



TEST REPORT FOR SAR TESTING

Report No.: SRTC2019-9004(F)-19011703(H)

Product Name: Mobile Phone

Product Model: HLTE215E

Applicant: Hisense International Co., Ltd.

Manufacturer: Hisense Communications Co., Ltd.

Specification: Part 2.1093

IEEE Std 1528

KDB Procedures

FCC ID: 2ADOBHLTE215E

The State Radio_monitoring_center Testing Center (SRTC)

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1. GENERAL INFORMATION

1.1 Notes of the test report

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1.2 Information about the testing laboratory

Company:	The State Radio Monitoring Center Testing Center (SRTC)
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1.3 Applicant's details

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1.4 Manufacturer's details

Company:	Hisense Communications Co., Ltd.
Address:	218 Qianwangang Road, Qingdao Economic & Technological Development Zone, Qingdao, China
City:	Qingdao
Country or Region:	Qingdao
Contacted person:	Zhangchuanzhu
Tel:	+86-532-55756010
Fax:	---
Email:	zhangchuanzhu@hisense.com

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2019.01.17
Testing Start Date:	2019.02.28
Testing End Date:	2019.03.04

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	21-23	40-45

Normal Supply Voltage (Vdc.):	3.85
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2. DESCRIPTION OF THE DEVICE UNDER TEST

2.1 Final Equipment Build Status

Wireless Technology and Frequency Bands	<input checked="" type="checkbox"/> GSM Band: GSM850/PCS1900 <input checked="" type="checkbox"/> WCDMA Band: FDD2/4/5 <input checked="" type="checkbox"/> LTE Band: 2/4/5/7/12/66 <input checked="" type="checkbox"/> Bluetooth Band: 2.4GHz <input checked="" type="checkbox"/> Wi-Fi Band: 2.4GHz
Mode	GSM <input checked="" type="checkbox"/> Voice (GMSK) <input checked="" type="checkbox"/> GPRS (GMSK) <input checked="" type="checkbox"/> EGPRS (GMSK) WCDMA <input checked="" type="checkbox"/> UMTS Rel. 99 (Voice & Data) <input checked="" type="checkbox"/> HSDPA (Rel. 5) <input checked="" type="checkbox"/> HSUPA (Rel. 6) <input checked="" type="checkbox"/> HSPA+ (Rel.) <input type="checkbox"/> DC-HSDPA (Rel.) Wi-Fi 2.4GHz <input checked="" type="checkbox"/> 802.11b <input checked="" type="checkbox"/> 802.11g <input checked="" type="checkbox"/> 802.11n (20MHz) Bluetooth <input checked="" type="checkbox"/> BR(GFSK) <input checked="" type="checkbox"/> EDR ($\pi/4$ DQPSK, 8-DPSK) <input checked="" type="checkbox"/> BLE(GFSK) LTE <input checked="" type="checkbox"/> QPSK <input checked="" type="checkbox"/> 16QAM <input checked="" type="checkbox"/> 64QAM
Duty Cycle	GSM Voice: 12.5%; GPRS: 12.5% (1 Slot), 25% (2 Slots), 37.5% (3 Slots), 50% (4 Slots) WCDMA: 100% Wi-Fi 802.11b: 98.9%; 11g: 93.4%; 11n: 93.0% Bluetooth: GFSK: 30.56% (DH1), 43.57% (DH3), 46.10% (DH5) $\pi/4$ DQPSK: 30.61% (DH1), 43.62% (DH3), 46.08% (DH5) 8-DPSK: 31.02% (DH1), 43.71% (DH3), 46.22% (DH5) BLE: 59.4%
GPRS/EGPRS Multi-Slot Class	<input type="checkbox"/> Class 8 - One Up <input type="checkbox"/> Class 10 - Two Up <input type="checkbox"/> Class 12 - Four Up <input checked="" type="checkbox"/> Class 33 - Four Up
Mobile Phone Capability	<input type="checkbox"/> Class A - Mobile phones can be connected to both GPRS and GSM services simultaneously. <input checked="" type="checkbox"/> Class B - Mobile phones can be attached to both GPRS and GSM services, using one service at a time. <input type="checkbox"/> Class C - Mobile phones are attached to either GPRS or GSM voice service. You need to switch manually between services
DTM (Dual Transfer Mode)	Not Supported

2.2 Support Equipment

The following support equipment was used to exercise the DUT during testing:

State of sample	Normal
Headset1	NLD-EM116T-046S
Batteries	LPN385300A/ Li-Lon
H/W Version	V1.00
S/W Version	L1592.6.01.05.MX05
IMEI	863375040000731
Notes	As the information described above, we use test sample offered by the customer. The relevant tests have been performed in order to verify in which combination case the EUT would have the worst features.

