontal-Up	0.5	18700	1	50	Reduce	16.0	15.05	-0.01	0.284	1.24	0.35
	LTE 2	QPSK20M	Horizontal-Down	0.5	18700	1	50	Reduce	16.0	15.05	0.04	0.315	1.24	0.39
	LTE 2	QPSK20M	Vertical-Front	0.5	18700	1	50	Reduce	16.0	15.05	-0.03	0.115	1.24	0.14
	LTE 2	QPSK20M	Vertical-Back	0.5	18700	1	50	Reduce	16.0	15.05	0.03	0.269	1.24	0.33
	LTE 2	QPSK20M	Tip-Mode	0.5	18700	1	50	Reduce	16.0	15.05	0.02	0.086	1.24	0.11
	LTE 2	QPSK20M	Horizontal-Up	1.6	18700	1	50	Full	22.0	21.38	0.02	0.25	1.15	0.29
	LTE 2	QPSK20M	Horizontal-Down	1.3	18700	1	50	Full	22.0	21.38	0.18	0.362	1.15	0.42
	LTE 2	QPSK20M	Vertical-Front	0.8	18700	1	50	Full	22.0	21.38	0.03	0.225	1.15	0.26
	LTE 2	QPSK20M	Vertical-Back	1.2	18700	1	50	Full	22.0	21.38	-0.02	0.338	1.15	0.39
	LTE 2	QPSK20M	Tip-Mode	1.7	18700	1	50	Full	22.0	21.38	0.07	0.113	1.15	0.13
	LTE 2	QPSK20M	Horizontal-Up	0.5	18700	50	50	Reduce	16.0	14.91	-0.04	0.303	1.29	0.39
6	LTE 2	QPSK20M	Horizontal-Down	0.5	18700	50	50	Reduce	16.0	14.91	-0.02	0.332	1.29	**0.43**
	LTE 2	QPSK20M	Vertical-Front	0.5	18700	50	50	Reduce	16.0	14.91	0.12	0.124	1.29	0.16
	LTE 2	QPSK20M	Vertical-Back	0.5	18700	50	50	Reduce	16.0	14.91	-0.11	0.25	1.29	0.32
	LTE 2	QPSK20M	Tip-Mode	0.5	18700	50	50	Reduce	16.0	14.91	0.08	0.09	1.29	0.12
	LTE 2	QPSK20M	Horizontal-Up	1.6	18700	50	50	Full	21.0	19.95	-0.18	0.215	1.27	0.27
	LTE 2	QPSK20M	Horizontal-Down	1.3	18700	50	50	Full	21.0	19.95	-0.01	0.311	1.27	0.40
	LTE 2	QPSK20M	Vertical-Front	0.8	18700	50	50	Full	21.0	19.95	0	0.183	1.27	0.23
	LTE 2	QPSK20M	Vertical-Back	1.2	18700	50	50	Full	21.0	19.95	-0.04	0.276	1.27	0.35
	LTE 2	QPSK20M	Tip-Mode	1.7	18700	50	50	Full	21.0	19.95	-0.11	0.085	1.27	0.11
	LTE 5	QPSK10M	Horizontal-Up	0.5	20600	1	24	Full	23.0	22.62	-0.1	0.597	1.09	0.65
7	LTE 5	QPSK10M	Horizontal-Down	0.5	20600	1	24	Full	23.0	22.62	-0.08	0.641	1.09	**0.70**
	LTE 5	QPSK10M	Vertical-Front	0.5	20600	1	24	Full	23.0	22.62	-0.18	0.274	1.09	0.30
	LTE 5	QPSK10M	Vertical-Back	0.5	20600	1	24	Full	23.0	22.62	-0.02	0.323	1.09	0.35
	LTE 5	QPSK10M	Tip-Mode	0.5	20600	1	24	Full	23.0	22.62	-0.02	0.115	1.09	0.13
	LTE 5	QPSK10M	Horizontal-Up	0.5	20600	25	25	Full	22.0	21.33	-0.12	0.412	1.17	0.48
	LTE 5	QPSK10M	Horizontal-Down	0.5	20600	25	25	Full	22.0	21.33	-0.03	0.478	1.17	0.56
	LTE 5	QPSK10M	Vertical-Front	0.5	20600	25	25	Full	22.0	21.33	0.04	0.212	1.17	0.25
	LTE 5	QPSK10M	Vertical-Back	0.5	20600	25	25	Full	22.0	21.33	-0.03	0.249	1.17	0.29
	LTE 5	QPSK10M	Tip-Mode	0.5	20600	25	25	Full	22.0	21.33	-0.08	0.09	1.17	0.11
	LTE 7	QPSK20M	Horizontal-Up	0.5	21100	1	99	Reduce	18.0	17.17	0.02	0.713	1.21	0.86
	LTE 7	QPSK20M	Horizontal-Down	0.5	21100	1	99	Reduce	18.0	17.17	-0.15	0.55	1.21	0.67
	LTE 7	QPSK20M	Vertical-Front	0.5	21100	1	99	Reduce	18.0	17.17	-0.02	0.208	1.21	0.25
	LTE 7	QPSK20M	Vertical-Back	0.5	21100	1	99	Reduce	18.0	17.17	-0.05	0.422	1.21	0.51
	LTE 7	QPSK20M	Tip-Mode	0.5	21100	1	99	Reduce	18.0	17.17	-0.03	0.467	1.21	0.57
	LTE 7	QPSK20M	Horizontal-Up	1.6	21100	1	99	Full	22.0	21.83	0.06	0.256	1.04	0.27
	LTE 7	QPSK20M	Horizontal-Down	1.3	21100	1	99	Full	22.0	21.83	0.07	0.418	1.04	0.43
	LTE 7	QPSK20M	Vertical-Front	0.8	21100	1	99	Full	22.0	21.83	-0.13	0.324	1.04	0.34
	LTE 7	QPSK20M	Vertical-Back	1.2	21100	1	99	Full	22.0	21.83	-0.11	0.587	1.04	0.61
8	LTE 7	QPSK20M	Tip-Mode	1.7	21100	1	99	Full	22.0	21.83	0.12	1.13	1.04	**1.18**
	LTE 7	QPSK20M	Horizontal-Up	0.5	21100	50	0	Reduce	18.0	16.97	-0.04	0.666	1.27	0.84
	LTE 7	QPSK20M	Horizontal-Down	0.5	21100	50	0	Reduce	18.0	16.97	0.09	0.484	1.27	0.61
	LTE 7	QPSK20M	Vertical-Front	0.5	21100	50	0	Reduce	18.0	16.97	-0.03	0.192	1.27	0.24
	LTE 7	QPSK20M	Vertical-Back	0.5	21100	50	0	Reduce	18.0	16.97	0.04	0.398	1.27	0.50
	LTE 7	QPSK20M	Tip-Mode	0.5	21100	50	0	Reduce	18.0	16.97	-0.19	0.454	1.27	0.58
	LTE 7	QPSK20M	Horizontal-Up	1.6	21100	50	0	Full	21.0	20.28	0.12	0.213	1.18	0.25

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	RB#	RB Offset	Power Reduction	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	LTE 7	QPSK20M	Horizontal-Down	1.3	21100	50	0	Full	21.0	20.28	0.01	0.32	1.18	0.38
	LTE 7	QPSK20M	Vertical-Front	0.8	21100	50	0	Full	21.0	20.28	-0.04	0.229	1.18	0.27
	LTE 7	QPSK20M	Vertical-Back	1.2	21100	50	0	Full	21.0	20.28	-0.02	0.404	1.18	0.48
	LTE 7	QPSK20M	Tip Mode	1.7	21100	50	0	Full	21.0	20.28	-0.04	0.845	1.18	1.00
	LTE 7	QPSK20M	Horizontal-Up	0.5	20850	1	99	Reduce	18.0	16.99	0.04	0.622	1.26	0.78
	LTE 7	QPSK20M	Horizontal-Up	0.5	21350	1	99	Reduce	18.0	17.07	-0.18	0.758	1.24	0.94
	LTE 7	QPSK20M	Tip Mode	1.7	20850	1	99	Full	22.0	21.52	0.19	1	1.12	1.12
	LTE 7	QPSK20M	Tip Mode	1.7	21350	1	99	Full	22.0	21.67	-0.02	1.03	1.08	1.11
	LTE 7	QPSK20M	Horizontal-Up	0.5	20850	50	0	Reduce	18.0	16.93	-0.05	0.582	1.28	0.74
	LTE 7	QPSK20M	Horizontal-Down	0.5	21350	50	0	Reduce	18.0	16.86	-0.08	0.811	1.30	1.05
	LTE 7	QPSK20M	Tip-Mode	1.7	20850	50	0	Full	21.0	20.02	-0.12	0.721	1.25	0.90
	LTE 7	QPSK20M	Tip-Mode	1.7	21350	50	0	Full	21.0	20.13	-0.02	0.942	1.22	1.15
	LTE 7	QPSK20M	Horizontal-Up	0.5	21350	100	0	Reduce	18.0	16.95	0.08	0.681	1.27	0.87
	LTE 7	QPSK20M	Tip-Mode	1.7	21100	100	0	Full	21.0	20.24	-0.10	0.949	1.19	1.13
	LTE 12	QPSK10M	Horizontal-Up	0.5	23130	1	24	Full	23.0	22.84	-0.17	0.767	1.04	0.80
	LTE 12	QPSK10M	Horizontal-Down	0.5	23130	1	24	Full	23.0	22.84	-0.03	0.695	1.04	0.72
	LTE 12	QPSK10M	Vertical-Front	0.5	23130	1	24	Full	23.0	22.84	-0.02	0.396	1.04	0.41
	LTE 12	QPSK10M	Vertical-Back	0.5	23130	1	24	Full	23.0	22.84	-0.03	0.389	1.04	0.40
	LTE 12	QPSK10M	Tip-Mode	0.5	23130	1	24	Full	23.0	22.84	-0.02	0.116	1.04	0.12
	LTE 12	QPSK10M	Horizontal-Up	0.5	23130	25	0	Full	22.0	21.71	-0.08	0.652	1.07	0.70
	LTE 12	QPSK10M	Horizontal-Down	0.5	23130	25	0	Full	22.0	21.71	0.11	0.564	1.07	0.60
	LTE 12	QPSK10M	Vertical-Front	0.5	23130	25	0	Full	22.0	21.71	-0.05	0.342	1.07	0.37
	LTE 12	QPSK10M	Vertical-Back	0.5	23130	25	0	Full	22.0	21.71	-0.06	0.306	1.07	0.33
	LTE 12	QPSK10M	Tip-Mode	0.5	23130	25	0	Full	22.0	21.71	-0.17	0.091	1.07	0.10
	LTE 12	QPSK10M	Horizontal-Up	0.5	23060	1	24	Full	23.0	22.6	-0.05	0.593	1.10	0.65
	LTE 12	QPSK10M	Horizontal-Up	0.5	23095	1	24	Full	23.0	22.41	-0.07	0.707	1.15	0.81
9	LTE 12	QPSK10M	Horizontal-Up	0.5	23130	50	0	Full	22.0	21.62	-0.09	0.741	1.09	**0.81**
	LTE 13	QPSK10M	Horizontal-Up	0.5	23230	1	24	Full	23.0	22.7	-0.06	0.767	1.07	0.82
10	LTE 13	QPSK10M	Horizontal-Down	0.5	23230	1	24	Full	23.0	22.7	0.06	0.891	1.07	**0.95**
	LTE 13	QPSK10M	Vertical-Front	0.5	23230	1	24	Full	23.0	22.7	-0.02	0.65	1.07	0.70
	LTE 13	QPSK10M	Vertical-Back	0.5	23230	1	24	Full	23.0	22.7	-0.03	0.443	1.07	0.47
	LTE 13	QPSK10M	Tip-Mode	0.5	23230	1	24	Full	23.0	22.7	-0.08	0.212	1.07	0.23
	LTE 13	QPSK10M	Horizontal-Up	0.5	23230	25	0	Full	22.0	21.6	-0.07	0.611	1.10	0.67
	LTE 13	QPSK10M	Horizontal-Down	0.5	23230	25	0	Full	22.0	21.6	0.04	0.841	1.10	0.92
	LTE 13	QPSK10M	Vertical-Front	0.5	23230	25	0	Full	22.0	21.6	-0.09	0.506	1.10	0.55
	LTE 13	QPSK10M	Vertical-Back	0.5	23230	25	0	Full	22.0	21.6	-0.02	0.366	1.10	0.40
	LTE 13	QPSK10M	Tip-Mode	0.5	23230	25	0	Full	22.0	21.6	-0.02	0.166	1.10	0.18
	LTE 13	QPSK10M	Horizontal-Up	0.5	23230	50	0	Full	22.0	21.67	0.04	0.784	1.08	0.85
	LTE 66	QPSK20M	Horizontal-Up	0.5	132572	1	50	Reduce	16.5	15.67	-0.02	0.414	1.21	0.50
	LTE 66	QPSK20M	Horizontal-Down	0.5	132572	1	50	Reduce	16.5	15.67	0.02	0.305	1.21	0.37
	LTE 66	QPSK20M	Vertical-Front	0.5	132572	1	50	Reduce	16.5	15.67	-0.02	0.242	1.21	0.29
	LTE 66	QPSK20M	Vertical-Back	0.5	132572	1	50	Reduce	16.5	15.67	-0.18	0.292	1.21	0.35
	LTE 66	QPSK20M	Tip-Mode	0.5	132572	1	50	Reduce	16.5	15.67	-0.02	0.081	1.21	0.10
	LTE 66	QPSK20M	Horizontal-Up	1.6	132572	1	50	Full	22.0	21.45	-0.07	0.332	1.14	0.38
	LTE 66	QPSK20M	Horizontal-Down	1.3	132572	1	50	Full	22.0	21.45	-0.07	0.473	1.14	0.54
11	LTE 66	QPSK20M	Vertical-Front	0.8	132572	1	50	Full	22.0	21.45	-0.02	0.551	1.14	**0.63**
	LTE 66	QPSK20M	Vertical-Back	1.2	132572	1	50	Full	22.0	21.45	-0.02	0.266	1.14	0.30
	LTE 66	QPSK20M	Tip-Mode	1.7	132572	1	50	Full	22.0	21.45	0.1	0.087	1.14	0.10
	LTE 66	QPSK20M	Horizontal-Up	0.5	132572	50	25	Reduce	16.5	15.29	-0.05	0.29	1.32	0.38
	LTE 66	QPSK20M	Horizontal-Down	0.5	132572	50	25	Reduce	16.5	15.29	-0.07	0.317	1.32	0.42
	LTE 66	QPSK20M	Vertical-Front	0.5	132572	50	25	Reduce	16.5	15.29	-0.11	0.237	1.32	0.31
	LTE 66	QPSK20M	Vertical-Back	0.5	132572	50	25	Reduce	16.5	15.29	-0.12	0.287	1.32	0.38
	LTE 66	QPSK20M	Tip-Mode	0.5	132572	50	25	Reduce	16.5	15.29	-0.02	0.076	1.32	0.10
	LTE 66	QPSK20M	Horizontal-Up	1.6	132572	50	25	Full	21.0	20.15	-0.16	0.283	1.22	0.34
	LTE 66	QPSK20M	Horizontal-Down	1.3	132572	50	25	Full	21.0	20.15	-0.04	0.366	1.22	0.45
	LTE 66	QPSK20M	Vertical-Front	0.8	132572	50	25	Full	21.0	20.15	-0.11	0.429	1.22	0.52
	LTE 66	QPSK20M	Vertical-Back	1.2	132572	50	25	Full	21.0	20.15	0.07	0.214	1.22	0.26