3. REFERENCE SPECIFICATION

Specification	Version	Title
Part 2.1093	2018	Radiofrequency radiation exposure evaluation: portable devices.
IEEE Std 1528	2013	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
IEEE Std 1528a	2005	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques Amendment 1: CAD File for Human Head Model (SAM Phantom)
KDB 447498 D01	v06	General RF Exposure Guidance
KDB 648474 D04	v01r03	Handset SAR
KDB 941225 D01	v03r01	3G SAR Procedures
KDB 248227 D01	v02r02	SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS
KDB 865664 D01	v01r04	SAR Measurement from 100 MHz to 6 GHz
KDB 865664 D02	v01r02	RF Exposure Reporting
KDB 941225 D05	v02r05	SAR for LTE Devices

4. TEST CONDITIONS

4.1 Picture to demonstrate the required liquid depth

The liquid depth in the used SAM phantoms



Liquid depth for SAR Measurement

4.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester. Communication between the device and the call tester was established by air link.

The device output power was set to maximum power level for all tests; a fully charged battery was used for every test sequence.

In all operating bands the measurements were performed on middle channel, and few of them were also performed on lowest and highest channels.

4.3 SAR Measurement Set-up

The system is based on a high precision robot (working range greater than 0.9m), which positions the probes with a positional repeatability of better than $\pm 0.02\text{mm}$. Special E-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines (length =300mm) to the data acquisition unit. A cell controller system contains the power supply, robot controller, teaches pendant (Joystick), and remote control, is used to drive the robot motors.

The PC consists of the Micron Pentium IV computer with Win7 system and SAR Measurement Software DASY5 Professional, A/D interface card, monitor, mouse, and

keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot.

A data acquisition electronic (DAE) circuit performs the signal amplification; signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card. The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines.

The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection

The robot uses its own controller with a built in VME-bus computer.

4.4 Phantoms

The phantom used for all tests i.e. for both system checks and device testing, was the twin headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528 - 2013.

System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.

The SPEAG device holder (see Section 5.1) was used to position the device in all tests whilst a tripod was used to position the validation dipoles against the flat section of phantom.

4.5 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 - 2013 and FCC Supplement C to OET Bulletin 65. All tests were carried out using simulants whose dielectric parameters were within $\pm 5\%$ of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.

The depth of the tissue simulant was 15.0 ± 0.5 cm measured from the ear reference point during system checking and device measurements.

4.5.1 Tissue Stimulant Recipes

The following tissue stimulants were used for Head and Body test:

Name	Broadband tissue-equivalent liquid
Type for Head	HBBL600-6000V6 Head Simulating Liquid
Type for Body	MBBL600-6000V6 Body Simulating Liquid

4.6 DESCRIPTION OF THE TEST PROCEDURE

4.6.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy5 system.



Device holder supplied by SPEAG

4.6.2 Test positions

4.6.2.1 Against Phantom Head

Measurements were made in "cheek" and "tilt" positions on both the left hand and right-hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 - 2013 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

4.6.2.2 Body Worn Configuration

The device was placed in the SPEAG holder below the flat section of the phantom. The distance between the device and the phantom was kept at the separation distance using a separate flat spacer that was removed before the start of the measurements. And the distance is 10mm. The device was oriented with its antenna facing the phantom since this orientation gives higher results.