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	RB#	RB Offset	Power Reduction	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	LTE 66	QPSK20M	Tip-Mode	1.7	132572	50	25	Full	21.0	20.15	-0.08	0.067	1.22	0.08
	LTE 71	QPSK20M	Horizontal-Up	0.5	133222	1	50	Full	22.0	21.68	-0.06	0.587	1.08	0.63
12	LTE 71	QPSK20M	Horizontal-Down	0.5	133222	1	50	Full	22.0	21.68	-0.04	0.693	1.08	**0.75**
	LTE 71	QPSK20M	Vertical-Front	0.5	133222	1	50	Full	22.0	21.68	-0.03	0.282	1.08	0.30
	LTE 71	QPSK20M	Vertical-Back	0.5	133222	1	50	Full	22.0	21.68	-0.19	0.199	1.08	0.21
	LTE 71	QPSK20M	Tip-Mode	0.5	133222	1	50	Full	22.0	21.68	-0.04	0.117	1.08	0.13
	LTE 71	QPSK20M	Horizontal-Up	0.5	133222	50	0	Full	21.0	20.29	-0.03	0.395	1.18	0.47
	LTE 71	QPSK20M	Horizontal-Down	0.5	133222	50	0	Full	21.0	20.29	0.02	0.374	1.18	0.44
	LTE 71	QPSK20M	Vertical-Front	0.5	133222	50	0	Full	21.0	20.29	-0.11	0.205	1.18	0.24
	LTE 71	QPSK20M	Vertical-Back	0.5	133222	50	0	Full	21.0	20.29	0.04	0.148	1.18	0.17
	LTE 71	QPSK20M	Tip-Mode	0.5	133222	50	0	Full	21.0	20.29	-0.09	0.0934	1.18	0.11

<LTE-TDD>

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	RB#	RB Offset	Power Reduction	Duty Cycle %	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Duty Cycle Scaling Factor	Tune-up Scaling Factor	Scaled SAR-1g (W/kg)
	LTE 41	QPSK20M	Horizontal-Up	0.5	41490	1	99	Reduce	62.9	20.0	18.83	-0.07	0.589	1.01	1.31	0.78
	LTE 41	QPSK20M	Horizontal-Down	0.5	41490	1	99	Reduce	62.9	20.0	18.83	-0.12	0.344	1.01	1.31	0.45
	LTE 41	QPSK20M	Vertical-Front	0.5	41490	1	99	Reduce	62.9	20.0	18.83	-0.02	0.378	1.01	1.31	0.50
	LTE 41	QPSK20M	Vertical-Back	0.5	41490	1	99	Reduce	62.9	20.0	18.83	0.11	0.163	1.01	1.31	0.21
	LTE 41	QPSK20M	Tip-Mode	0.5	41490	1	99	Reduce	62.9	20.0	18.83	-0.15	0.352	1.01	1.31	0.46
	LTE 41	QPSK20M	Horizontal-Up	1.6	41490	1	99	Full	62.9	23.0	22.22	-0.03	0.118	1.01	1.20	0.14
	LTE 41	QPSK20M	Horizontal-Down	1.3	41490	1	99	Full	62.9	23.0	22.22	-0.09	0.209	1.01	1.20	0.25
	LTE 41	QPSK20M	Vertical-Front	0.8	41490	1	99	Full	62.9	23.0	22.22	-0.02	0.289	1.01	1.20	0.35
	LTE 41	QPSK20M	Vertical-Back	1.2	41490	1	99	Full	62.9	23.0	22.22	0.05	0.118	1.01	1.20	0.14
	LTE 41	QPSK20M	Tip-Mode	1.7	41490	1	99	Full	62.9	23.0	22.22	-0.04	0.536	1.01	1.20	0.65
	LTE 41	QPSK20M	Horizontal-Up	0.5	41490	50	50	Reduce	62.9	20.0	18.38	-0.01	0.641	1.01	1.45	0.94
	LTE 41	QPSK20M	Horizontal-Down	0.5	41490	50	50	Reduce	62.9	20.0	18.38	-0.04	0.373	1.01	1.45	0.55
	LTE 41	QPSK20M	Vertical-Front	0.5	41490	50	50	Reduce	62.9	20.0	18.38	-0.02	0.427	1.01	1.45	0.62
	LTE 41	QPSK20M	Vertical-Back	0.5	41490	50	50	Reduce	62.9	20.0	18.38	0.03	0.175	1.01	1.45	0.26
	LTE 41	QPSK20M	Tip-Mode	0.5	41490	50	50	Reduce	62.9	20.0	18.38	-0.12	0.39	1.01	1.45	0.57
	LTE 41	QPSK20M	Horizontal-Up	1.6	41490	50	50	Full	62.9	22.0	21.23	-0.01	0.095	1.01	1.19	0.11
	LTE 41	QPSK20M	Horizontal-Down	1.3	41490	50	50	Full	62.9	22.0	21.23	-0.07	0.179	1.01	1.19	0.22
	LTE 41	QPSK20M	Vertical-Front	0.8	41490	50	50	Full	62.9	22.0	21.23	-0.1	0.248	1.01	1.19	0.30
	LTE 41	QPSK20M	Vertical-Back	1.2	41490	50	50	Full	62.9	22.0	21.23	0.07	0.096	1.01	1.19	0.12
	LTE 41	QPSK20M	Tip-Mode	1.7	41490	50	50	Full	62.9	22.0	21.23	-0.02	0.446	1.01	1.19	0.54
	LTE 41	QPSK20M	Horizontal-Up	0.5	39750	50	50	Reduce	62.9	20.0	17.98	0.06	0.715	1.01	1.59	1.15
	LTE 41	QPSK20M	Horizontal-Up	0.5	40185	50	50	Reduce	62.9	20.0	18.04	-0.15	0.619	1.01	1.57	0.98
13	LTE 41	QPSK20M	Horizontal-Up	0.5	40620	50	50	Reduce	62.9	20.0	18.03	-0.04	0.752	1.01	1.57	**1.19**
	LTE 41	QPSK20M	Horizontal-Up	0.5	41055	50	50	Reduce	62.9	20.0	18.32	-0.05	0.734	1.01	1.47	1.09
	LTE 41	QPSK20M	Horizontal-Up	0.5	41490	100	0	Reduce	62.9	20.0	18.31	0.08	0.672	1.01	1.48	1.00

Note:

1. SAR testing for LTE was performed on the maximum power mode.

4.6.3 SAR Measurement Variability

According to KDB 865664 D01, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10, the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement. These 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.

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is >= 0.80 W/kg, repeat that measurement once.
3. 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, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20, and the original, first or second repeated measurement is >= 1.5 W/kg, perform a third repeated measurement.

Band	Test Position	Ch.	Original Measured SAR-1g (W/kg)	1st Repeated SAR-1g (W/kg)	L/S Ratio	2nd Repeated SAR-1g (W/kg)	L/S Ratio	3rd Repeated SAR-1g (W/kg)	L/S Ratio
GSM1900	GPRS10	Horizontal-Down	0.958	0.946	1.01	N/A	N/A	N/A	N/A
WCDMA V	RMC12.2K	Horizontal-Down	0.801	0.782	1.02	N/A	N/A	N/A	N/A
LTE 7	QPSK20M	Tip-Mode	1.13	1.06	1.07	N/A	N/A	N/A	N/A
LTE 13	QPSK10M	Horizontal-Down	0.891	0.821	1.09	N/A	N/A	N/A	N/A

Test Engineer : ShunXin Hou, and ChengKai Wang

5. Calibration of Test Equipment

Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Dipole	SPEAG	D750V3	1200	Oct.27,2021	1 Year
System Validation Dipole	SPEAG	D835V2	4d265	Oct.18,2021	1 Year
System Validation Dipole	SPEAG	D1750V2	1176	Oct.19,2021	1 Year
System Validation Dipole	SPEAG	D1950V3	1229	Oct.28,2021	1 Year
System Validation Dipole	SPEAG	D2600V2	1110	Sep.16,2021	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1288	Aug.20,2021	1 Year
Dosimetric E-field Probe	SPEAG	ES3DV3	3268	Aug.24,2021	1 Year
Magnetic Field Probe	SPEAG	DAKS-3.5	1119	Feb.28,2022	1 Year
Vector network analyzer	SPEAG	DAKS_VNA R140	0121219	Feb.28,2022	1 Year
Wideband Radio Communication Tester	Rohde&Schwarz	CMW 500	169210	Jun. 22, 2022	1 Year
Power Meter	Rohde&Schwarz	NRX	102380	Feb.15,2022	1 Year
Power Sensor	Rohde&Schwarz	NRP6A	102942	Feb.15,2022	1 Year
Power Sensor	Rohde&Schwarz	NRP6A	102943	Feb.15,2022	1 Year
ESG Analog Signal Generator	Rohde&Schwarz	SMB100A03	182185	Feb.16,2022	1 Year
Coupler	Woken	0110A056020-10	COM27RW1A3	May.11,2022	1 Year
Temp.&Humi.Recorder	ANYMETER	JR912	SZ01	Jun.19,2022	1 Year

6. Measurement Uncertainty

DASY6 Uncertainty Budget According to IEC 62209-2/2010 (30 MHz - 6 GHz range)								
Error Description	**Uncertainty Value (±%)**	**Probability**	**Divisor**	**(Ci) 1g**	**(Ci) 10g**	**Standard Uncertainty (1g) (±%)**	**Standard Uncertainty (10g) (±%)**	**(Vi) Veff**
Measurement System								
Probe Calibration	6.65	N	1	1	1	6.7	6.7	∞
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9	∞
Boundary Effects	2.0	R	1.732	1	1	1.2	1.2	∞
Linearity	4.7	R	1.732	1	1	2.7	2.7	∞
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6	∞
Modulation Response	3.2	R	1.732	1	1	1.8	1.8	∞
Readout Electronics	0.3	N	1	1	1	0.3	0.3	∞
Response Time	0.0	R	1.732	1	1	0.0	0.0	∞
Integration Time	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7	∞
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7	∞
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2	∞
Probe Positioning	6.7	R	1.732	1	1	3.9	3.9	∞
Max. SAR Eval.	4.0	R	1.732	1	1	2.3	2.3	∞
Test Sample Related								
Device Positioning	4.3	N	1	1	1	4.3	4.3	35
Device Holder	4.9	N	1	1	1	4.9	4.9	12
Power Drift	5.0	R	1.732	1	1	2.9	2.9	∞
Power Scaling	0.0	R	1.732	1	1	0.0	0.0	∞
Phantom and Setup								
Phantom Uncertainty	6.6	R	1.732	1	1	3.8	3.8	∞
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0	∞
Liquid Conductivity Repeatability	0.16	N	1	0.78	0.71	0.1	0.1	5
Liquid Conductivity (target)	10.0	R	1.732	0.78	0.71	4.5	4.1	∞
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0	∞
Temp. unc. - Conductivity	3.64	R	1.732	0.78	0.71	1.6	1.5	∞
Liquid Permittivity Repeatability	0.08	N	1	0.23	0.26	0.0	0.0	5
Liquid Permittivity (target)	10.0	R	1.732	0.23	0.26	1.3	1.5	∞
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4	∞
Temp. unc. - Permittivity	1.78	R	1.732	0.23	0.26	0.2	0.3	∞
Combined Std. Uncertainty						14.0%	13.9%	624
Coverage Factor for 95 %						K=2	K=2	
Expanded STD Uncertainty						28.0%	27.7%	

Uncertainty budget for frequency range 30 MHz to 6 GHz

7. Information on the Testing Laboratories

We, Huarui 7layers High Technology (Suzhou) Co., Ltd., were founded in 2020 to provide our best service in EMC, Radio, Telecom and Safety consultation.