4.6.3 Scan Procedure

First, area scans were used for determination of the field distribution and the approximate location of the local peak SAR values. The SAR distribution is scanned along the inside surface, at least for an area larger than the projection of the handset and antenna. The angle between the probe axis and the surface normal line is recommended but not required to be less than 30°. The SAR distribution is first measured on a 2-D coarse grid. The scan region should cover all areas that are exposed and encompassed by the projection of the handset. There are 15 mm × 15 mm (equal or less than 2GHz), 12 mm × 12 mm (from 2GHz~3GHz) and 10mm x 10mm (above 5GHz) measurement grid used when two staggered one-dimensional cubic splines are used to estimate the maximum SAR location. Next, a zoom scan, a minimum of 7 x 7x7 points covering a volume of at least 30x30x30mm, was performed around the highest E-field value to determine the averaged SAR value. Drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan.

4.6.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.

The interpolation, extrapolation and maximum search routines within DASY5 are all based on the modified Quadratic Shepard's method (Robert J. Renka, Multivariate Interpolation of Large Sets of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).

The interpolation scheme combines a least-square fitted function method with a weighted average method. A triradiate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighboring points by a least-square method. For the zoom scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.

In the zoom scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

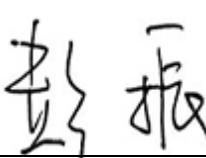
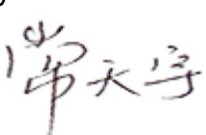
5 RESULT SUMMAR

The maximum reported SAR values for Head configuration and Body Worn configuration are given as follows. The device conforms to the requirements of the standard(s) when the maximum reported SAR value is less than or equal to the limit.

Exposure Position	Frequency Band	1g-SAR Result(W/kg)	Highest 1g-SAR Result(W/kg)	Limit (W/kg)/1g	Result
Head	GSM 850	1.07	1.24		
	GSM 1900	0.70			
	WCDMA Band 2	0.09			
	WCDMA Band 4	0.66			
	WCDMA Band 5	0.98			
	LTE Band 2	0.09			
	LTE Band 4	0.98			
	LTE Band 5	0.96			
	LTE Band 7	0.12			
	LTE Band 12	0.16			
	LTE Band 66	1.24			
	WLAN 2.4GHz Band	0.32			
Body-Worn (10mm Gap)	GSM 850	0.22	0.79	1.31	1.6 pass
	GSM 1900	0.65			
	WCDMA Band 2	0.68			
	WCDMA Band 4	0.14			
	WCDMA Band 5	0.23			
	LTE Band 2	0.64			
	LTE Band 4	0.31			
	LTE Band 5	0.26			
	LTE Band 7	0.58			
	LTE Band 12	0.36			
	LTE Band 66	0.79			
	WLAN 2.4GHz Band	0.16			
Hotspot (10mm Gap)	GSM 850	0.22	1.31		
	GSM 1900	1.14			
	WCDMA Band 2	1.12			
	WCDMA Band 4	0.18			
	WCDMA Band 5	0.23			
	LTE Band 2	1.31			
	LTE Band 4	0.88			
	LTE Band 5	0.26			
	LTE Band 7	0.75			
	LTE Band 12	0.40			
	LTE Band 66	0.35			
	WLAN 2.4GHz Band	0.16			

Simultaneous Transmission Summary

Exposure Position	Frequency Band	1g-SAR Result(W/kg)	Highest 1g-SAR Result(W/kg)	Limit (W/kg)/1g	Result
Head	GSM & Wi-Fi	1.38	1.55	1.6	pass
	WCDMA & Wi-Fi	1.29			
	LTE & Wi-Fi	1.55			
	GSM & Bluetooth	1.21			
	WCDMA & Bluetooth	1.12			
	LTE & Bluetooth	1.39			
Body-Worn (10mm Gap)	GSM & Wi-Fi	0.81	0.84	1.6	pass
	WCDMA & Wi-Fi	0.84			
	LTE & Wi-Fi	0.80			
	GSM & Bluetooth	0.73			
	WCDMA & Bluetooth	0.75			
	LTE & Bluetooth	0.86			
hotspot (10mm Gap)	GSM & Wi-Fi(2.4G/5G)	1.14	1.31	1.6	pass
	WCDMA & Wi-Fi(2.4G/5G)	1.12			
	LTE & Wi-Fi(2.4G/5G)	1.31			

This Test Report Is Issued by: Mr. Peng Zhen 	Checked by: Mr. Li Bin 
Tested by: Mr. Chang Tianyu 	Issued date: 20190307

6 TEST RESULT

C6.1 Manufacturing Tolerance

GSM

GSM 850			
Channel	Channel 128	Channel 189	Channel 251
Tolerance (dBm)	28.5~32.5	28.5~32.5	28.5~32.5
GSM 1900			
Channel	Channel 512	Channel 661	Channel 810
Tolerance (dBm)	25.5~29.5	25.5~29.5	25.5~29.5

GSM 850 GPRS

Channel		128	189	251
1 Txslot	Tolerance (dBm)	28.5~32.5	28.5~32.5	28.5~32.5
2 Txslot	Tolerance (dBm)	27.0~31.0	27.0~31.0	27.0~31.0
3 Txslot	Tolerance (dBm)	25.5~29.5	25.5~29.5	25.5~29.5
4 Txslot	Tolerance (dBm)	23.5~27.5	23.5~27.5	23.5~27.5

GSM 850 EGPRS(GMSK)

Channel		128	189	251
1 Txslot	Tolerance (dBm)	28.5~32.5	28.5~32.5	28.5~32.5
2 Txslot	Tolerance (dBm)	27.0~31.0	27.0~31.0	27.0~31.0
3 Txslot	Tolerance (dBm)	25.5~29.5	25.5~29.5	25.5~29.5
4 Txslot	Tolerance (dBm)	23.5~27.5	23.5~27.5	23.5~27.5

GSM 850 EGPRS(8DPSK)

Channel		128	189	251
1 Txslot	Tolerance (dBm)	22.5~26.5	22.5~26.5	22.5~26.5
2 Txslot	Tolerance (dBm)	21.5~25.5	21.5~25.5	21.5~25.5
3 Txslot	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
4 Txslot	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0

GSM 1900 GPRS

Channel		512	661	810
1 Txslot	Tolerance (dBm)	25.5~29.5	25.5~29.5	25.5~29.5
2 Txslot	Tolerance (dBm)	24.0~28.0	24.0~28.0	24.0~28.0
3 Txslot	Tolerance (dBm)	22.0~26.0	22.0~26.0	22.0~26.0
4 Txslot	Tolerance (dBm)	21.0~25.0	21.0~25.0	21.0~25.0

GSM 1900 EGPRS(GMSK)

Channel		512	661	810
1 Txslot	Tolerance (dBm)	25.5~29.5	25.5~29.5	25.5~29.5
2 Txslot	Tolerance (dBm)	24.0~28.0	24.0~28.0	24.0~28.0
3 Txslot	Tolerance (dBm)	22.0~26.0	22.0~26.0	22.0~26.0
4 Txslot	Tolerance (dBm)	21.0~25.0	21.0~25.0	21.0~25.0

GSM 1900 EGPRS(8DPSK)				
Channel		512	661	810
1 Txslot	Tolerance (dBm)	21.0~25.0	21.0~25.0	21.0~25.0
2 Txslot	Tolerance (dBm)	20.0~24.0	20.0~24.0	20.0~24.0
3 Txslot	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
4 Txslot	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0

WCDMA

WCDMA Band2			
Channel	9262	9400	9538
Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
WCDMA Band4			
Channel	1312	1412	1513
Tolerance (dBm)	19.0~23.0	19.0~23.0	19.0~23.0
WCDMA Band5			
Channel	4132	4183	4233
Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5

HSDPA Band2

Channel		9262	9400	9538
Sub test 1	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
Sub test 2	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
Sub test 3	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
Sub test 4	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
HSDPA Band4				
Channel		1312	1412	1513
Sub test 1	Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5
Sub test 2	Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5
Sub test 3	Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5
Sub test 4	Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5
HSDPA Band5				
Channel		4132	4183	4233
Sub test 1	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
Sub test 2	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
Sub test 3	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
Sub test 4	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5

HSUPA Band2				
Channel		9262	9400	9538
Sub test 1	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
Sub test 2	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
Sub test 3	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
Sub test 4	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
Sub test 5	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
HSPA+ Band2				
Channel		9262	9400	9538
Sub test 1	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0