If you have any comments, please feel free to contact us at the following:

Add: Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province
Tel: +86 (0557) 368 1008

The road map of all our labs can be found in our web site also
Web: http://www.7Layers.com

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Appendix A. SAR Plots of System Verification

The plots for system verification with largest deviation for each SAR system combination are shown as follows.

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab   Date: 14/7/2022

System Check_HSL750_220714

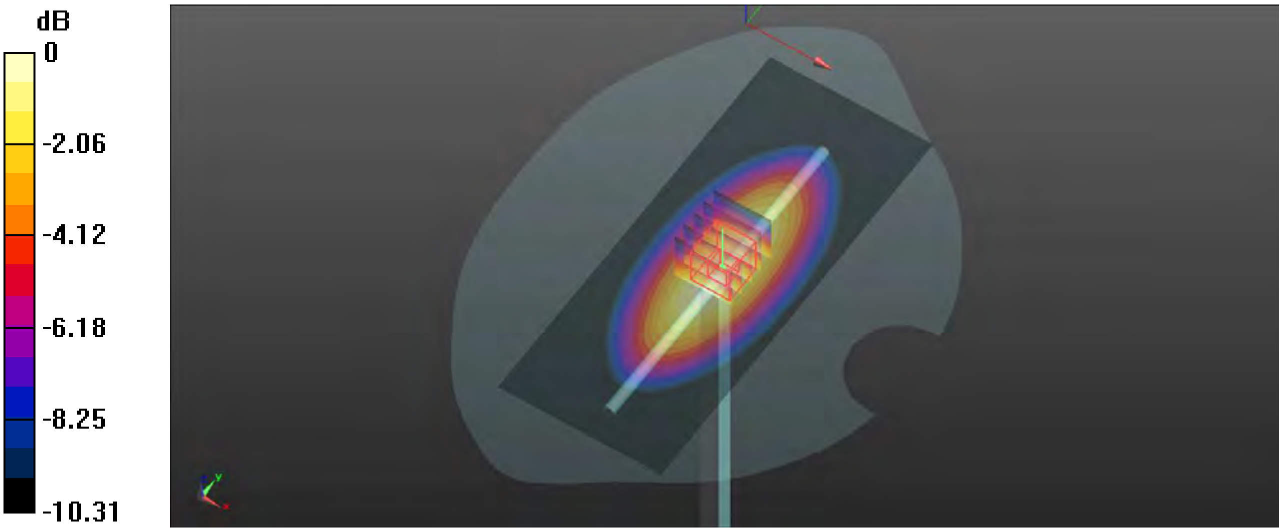
DUT: Dipole 750 MHz; Type: D750V3; SN:1200

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: HSL750_0714 Medium parameters used: f = 750 MHz; σ = 0.916 S/m; ε_r = 42.778; ρ = 1000 kg/m^3
Ambient Temperature：23.6℃; Liquid Temperature：22.4℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(6.6, 6.6, 6.6); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x151x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.38 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.22 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.26 W/kg
SAR(1 g) = 2.22 W/kg; SAR(10 g) = 1.46 W/kg
Maximum value of SAR (measured) = 2.40 W/kg



0 dB = 2.40 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab   Date: 13/7/2022

System Check_HSL835_220713

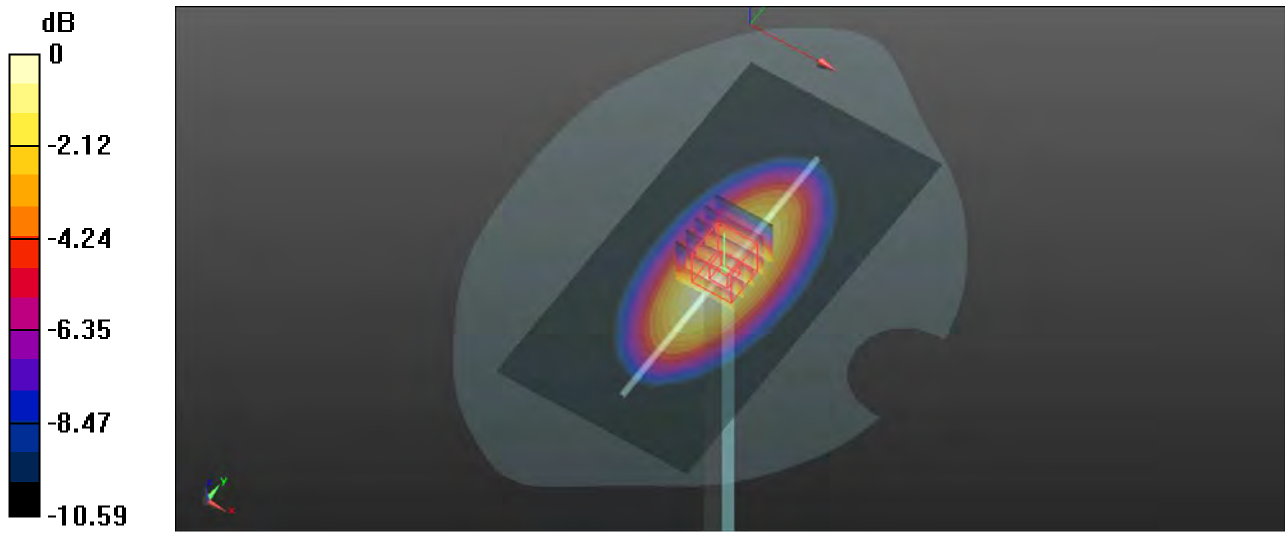
DUT: Dipole 835 MHz; Type: D835V2; SN:4d265

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835_0713 Medium parameters used: f = 835 MHz; σ = 0.912 S/m; ε_r = 42.787; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.7℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(6.04, 6.04, 6.04); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.77 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 55.42 V/m; Power Drift = -0.34 dB
Peak SAR (extrapolated) = 3.54 W/kg
SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.58 W/kg
Maximum value of SAR (measured) = 2.61 W/kg



0 dB = 2.61 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 15/7/2022

System Check_HSL1750_220715

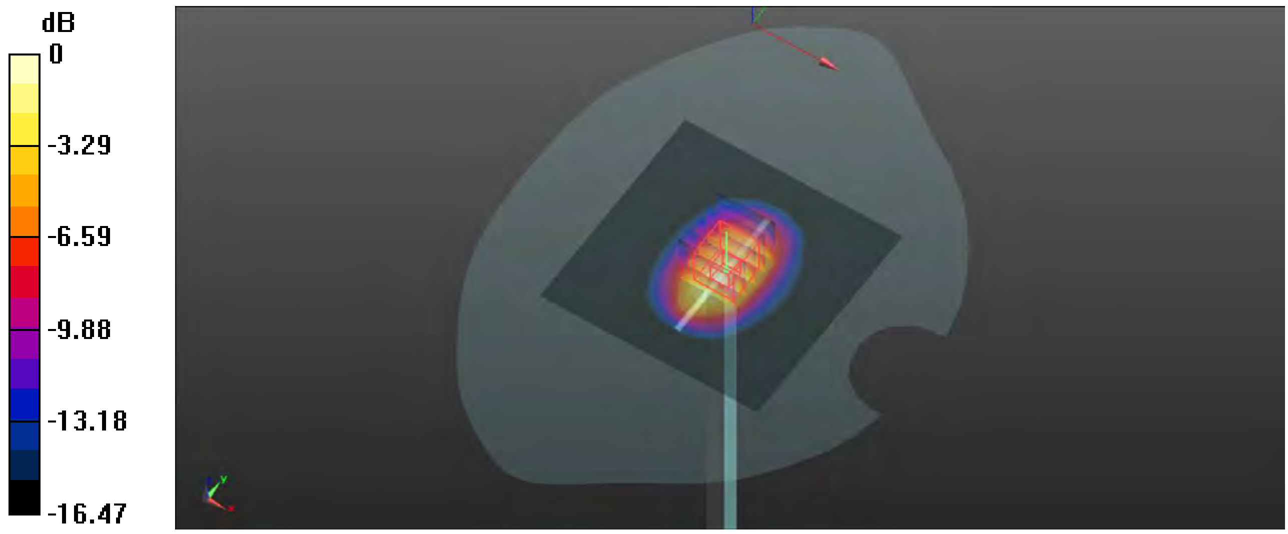
DUT: Dipole 1750 MHz; Type: D1750V2; SN:1176

Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: HSL1750_0715 Medium parameters used: f = 1750 MHz; σ = 1.339 S/m; ε_r = 41.477; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.8℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(5.43, 5.43, 5.43); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 9.58 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.75 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 15.3 W/kg
SAR(1 g) = 8.56 W/kg; SAR(10 g) = 4.6 W/kg
Maximum value of SAR (measured) = 9.59 W/kg



0 dB = 9.59 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 16/7/2022

System Check_HSL1950_220716

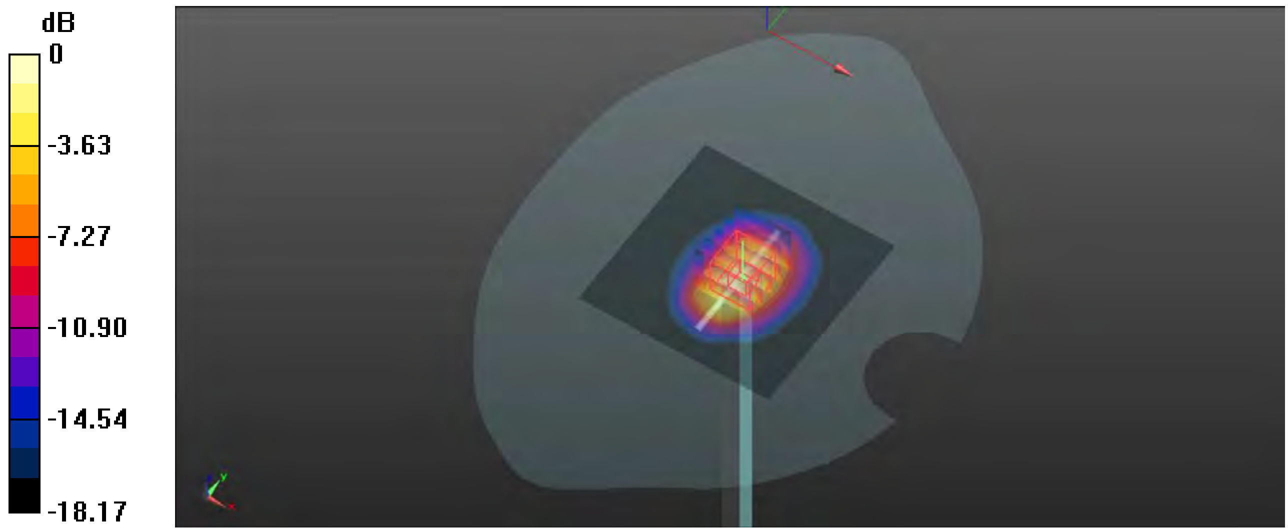
DUT: Dipole 1950 MHz; Type: D1950V3; SN:1229

Communication System: CW; Frequency: 1950 MHz;Duty Cycle: 1:1
Medium: HSL1950_0716 Medium parameters used: f = 1950 MHz; σ = 1.432 S/m; ε_r = 38.763; ρ = 1000 kg/m^3
Ambient Temperature：23.8℃; Liquid Temperature：22.2℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(5.19, 5.19, 5.19); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 12.2 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 86.33 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 19.5 W/kg
SAR(1 g) = 10.4 W/kg; SAR(10 g) = 5.33 W/kg
Maximum value of SAR (measured) = 11.8 W/kg



0 dB = 11.8 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab   Date: 17/7/2022

System Check_HSL2600_220717

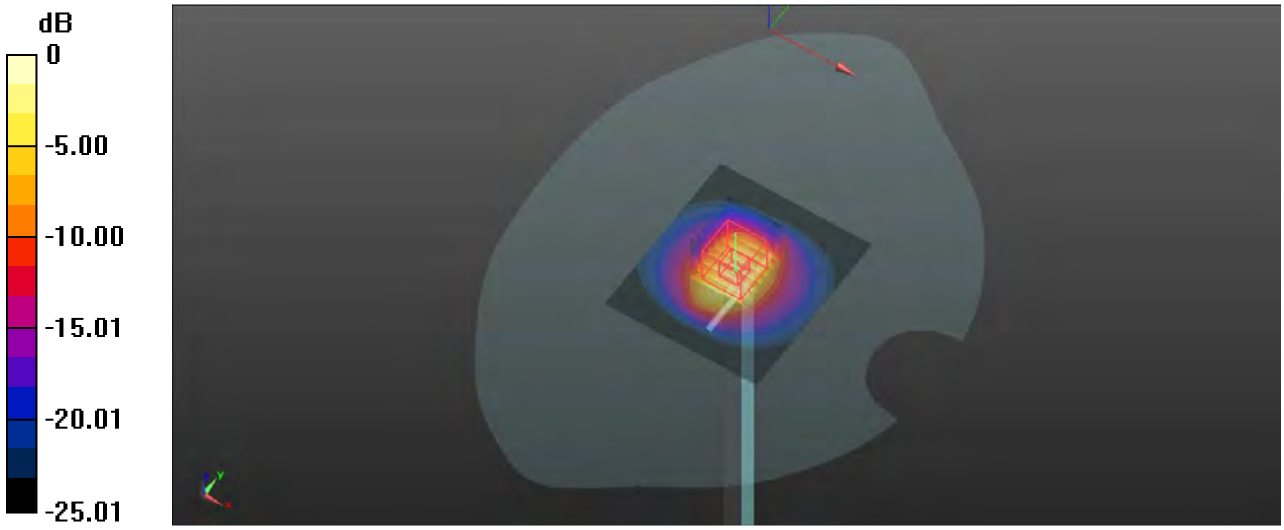
DUT: Dipole 2600 MHz; Type:D2600V2; SN:1110

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: HSL2600_0717 Medium parameters used: f = 2600 MHz; σ = 2.056 S/m; ε_r = 37.589; ρ = 1000 kg/m^3
Ambient Temperature：23.2℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(6.04, 6.04, 6.04); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 27.6 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 112.9 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 34.6 W/kg
SAR(1 g) = 14.7 W/kg; SAR(10 g) = 6.55 W/kg
Maximum value of SAR (measured) = 27.5 W/kg



0 dB = 27.5 W/kg

Appendix B. SAR Plots of SAR Measurement

The SAR plots for highest measured SAR in each exposure configuration, wireless mode and frequency band combination, and measured SAR > 1.5 W/kg are shown as follows.