HSUPA Band4				
Channel		1312	1412	1513
Sub test 1	Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5
Sub test 2	Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5
Sub test 3	Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5
Sub test 4	Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5
Sub test 5	Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5
HSPA+ Band4				
Channel		1312	1412	1513
Sub test 1	Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5

HSUPA Band5				
Channel		4132	4183	4233
Sub test 1	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
Sub test 2	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
Sub test 3	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
Sub test 4	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
Sub test 5	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
HSPA+ Band5				
Channel		4132	4183	4233
Sub test 1	Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5

LTE

Band 2 QPSK

20BW 100%RB			
Channel	Channel 19300	Channel 19575	Channel 19850
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5
20BW 50%RB			
Channel	Channel 19300	Channel 19575	Channel 19850
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5
20BW 1RB			
Channel	Channel 19300	Channel 19575	Channel 19850
Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5

16QAM

20BW 100%RB			
Channel	Channel 19300	Channel 19575	Channel 19850
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5
20BW 50%RB			
Channel	Channel 19300	Channel 19575	Channel 19850
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5
20BW 1RB			
Channel	Channel 19300	Channel 19575	Channel 19850
Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5

64QAM

20BW 100%RB			
Channel	Channel 19300	Channel 19575	Channel 19850
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5
20BW 50%RB			
Channel	Channel 19300	Channel 19575	Channel 19850
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5
20BW 1RB			
Channel	Channel 19300	Channel 19575	Channel 19850
Tolerance (dBm)	18.5~22.5	18.5~22.5	18.5~22.5

Band 4
QPSK

20BW 100%RB			
Channel	Channel 20050	Channel 20175	Channel 20300
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 50%RB			
Channel	Channel 20050	Channel 20175	Channel 20300
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 1RB			
Channel	Channel 20050	Channel 20175	Channel 20300
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5

16QAM

20BW 100%RB			
Channel	Channel 20050	Channel 20175	Channel 20300
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 50%RB			
Channel	Channel 20050	Channel 20175	Channel 20300
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 1RB			
Channel	Channel 20050	Channel 20175	Channel 20300
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5

64QAM

20BW 100%RB			
Channel	Channel 20050	Channel 20175	Channel 20300
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 50%RB			
Channel	Channel 20050	Channel 20175	Channel 20300
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 1RB			
Channel	Channel 20050	Channel 20175	Channel 20300
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5

Band 5
QPSK

10BW 100%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
10BW 50%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
10BW 1RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	20.5~24.5	20.5~24.5	20.5~24.5

16QAM

10BW 100%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
10BW 50%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
10BW 1RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	20.5~24.5	20.5~24.5	20.5~24.5

64QAM

10BW 100%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
10BW 50%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	19.5~23.5	19.5~23.5	19.5~23.5
10BW 1RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	20.5~24.5	20.5~24.5	20.5~24.5

Band 7

QPSK

20BW 100%RB			
Channel	Channel 20850	Channel 21100	Channel 21350
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
20BW 50%RB			
Channel	Channel 20850	Channel 21100	Channel 21350
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
20BW 1RB			
Channel	Channel 20850	Channel 21100	Channel 21350
Tolerance (dBm)	19.0~23.0	19.0~23.0	19.0~23.0

16QAM

20BW 100%RB			
Channel	Channel 20850	Channel 21100	Channel 21350
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
20BW 50%RB			
Channel	Channel 20850	Channel 21100	Channel 21350
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
20BW 1RB			
Channel	Channel 20850	Channel 21100	Channel 21350
Tolerance (dBm)	19.0~23.0	19.0~23.0	19.0~23.0

64QAM

20BW 100%RB			
Channel	Channel 20850	Channel 21100	Channel 21350
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
20BW 50%RB			
Channel	Channel 20850	Channel 21100	Channel 21350
Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
20BW 1RB			
Channel	Channel 20850	Channel 21100	Channel 21350
Tolerance (dBm)	19.0~23.0	19.0~23.0	19.0~23.0

Band 12
QPSK

10BW 100%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	20.0~24.0	20.0~24.0	20.0~24.0
10BW 50%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	20.0~24.0	20.0~24.0	20.0~24.0
10BW 1RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	21.0~25.0	21.0~25.0	21.0~25.0

16QAM

10BW 100%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	20.0~24.0	20.0~24.0	20.0~24.0
10BW 50%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	20.0~24.0	20.0~24.0	20.0~24.0
10BW 1RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	21.0~25.0	21.0~25.0	21.0~25.0

64QAM

10BW 100%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	20.0~24.0	20.0~24.0	20.0~24.0
10BW 50%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	20.0~24.0	20.0~24.0	20.0~24.0
10BW 1RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	21.0~25.0	21.0~25.0	21.0~25.0

Band 66
QPSK

20BW 100%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 50%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 1RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5

16QAM

20BW 100%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 50%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 1RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5

64QAM

20BW 100%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 50%RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	16.5~20.5	16.5~20.5	16.5~20.5
20BW 1RB			
Channel	Channel	Channel	Channel
Tolerance (dBm)	17.5~21.5	17.5~21.5	17.5~21.5

Note: SRTC check the power for QPSK, 16QAM and 64 QAM, although the power for 16QAM and 64 QAM are smaller than QPSK, they all in the tune-up tolerance so that they can use the same tune up power tolerance.

Bluetooth

GFSK			
Channel	0	39	78
Tolerance (dBm)	1.5~5.5	1.5~5.5	1.5~5.5
$\pi/4$ DQPSK			
Channel	0	39	78
Tolerance (dBm)	-1.5~3.5	-1.5~3.5	-1.5~3.5
8DPSK			
Channel	0	39	78
Tolerance (dBm)	-1.5~3.5	-1.5~3.5	-1.5~3.5

Bluetooth (BLE)

GFSK			
Channel	0	19	39
Tolerance (dBm)	-6.0~-2.0	-6.0~-2.0	-6.0~-2.0

Wi-Fi (2.4GHz)

802.11b			
Channel	1	6	11
Tolerance (dBm)	8.5~12.5	8.5~12.5	8.5~12.5
802.11g			
Channel	1	6	11
Tolerance (dBm)	6.0~10.0	6.0~10.0	6.0~10.0
802.11n HT20			
Channel	1	6	11
Tolerance (dBm)	4.0~8.0	4.0~8.0	4.0~8.0

6.2 GSM Measurement result

GSM Measured Power

Mode	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
Measured Power(dBm)	32.19	32.26	32.20	28.98	29.14	28.9

GSM Frame Average Power

Mode	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
Frame Average Power (dBm)	23.16	23.23	23.17	19.95	20.11	19.87

GPRS Measured Power

Mode	GPRS850			GPRS1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	32.20	32.28	32.21	29.01	29.18	28.94
3Downlink2uplinkPower(dBm)	30.68	30.72	30.75	27.74	27.46	27.12
2Downlink3uplinkPower(dBm)	28.82	28.94	28.92	25.98	25.53	25.34
1Downlink4uplinkPower(dBm)	27.34	27.32	27.46	24.67	24.55	24.18

GPRS Frame Average Power

Mode	GPRS850			GPRS1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	23.17	23.25	23.18	19.98	20.15	19.91
3Downlink2uplinkPower(dBm)	24.66	24.70	24.73	21.72	21.44	21.10
2Downlink3uplinkPower(dBm)	24.56	24.68	24.66	21.72	21.27	21.08
1Downlink4uplinkPower(dBm)	24.33	24.31	24.45	21.66	21.54	21.17

Division Factors (for Measured Power and Frame Average Power):

To average the power, the division factor is as follows:

1TX-slot (4Downlink1uplink) = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots(3Downlink2uplink) = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots (2Downlink3uplink) = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots (1Downlink4uplink) = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with **2Txslots** (3Downlink2uplink) for GPRS.