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 13/7/2022

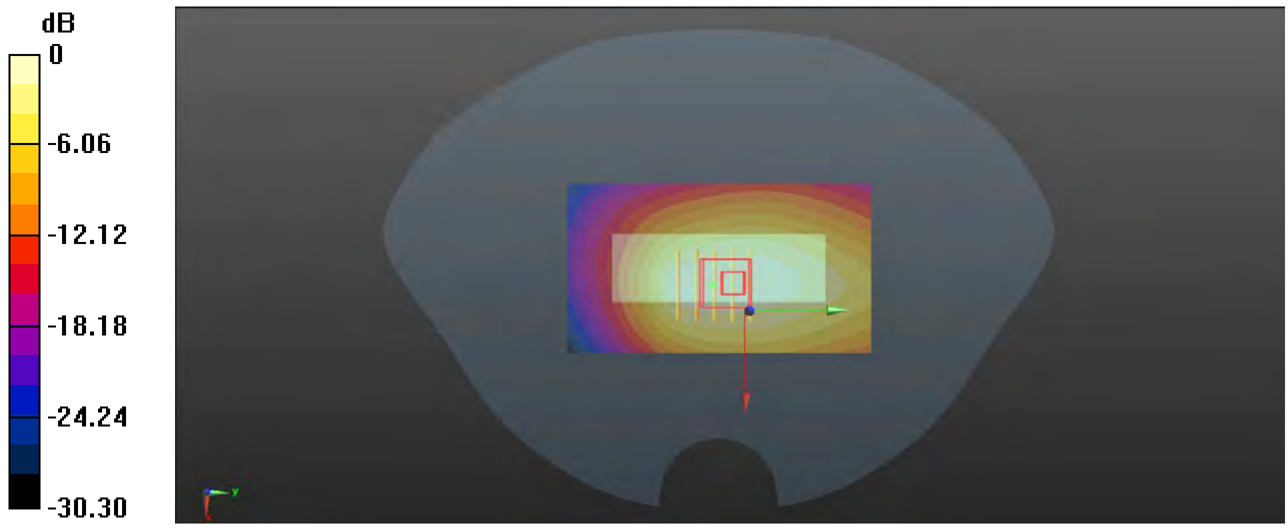
P01 GSM850_GPRS10_Horizontal-Down_0.5cm_Ch128

Communication System: GPRS; Frequency: 824.2 MHz;Duty Cycle: 1:4.15
Medium: HSL835_0713 Medium parameters used : f = 824.2 MHz; σ = 0.908 S/m; ε_r = 42.831; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.7℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(6.04, 6.04, 6.04); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.662 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.54 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.888 W/kg
SAR(1 g) = 0.594 W/kg; SAR(10 g) = 0.385 W/kg
Maximum value of SAR (measured) = 0.631 W/kg



0 dB = 0.631 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 16/7/2022

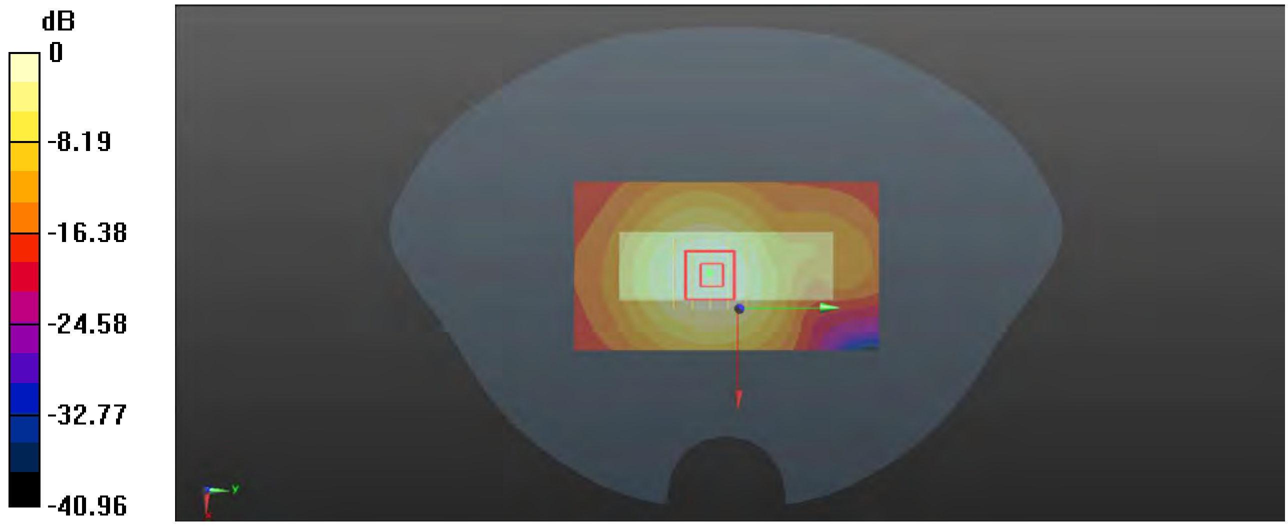
P02 GSM1900_GPRS10_Horizontal-Down_1.3cm_Ch810

Communication System: GPRS; Frequency: 1909.8 MHz;Duty Cycle: 1:4.15
Medium: HSL1950_0716 Medium parameters used: f = 1910 MHz; σ = 1.411 S/m; ε_r = 38.836; ρ = 1000 kg/m^3
Ambient Temperature：23.8℃; Liquid Temperature：22.2℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(5.19, 5.19, 5.19); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.09 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.98 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.67 W/kg
SAR(1 g) = 0.958 W/kg; SAR(10 g) = 0.565 W/kg
Maximum value of SAR (measured) = 1.08 W/kg



0 dB = 1.08 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab   Date: 16/7/2022

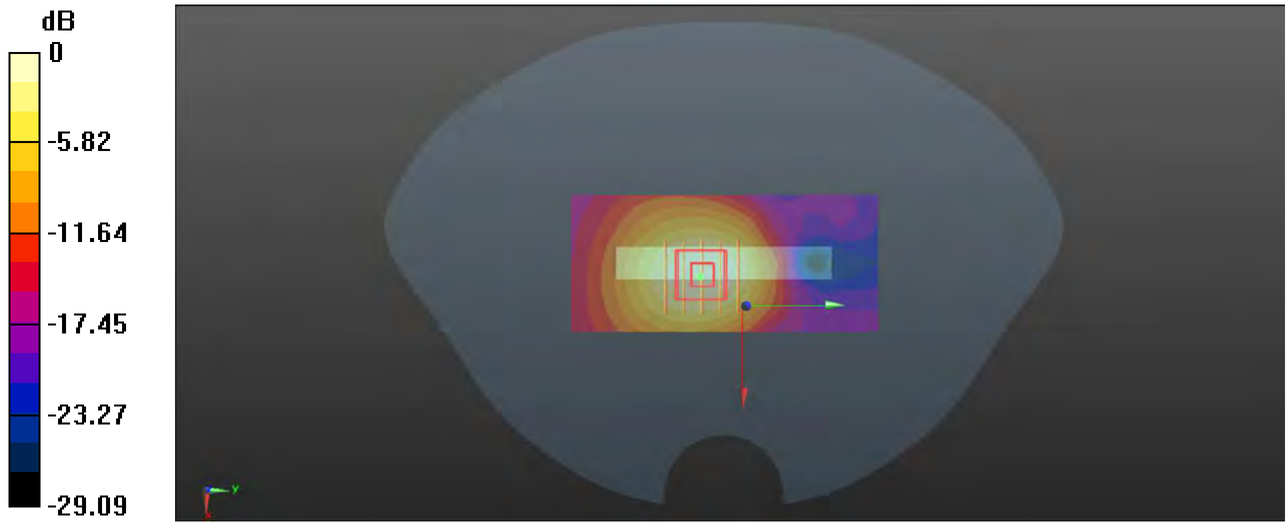
P03 WCDMA II_RMC12.2K_Verzontal-Front_0.8cm_Ch9400

Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL1950_0716 Medium parameters used : f = 1880 MHz; σ = 1.39 S/m; ε_r = 38.845; ρ = 1000 kg/m^3
Ambient Temperature：23.8℃; Liquid Temperature：22.2℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(5.19, 5.19, 5.19); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (41x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.09 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.25 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.65 W/kg
SAR(1 g) = 0.956 W/kg; SAR(10 g) = 0.534 W/kg
Maximum value of SAR (measured) = 1.02 W/kg



0 dB = 1.02 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 15/7/2022

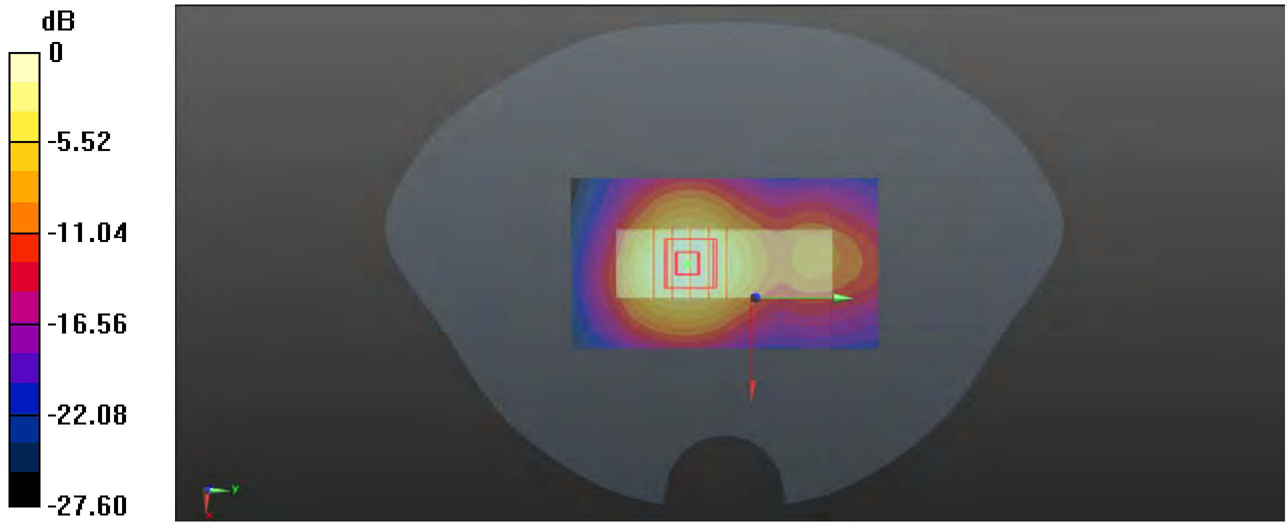
P04 WCDMA IV_RMC12.2K_Horizontal-Down_0.5cm_Ch1513

Communication System: WCDMA; Frequency: 1752.6 MHz;Duty Cycle: 1:1
Medium: HSL1750_0715 Medium parameters used: f = 1753 MHz; σ = 1.34 S/m; ε_r = 41.475; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.8℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(5.43, 5.43, 5.43); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.888 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.56 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.742 W/kg; SAR(10 g) = 0.430 W/kg
Maximum value of SAR (measured) = 0.784 W/kg



0 dB = 0.784 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 13/7/2022

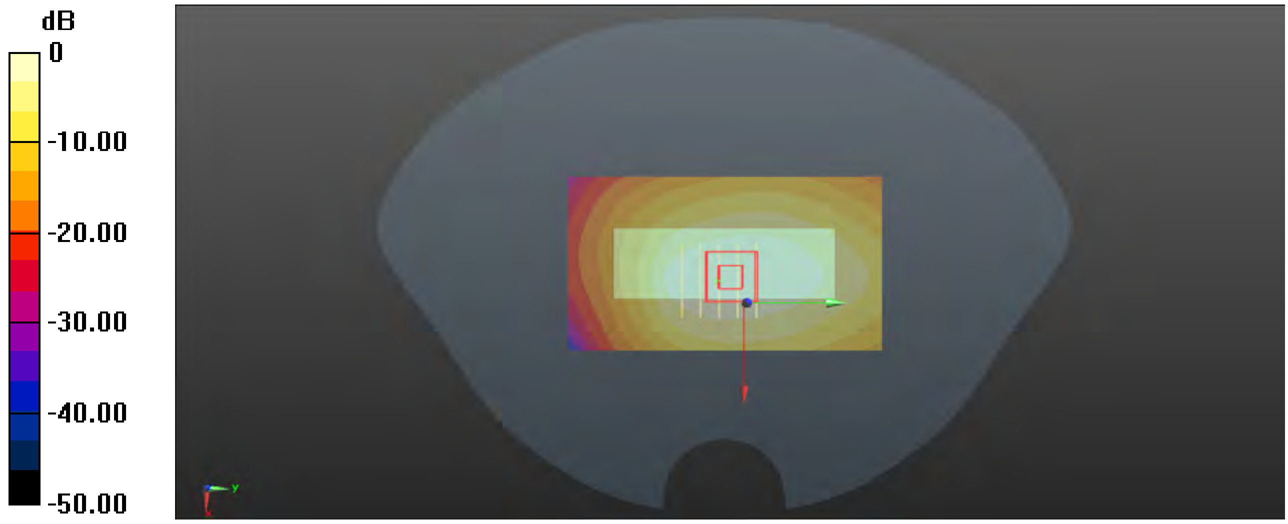
P05 WCDMA V_RMC12.2K_Horizontal-Down_0.5cm_Ch4182

Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL835_0713 Medium parameters used : f = 836.4 MHz; σ = 0.912 S/m; ε_r = 42.786; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.7℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(6.04, 6.04, 6.04); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.877 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.22 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.801 W/kg; SAR(10 g) = 0.522 W/kg
Maximum value of SAR (measured) = 0.852 W/kg



0 dB = 0.852 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 16/7/2022

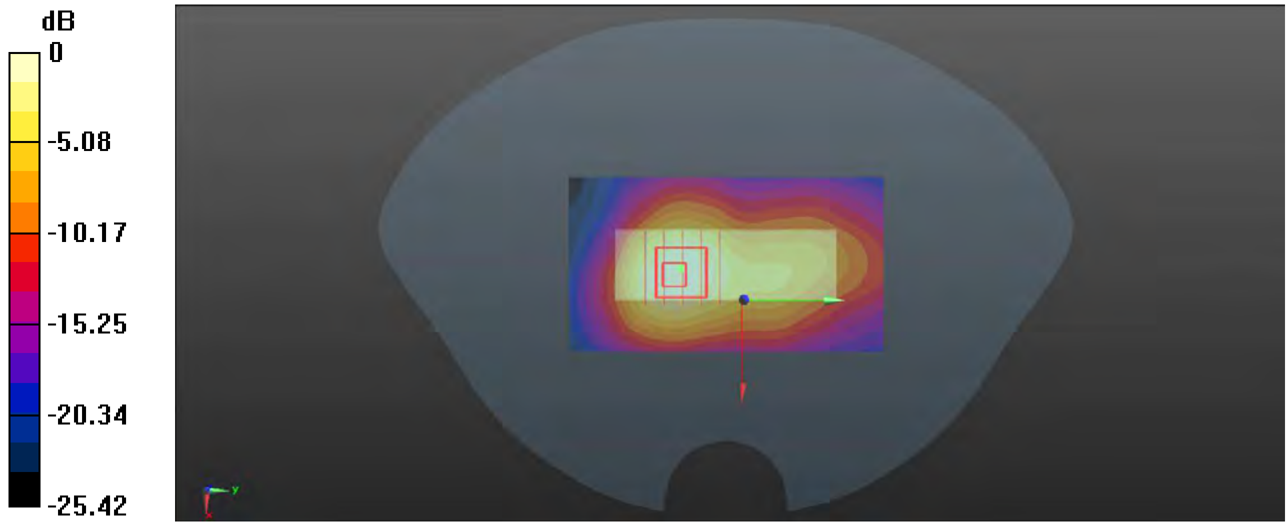
P06 LTE 2_QPSK20M_Horizontal-Down _0.5cm_Ch18700_50RB_OS50

Communication System: LTE; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: HSL1950_0716 Medium parameters used : f = 1860 MHz; σ = 1.378 S/m; ε_r = 38.868; ρ = 1000 kg/m^3
Ambient Temperature：23.8℃; Liquid Temperature：22.2℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(5.19, 5.19, 5.19); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.394 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.57 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.586 W/kg
SAR(1 g) = 0.332 W/kg; SAR(10 g) = 0.187 W/kg
Maximum value of SAR (measured) = 0.349 W/kg



0 dB = 0.349 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 13/7/2022

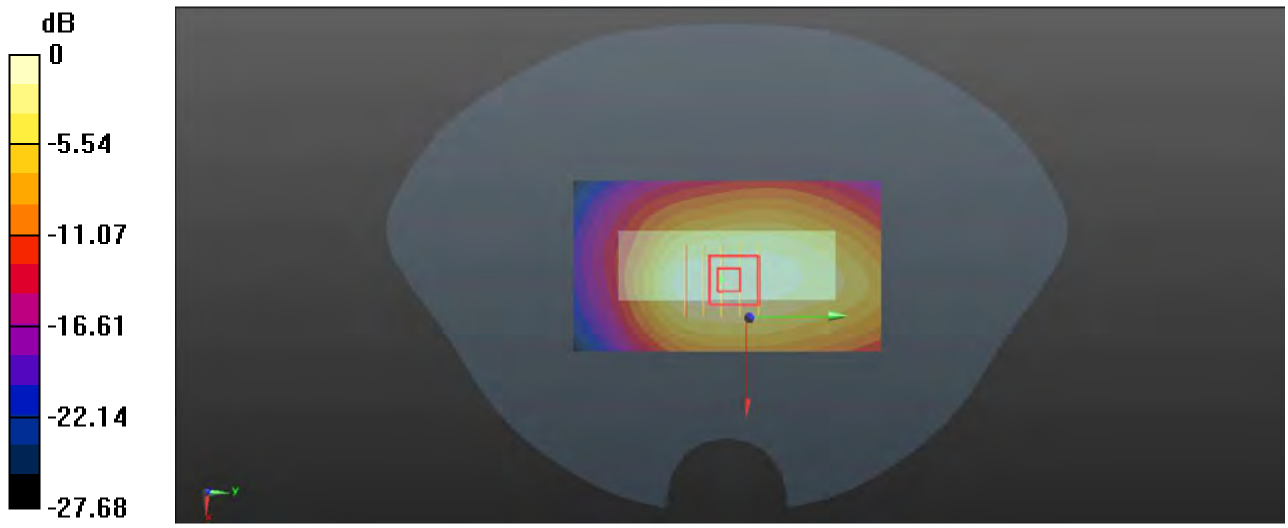
P07 LTE 5_QPSK10M_Horizontal-Down _0.5cm_Ch20600_1RB_OS24

Communication System: LTE; Frequency: 844 MHz;Duty Cycle: 1:1
Medium: HSL835_0713 Medium parameters used: f = 844 MHz; σ = 0.916 S/m; ε_r = 42.788; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.7℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(6.04, 6.04, 6.04); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.674 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.78 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.989 W/kg
SAR(1 g) = 0.641 W/kg; SAR(10 g) = 0.417 W/kg
Maximum value of SAR (measured) = 0.684 W/kg



0 dB = 0.684 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 17/7/2022

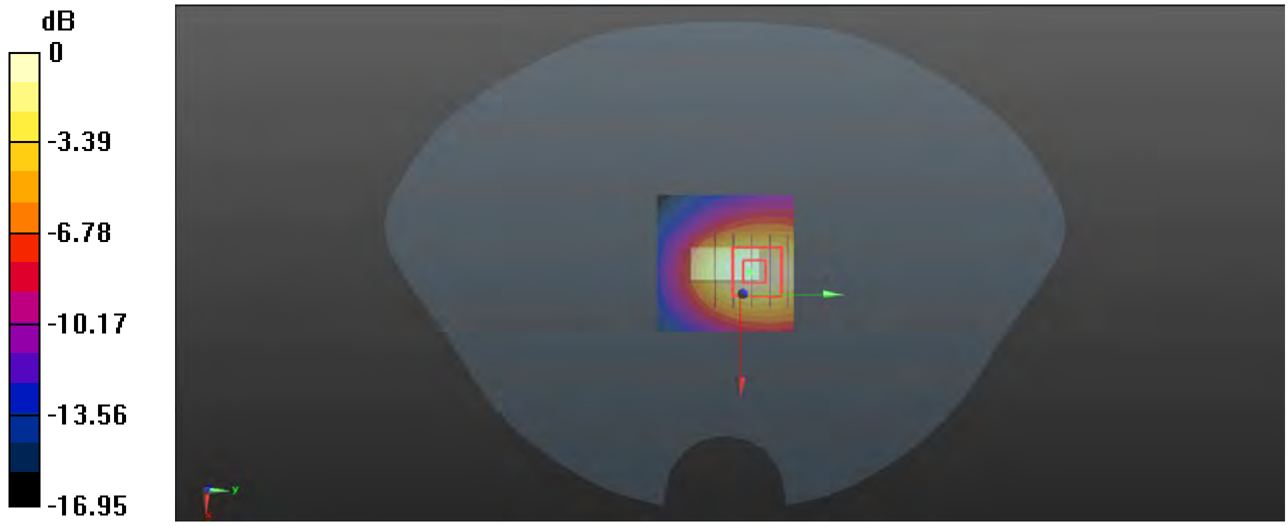
P08 LTE 7_QPSK20M_Tip-Mode_1.7cm_Ch21100_1RB_OS99

Communication System: LTE; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium: HSL2600_0717 Medium parameters used: f = 2535 MHz; σ = 1.917 S/m; ε_r = 40.094; ρ = 1000 kg/m^3
Ambient Temperature：23.2℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(4.42, 4.42, 4.42); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (51x51x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.31 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.68 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 2.26 W/kg
SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.626 W/kg
Maximum value of SAR (measured) = 1.34 W/kg



0 dB = 1.34 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 14/7/2022

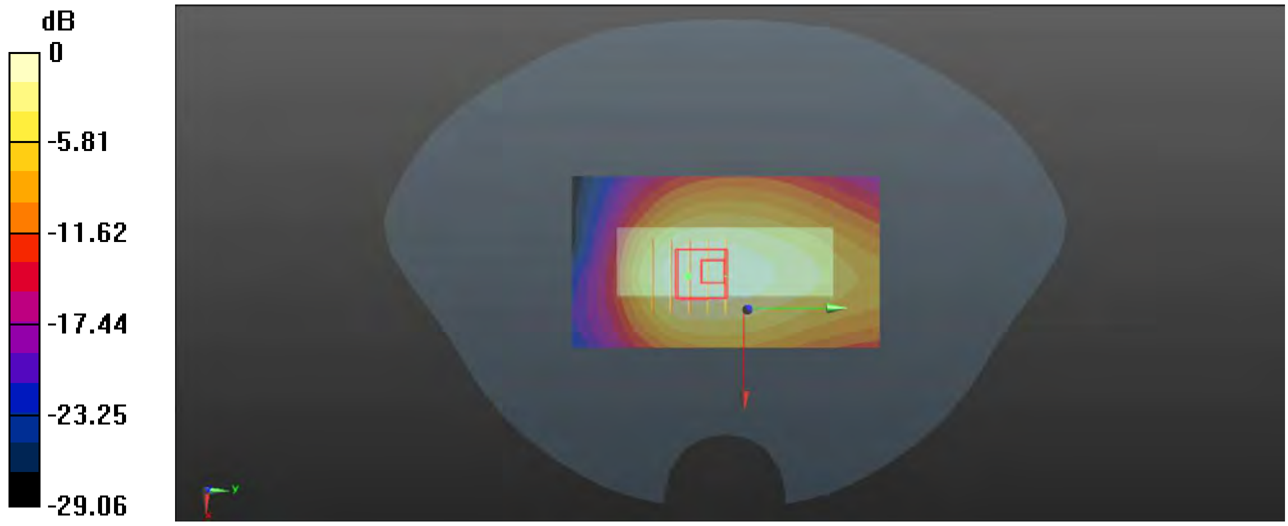
P09 LTE 12_QPSK10M_Horizontal-Up _0.5cm_Ch23130_50RB_OS0

Communication System: LTE; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: HSL750_0714 Medium parameters used : f = 711 MHz; σ = 0.932 S/m; ε_r = 42.898; ρ = 1000 kg/m^3
Ambient Temperature：23.6℃; Liquid Temperature：22.4℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(6.6, 6.6, 6.6); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.747 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.24 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.741 W/kg; SAR(10 g) = 0.397 W/kg
Maximum value of SAR (measured) = 0.695 W/kg



0 dB = 0.695 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 14/7/2022

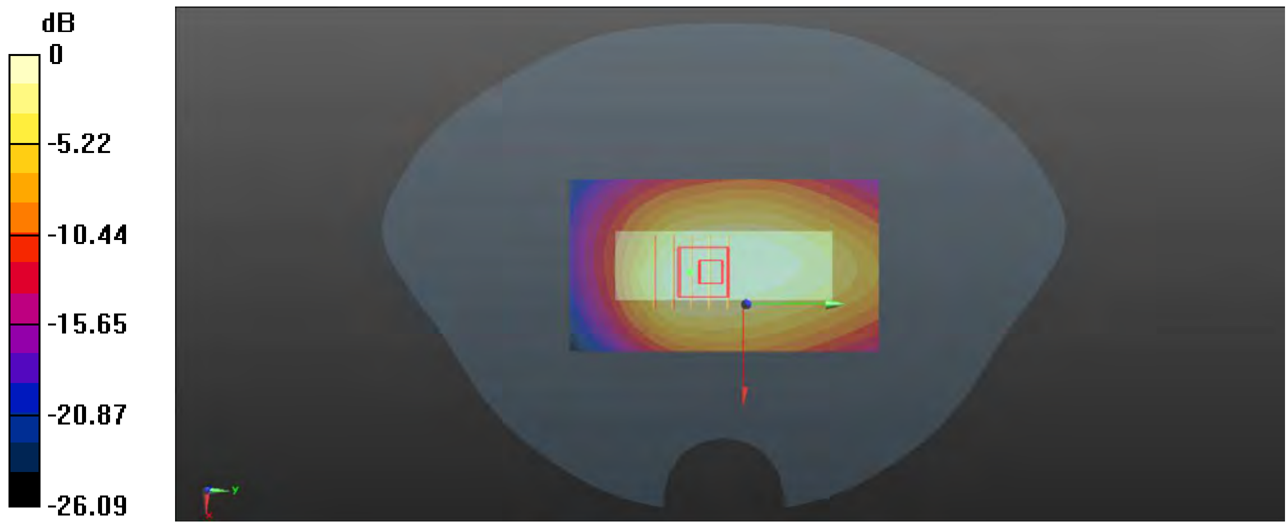
P10 LTE 13_QPSK10M_Horizontal-Down _0.5cm_Ch23230_1RB_OS24

Communication System: LTE; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: HSL750_0714 Medium parameters used: f = 782 MHz; σ = 0.928 S/m; ε_r = 42.931; ρ = 1000 kg/m^3
Ambient Temperature：23.6℃; Liquid Temperature：22.4℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(6.6, 6.6, 6.6); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.935 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.15 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.891 W/kg; SAR(10 g) = 0.572 W/kg
Maximum value of SAR (measured) = 0.952 W/kg



0 dB = 0.952 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 15/7/2022

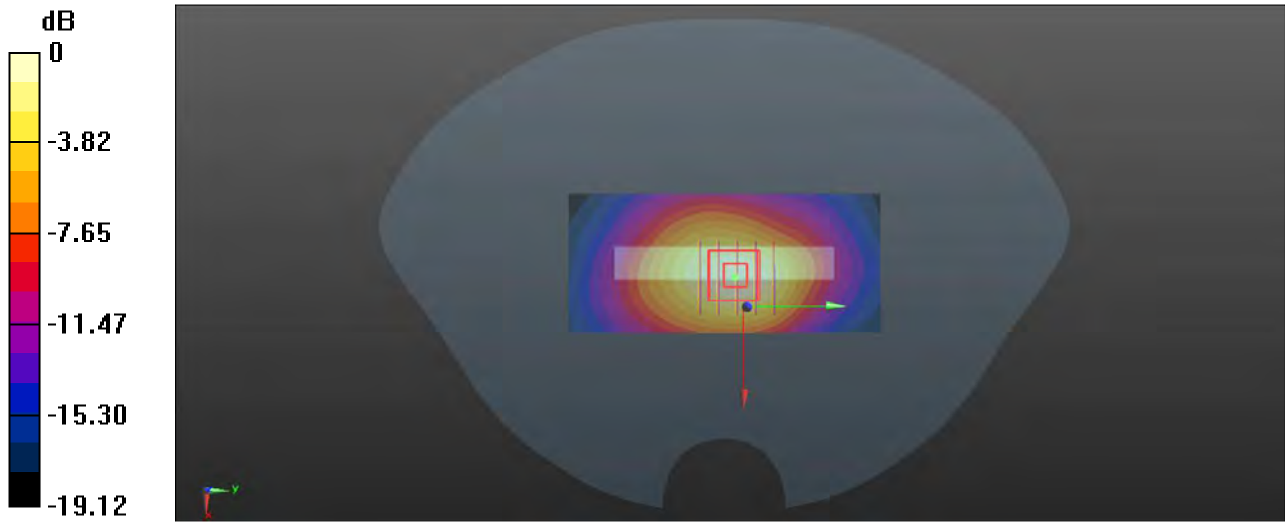
P11 LTE 66_QPSK20M_Vertical-Front _8cm_Ch132572_1RB_OS50

Communication System: LTE; Frequency: 1770 MHz;Duty Cycle: 1:1
Medium: HSL1750_0715 Medium parameters used: f = 1770 MHz; σ = 1.354 S/m; ε_r = 41.431; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.8℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(5.43, 5.43, 5.43); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (41x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.601 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.17 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.905 W/kg
SAR(1 g) = 0.551 W/kg; SAR(10 g) = 0.313 W/kg
Maximum value of SAR (measured) = 0.593 W/kg



0 dB = 0.593 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab Date: 14/7/2022

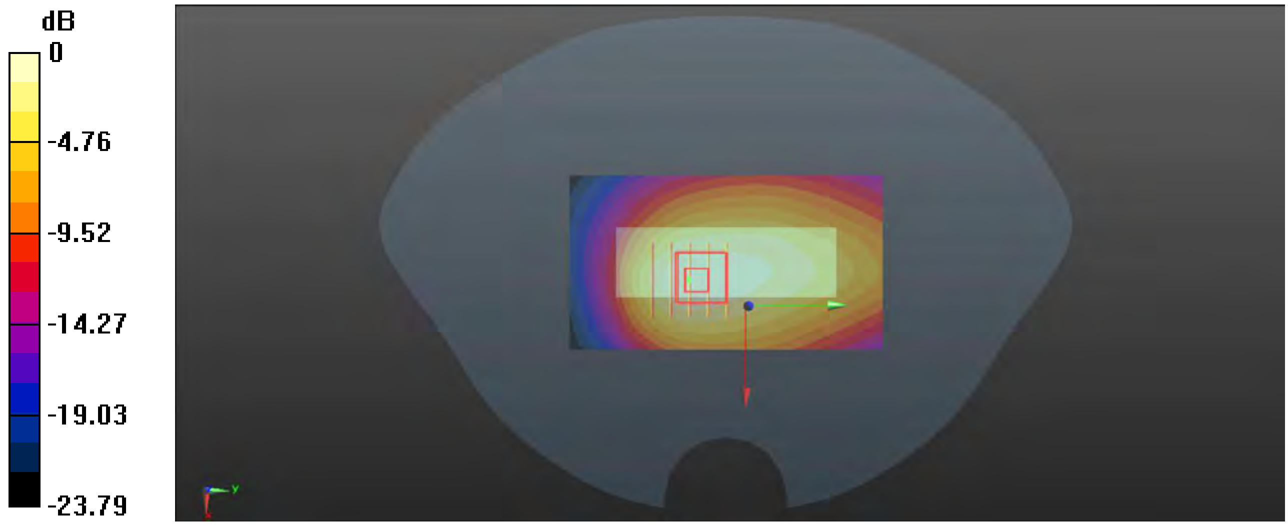
P12 LTE 71_QPSK20M_Horizontal-Down_0.5cm_Ch133222_1RB_OS50

Communication System: LTE; Frequency: 673 MHz;Duty Cycle: 1:1
Medium: HSL750_0714 Medium parameters used: f = 673 MHz; σ = 0.916 S/m; ε_r = 43.002; ρ = 1000 kg/m^3
Ambient Temperature：23.6℃; Liquid Temperature：22.4℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(6.6, 6.6, 6.6); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

-Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.743 W/kg

-Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.23 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.693 W/kg; SAR(10 g) = 0.444 W/kg
Maximum value of SAR (measured) = 0.739 W/kg



0 dB = 0.739 W/kg

Test Laboratory: ritt 7 Layers SAR/HAC Testing Lab   Date: 17/7/2022

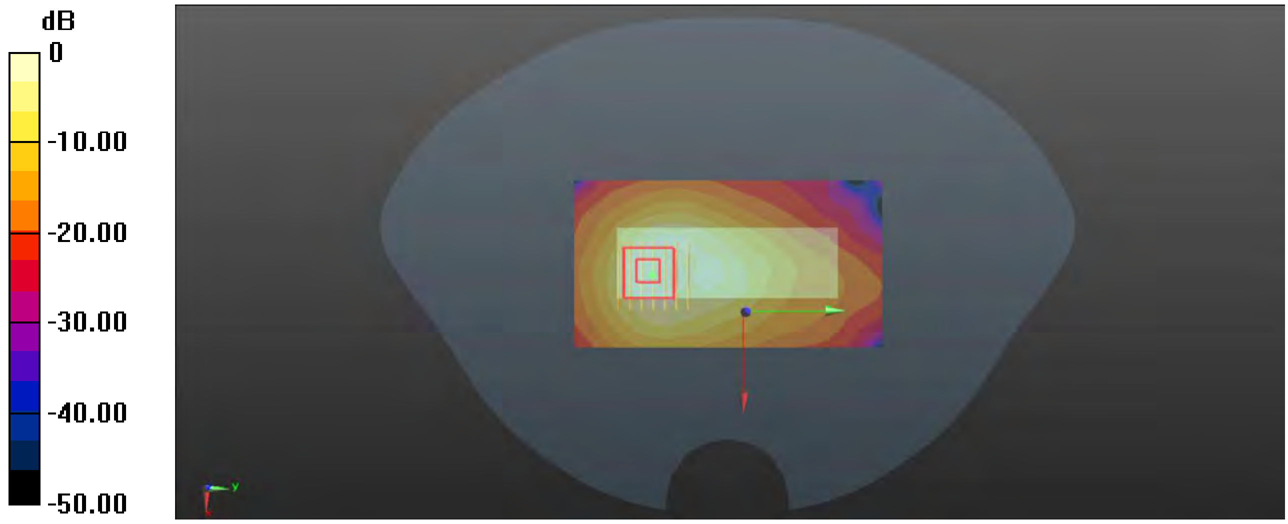
P13 LTE 41_QPSK20M_Horizontal-Up _0.5cm_Ch40620_50RB_OS50

Communication System: LTE; Frequency: 2593 MHz;Duty Cycle: 1:1
Medium: HSL2600_0717 Medium parameters used: f = 2593 MHz; σ = 1.961 S/m; ε_r = 39.955; ρ = 1000 kg/m^3
Ambient Temperature：23.2℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3268; ConvF(4.42, 4.42, 4.42); Calibrated: 24/8/2021;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1288; Calibrated: 20/8/2021
- Phantom: SAM (front) with CRP V5.0; Type: QD000P40CB; Serial: TP:1430
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- **Area Scan (61x111x1):** Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.848 W/kg

- **Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.95 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 0.752 W/kg; SAR(10 g) = 0.324 W/kg
Maximum value of SAR (measured) = 0.907 W/kg



0 dB = 0.907 W/kg

Appendix C. Calibration Certificate for Probe and Dipole

The SPEAG calibration certificates are shown as follows.

In Collaboration with
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CALIBRATION LABORATORY

Add: No.52 HuanYuanBei Road, Haidian District, Beijing, 100191, Cl
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client **7layers** **Certificate No: Z21-60420**

CALIBRATION CERTIFICATE

Object: D750V3 - SN: 1200

Calibration Procedure(s): FF-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: October 27, 2021

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)°C and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
NetworkAnalyzer E5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: October 31, 2021

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CALIBRATION LABORATORY

Add: No.52 HuanYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

Add: No.52 HuanYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	42.0	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.45 W/kg ± 18.8 % (*k*=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.57 W/kg ± 18.7 % (*k*=2)**

Add: No.52 HuanYuanBei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	56.0Ω+ 0.47jΩ
Return Loss	- 24.9dB

General Antenna Parameters and Design

Electrical Delay (one direction)	0.946 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Head TSL Date: 10.27.2021

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1200

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 750 MHz; σ = 0.883 S/m; ε_r = 40.92; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(9.81, 9.81, 9.81) @ 750 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.88 V/m; Power Drift = -0.03 dB

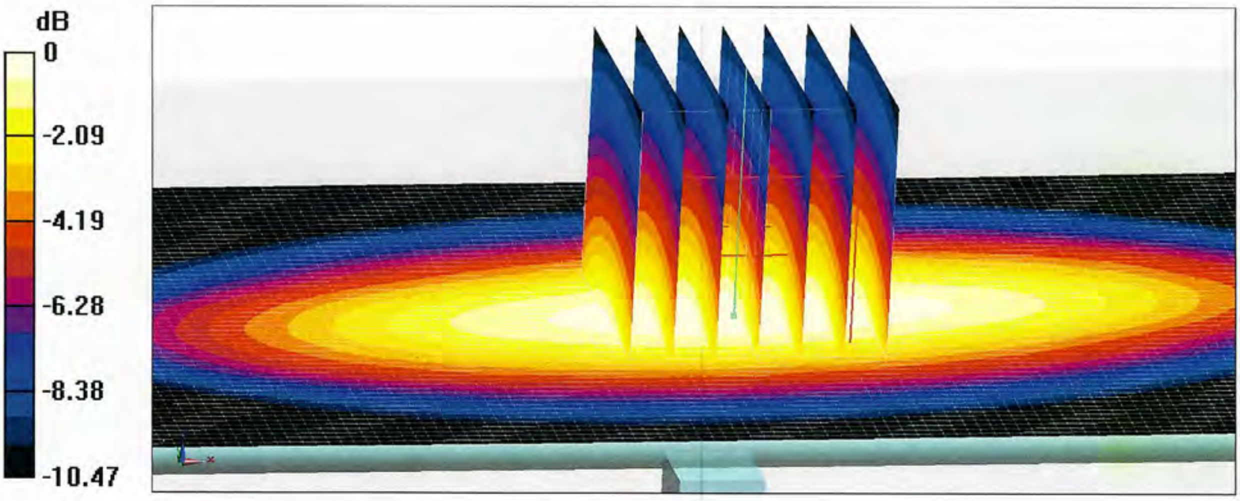
Peak SAR (extrapolated) = 3.27 W/kg

SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.39 W/kg

Smallest distance from peaks to all points 3 dB below = 20.6 mm

Ratio of SAR at M2 to SAR at M1 = 64.5%

Maximum value of SAR (measured) = 2.86 W/kg



0 dB = 2.86 W/kg = 4.56 dBW/kg

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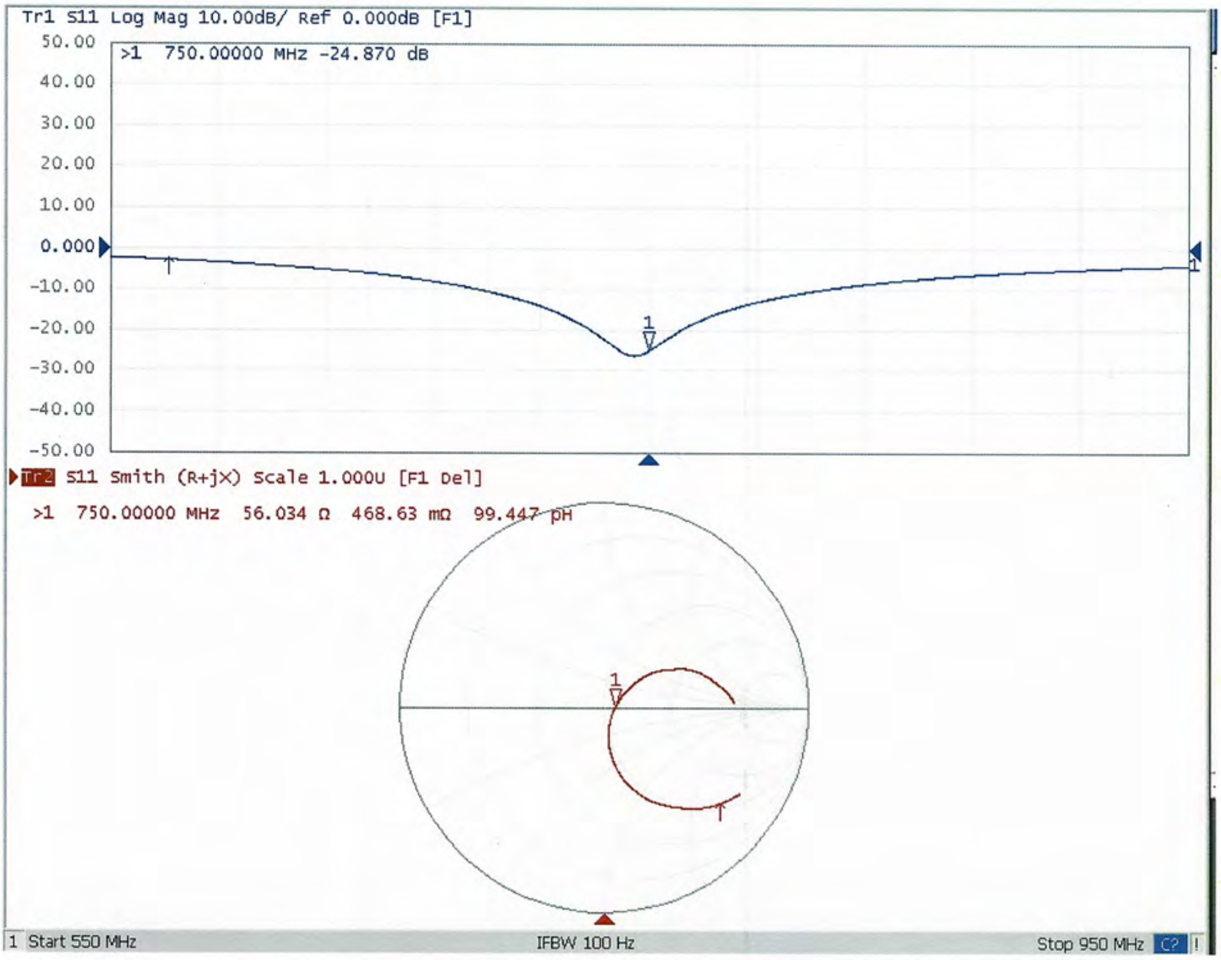
Impedance Measurement Plot for Head TSL



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Client 7layers Certificate No: Z21-60421

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d265
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	October 18, 2021

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
NetworkAnalyzer E5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: October 24, 2021

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.60 W/kg ± 18.8 % (*k*=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.25 W/kg ± 18.7 % (*k*=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.9Ω- 2.16jΩ
Return Loss	- 32.6dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.304 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Date: 10.18.2021

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d265

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.886 S/m; ε_r = 40.9; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(9.81, 9.81, 9.81) @ 835 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 59.24 V/m; Power Drift = -0.01 dB

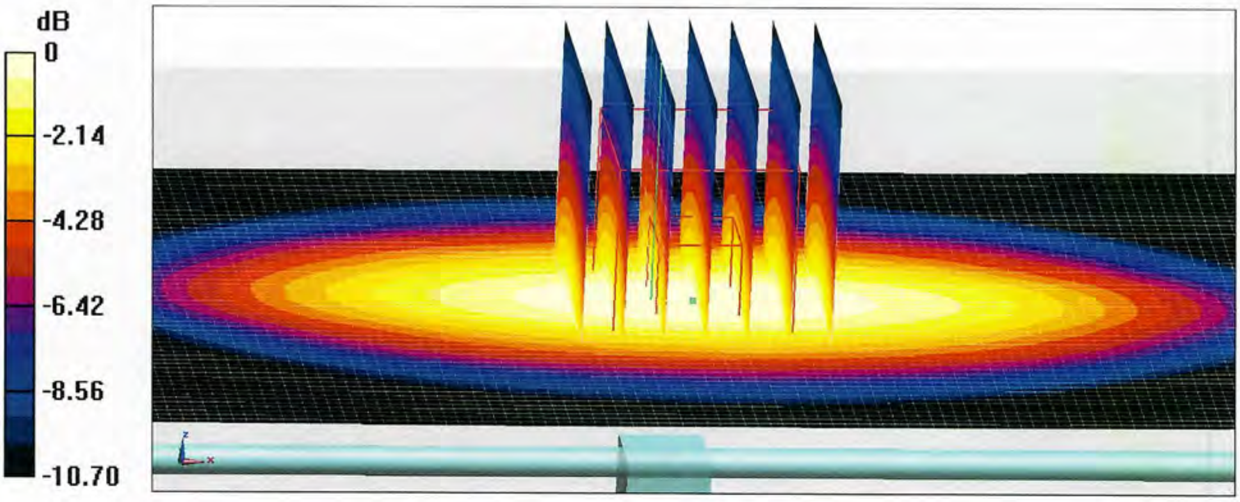
Peak SAR (extrapolated) = 3.66 W/kg

SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.55 W/kg

Smallest distance from peaks to all points 3 dB below = 19.2 mm

Ratio of SAR at M2 to SAR at M1 = 64.7%

Maximum value of SAR (measured) = 3.21 W/kg



0 dB = 3.21 W/kg = 5.07 dBW/kg

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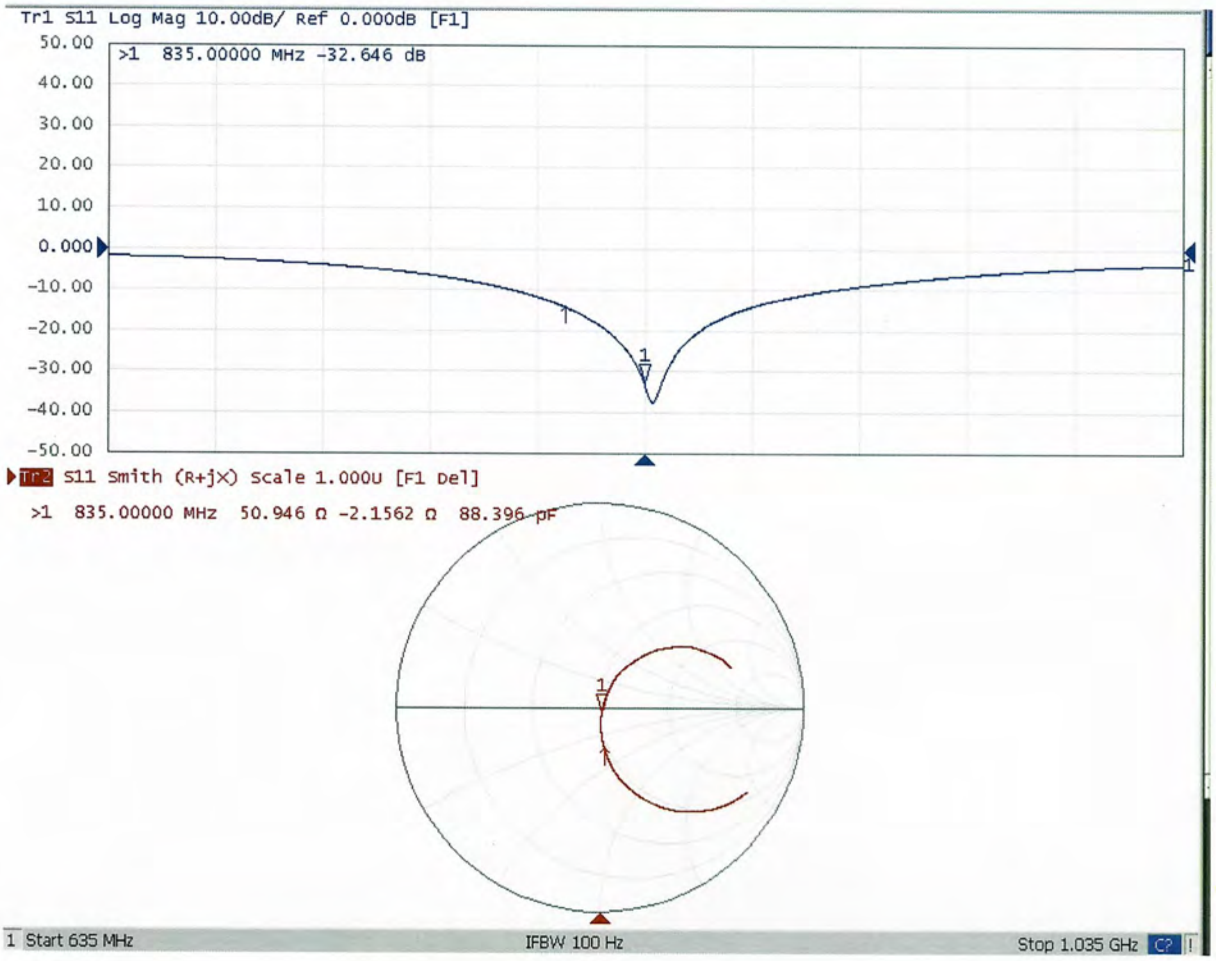
Impedance Measurement Plot for Head TSL



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CNAS L0570

Client **7layers** **Certificate No: Z21-60422**

CALIBRATION CERTIFICATE

Object	D1750V2 - SN: 1176
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	October 19, 2021

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	**ID #**	**Cal Date (Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
NetworkAnalyzer E5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: October 24 2021

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.8 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.21 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.6 W/kg ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	4.83 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.2 W/kg ± 18.7 % (k=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.0Ω- 2.09jΩ
Return Loss	- 33.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.129 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Date: 10.19.2021

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1176

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1750 MHz; σ = 1.382 S/m; ε_r = 39.76; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(8.22, 8.22, 8.22) @ 1750 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.37 V/m; Power Drift = 0.01 dB

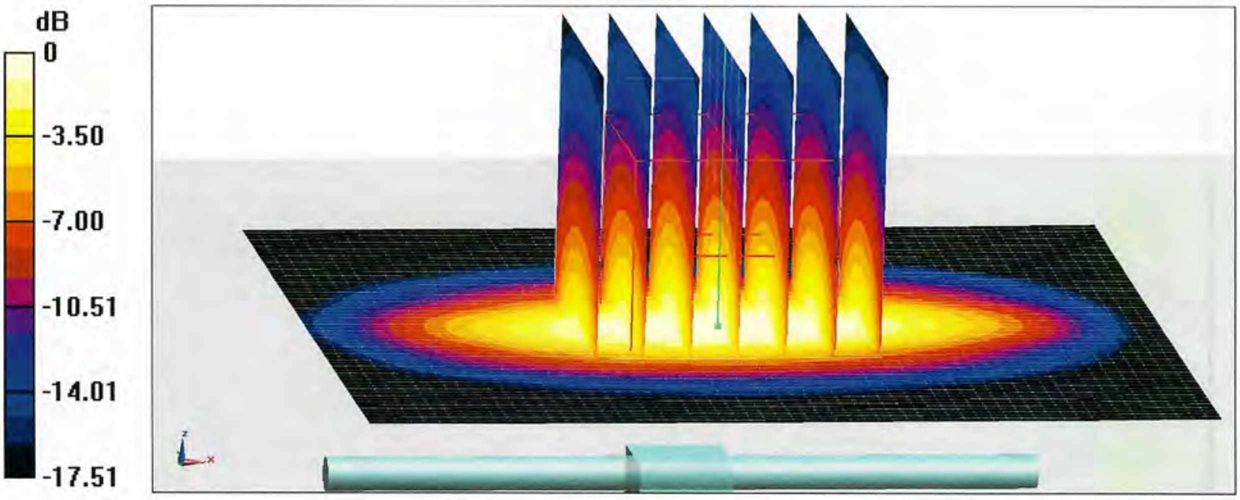
Peak SAR (extrapolated) = 17.4 W/kg

SAR(1 g) = 9.21 W/kg; SAR(10 g) = 4.83 W/kg

Smallest distance from peaks to all points 3 dB below = 10.2 mm

Ratio of SAR at M2 to SAR at M1 = 53%

Maximum value of SAR (measured) = 14.4 W/kg



0 dB = 14.4 W/kg = 11.58 dBW/kg

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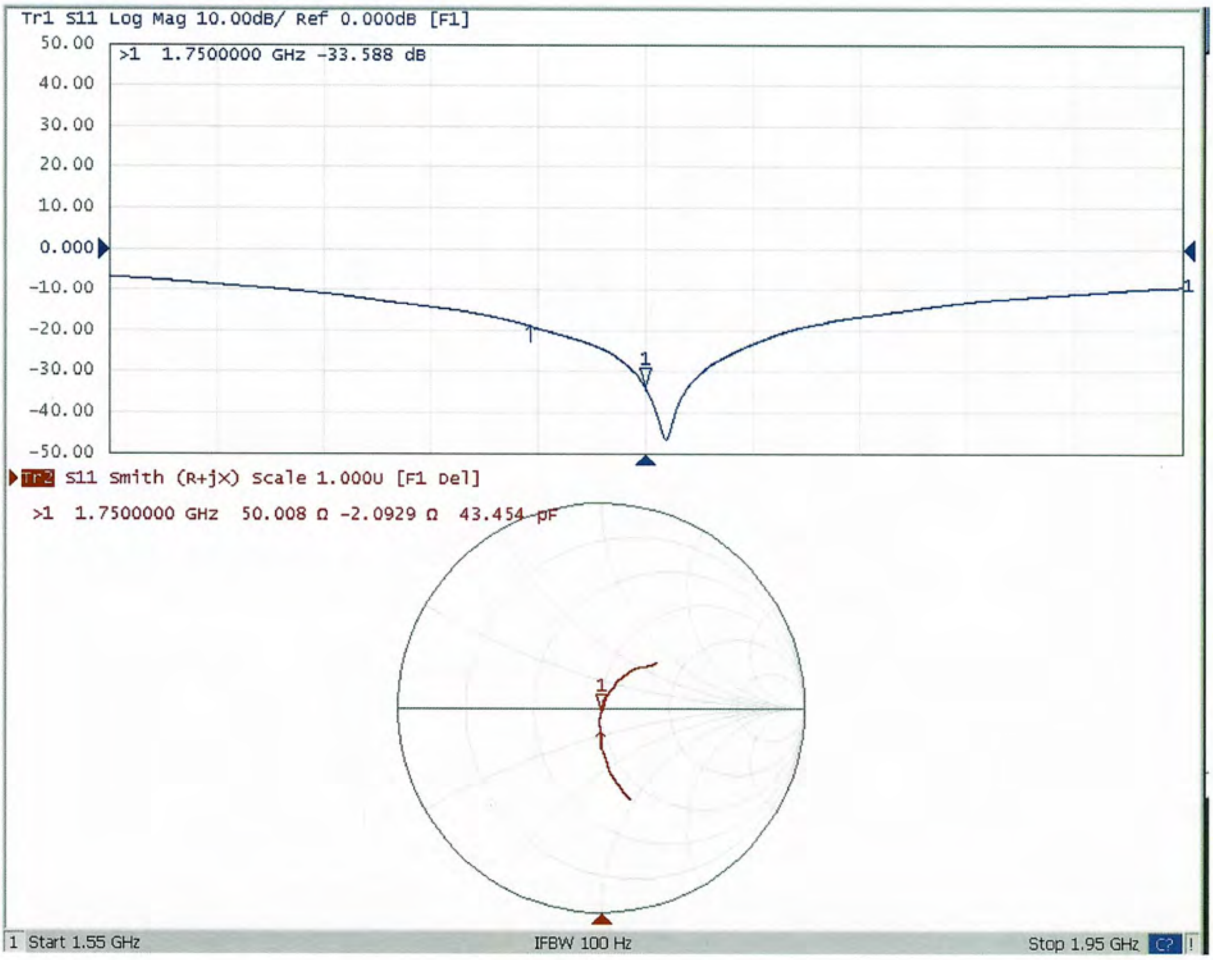
Impedance Measurement Plot for Head TSL



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Client **7layers** **Certificate No: Z21-60423**

CALIBRATION CERTIFICATE

Object	D1950V3 - SN: 1229
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	October 28, 2021

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Power sensor NRP8S	104291	24-Sep-21 (CTTL, No.J21X08326)	Sep-22
Reference Probe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
NetworkAnalyzer E5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	[signature]
Reviewed by:	Lin Hao	SAR Test Engineer	[signature]
Approved by:	Qi Dianyuan	SAR Project Leader	[signature]

Issued: October 31, 2021

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lossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1950 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.39 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.3 W/kg ± 18.8 % (*k*=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.08 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.3 W/kg ± 18.7 % (*k*=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.5Ω+ 2.19jΩ
Return Loss	- 33.0dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.102 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

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DASY5 Validation Report for Head TSL Date: 10.28.2021

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1950 MHz; Type: D1950V3; Serial: D1950V3 - SN: 1229

Communication System: UID 0, CW; Frequency: 1950 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1950 MHz; $\sigma = 1.39$ S/m; $\varepsilon_r = 38.86$; $\rho = 1000$ kg/m^3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(7.81, 7.81, 7.81) @ 1950 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7501)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.9 V/m; Power Drift = 0.06 dB

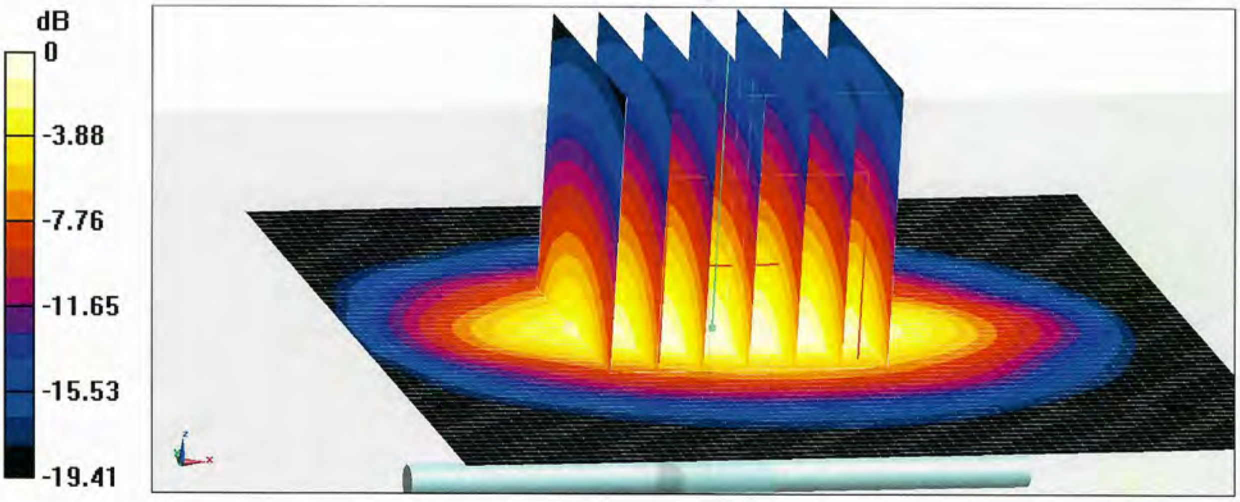
Peak SAR (extrapolated) = 20.0 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.08 W/kg

Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 50.6%

Maximum value of SAR (measured) = 16.3 W/kg



0 dB = 16.3 W/kg = 12.12 dBW/kg

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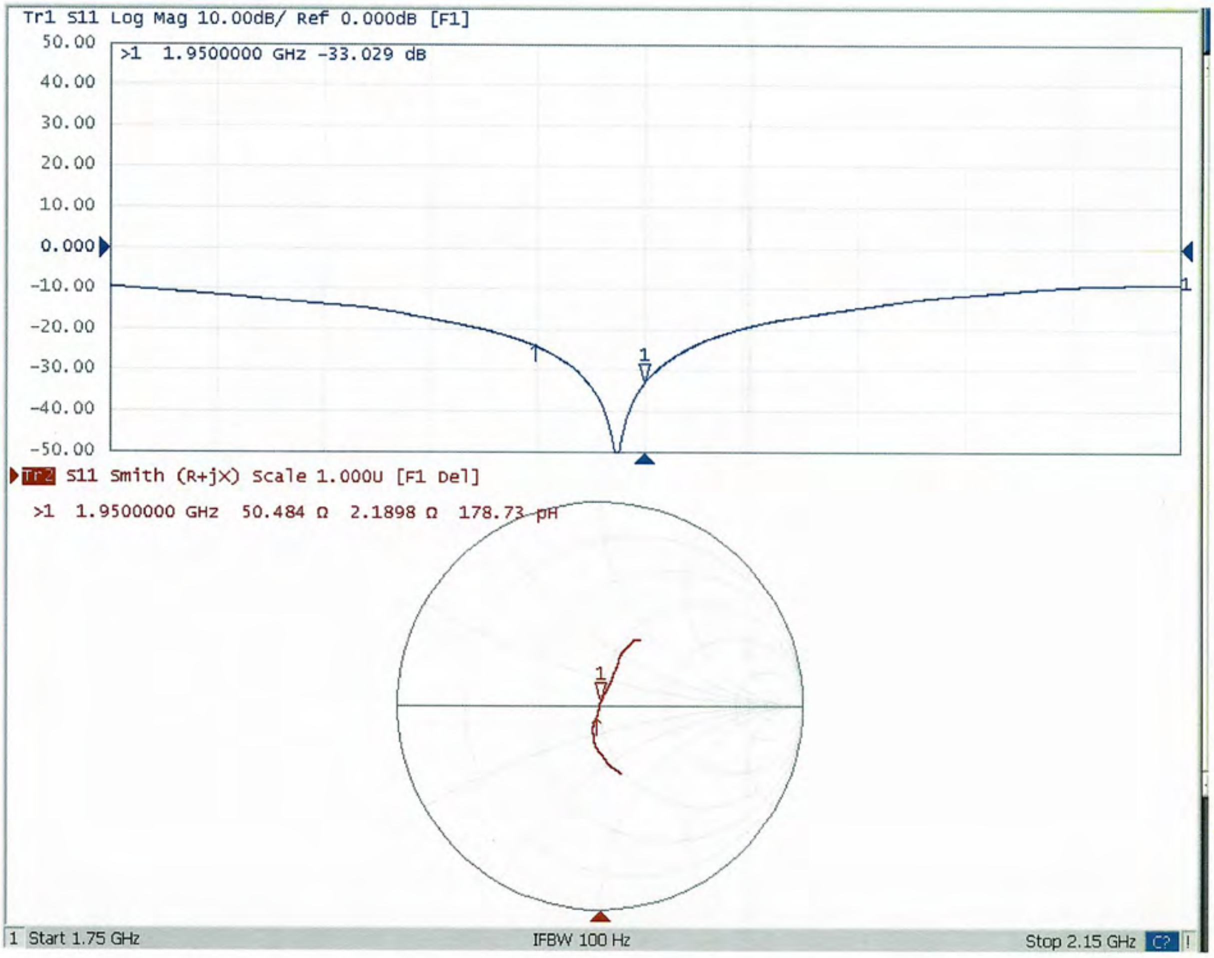
Impedance Measurement Plot for Head TSL



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CNAS L0570

Client **B.V.ADT** **Certificate No: Z21-60339**

CALIBRATION CERTIFICATE

Object	D2600V2 - SN: 1110
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	September 16, 2021

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	23-Sep-20 (CTTL, No.J20X08336)	Sep-21
Power sensor NRP8S	104291	23-Sep-20 (CTTL, No.J20X08336)	Sep-21
Reference Probe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	**ID #**	**Cal Date (Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
Network Analyzer E5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: September 21, 2021

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.0 ± 6 %	1.95 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**55.8 W/kg ± 18.8 % (*k*=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.13 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.6 W/kg ± 18.7 % (*k*=2)**

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Appendix(Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.1Ω- 5.12jΩ
Return Loss	- 25.7dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.058 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

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DASY5 Validation Report for Head TSL Date: 09.16.2021

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1110

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2600 MHz; σ = 1.949 S/m; ε_r = 39.04; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(7.1, 7.1, 7.1) @ 2600 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 105.3 V/m; Power Drift = 0.01 dB

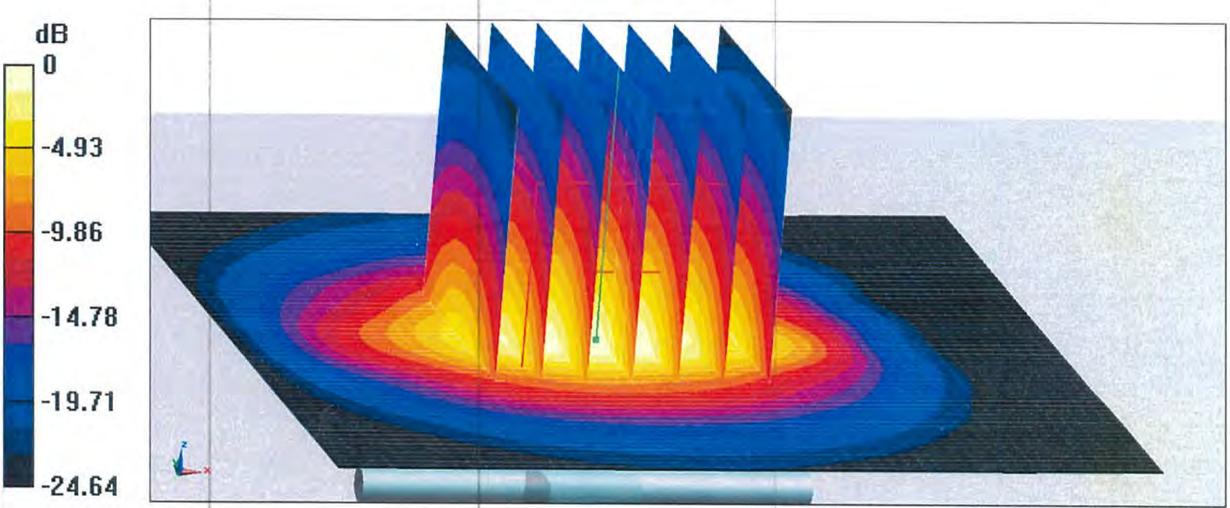
Peak SAR (extrapolated) = 30.6 W/kg

SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.13 W/kg

Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 45.2%

Maximum value of SAR (measured) = 24.1 W/kg



0 dB = 24.1 W/kg = 13.82 dBW/kg

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Impedance Measurement Plot for Head TSL