EGPRS Measured Power

Mode	EGPRS850(GMSK)			EGPRS1900(GMSK)		
	EGPRS850 (8PSK)			EGPRS1900 (8PSK)		
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	32.17	32.26	32.21	28.92	29.12	28.98
	26.48	26.16	26.35	24.80	24.23	24.12
3Downlink2uplinkPower(dBm)	30.65	30.69	30.7	27.75	27.43	27.15
	25.07	25.12	25.14	23.78	23.25	22.98
2Downlink3uplinkPower(dBm)	29.07	29.12	28.97	25.98	25.48	25.52
	23.48	23.45	23.36	21.86	21.45	21.05
1Downlink4uplinkPower(dBm)	27.32	27.4	27.38	24.56	24.53	24.12
	21.78	21.82	21.65	20.92	20.48	20.14

EGPRS Frame Average Power

Mode	EGPRS850(GMSK)			EGPRS1900(GMSK)		
	EGPRS850 (8PSK)			EGPRS1900 (8PSK)		
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	23.14	23.23	23.18	19.89	20.09	19.95
	17.45	17.13	17.32	15.77	15.20	15.09
3Downlink2uplinkPower(dBm)	24.63	24.67	24.68	21.73	21.41	21.13
	19.05	19.10	19.12	17.76	17.23	16.96
2Downlink3uplinkPower(dBm)	24.81	24.86	24.71	21.72	21.22	21.26
	19.22	19.19	19.10	17.60	17.19	16.79
1Downlink4uplinkPower(dBm)	24.31	24.39	24.37	21.55	21.52	21.11
	18.77	18.81	18.64	17.91	17.47	17.13

Division Factors (for Measured Power and Averaged Power):

To average the power, the division factor is as follows:

1TX-slot (4Downlink1uplink) = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots(3Downlink2uplink) = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots (2Downlink3uplink) = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots (1Downlink4uplink) = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with **4Txslots (1Downlink4uplink)** for EGPRS (GMSK).

6.3 WCDMA Measurement result

The following procedures are according to FCC KDB Publication 941225 D01.

Release 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

Measured Results

Mode	Band II			Band IV		
	Channel	9262	9400	9538	1312	1412
Frequency (MHz)	1852.4	1880	1907.6	1712.4	1732.4	1752.6
RB test mode1+64kRMC(dBm)	20.71	20.53	20.60	22.40	22.21	22.18
RB test mode1+12.2kRMC(dBm)	20.74	20.66	20.68	22.42	22.25	22.21
RB test mode1+144kRMC(dBm)	20.68	20.47	20.63	22.39	22.17	22.15
RB test mode1+384kRMC(dBm)	20.70	20.65	20.58	22.38	22.22	22.16

Mode	Band V			
	Channel	4132	4183	4233
Frequency(MHz)	826.4	836.4	846.6	
RB test mode1+64kRMC(dBm)	23.40	23.39	23.37	
RB test mode1+12.2kRMC(dBm)	23.45	23.42	23.39	
RB test mode1+144kRMC(dBm)	23.39	23.37	23.30	
RB test mode1+384kRMC(dBm)	23.41	23.40	23.36	

HSDPA

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	CM(dB) ⁽²⁾
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 ⁽³⁾	15/15 ⁽³⁾	64	12/15 ⁽³⁾	24/15	1.0
3	15/15	8/15	64	15/18	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI}=8 \Leftrightarrow A_{hs}=\beta_{hs}/\beta_c=30/15 \Leftrightarrow \beta_{hs}=30/15 * \beta_c$.

Note2: CM=1 for $\beta_c/\beta_d=12/15$, $\beta_{hs}/\beta_c=24/15$.

Note3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC(TF1,TF1) to $\beta_c=11/15$ and $\beta_d=15/15$.

Measured Results

Mode	HSDPA Band II			HSDPA Band IV		
Channel	9262	9400	9538	1312	1412	1513
Frequency (MHz)	1852.4	1880	1907.6	1712.6	1740.0	1752.4
sub-test1(dBm)	20.74	20.66	20.65	22.41	22.24	22.23
sub-test2(dBm)	20.64	20.63	20.65	22.36	22.21	22.22
sub-test3(dBm)	20.66	20.62	20.63	22.35	22.22	22.21
sub-test4(dBm)	20.64	20.62	20.65	22.34	22.21	22.21

Mode	HSDPA Band V		
Channel	4132	4183	4233
Frequency(MHz)	826.4	836.4	846.6
sub-test1(dBm)	23.43	23.38	23.37
sub-test2(dBm)	23.36	23.36	23.33
sub-test3(dBm)	23.33	23.35	23.36
sub-test4(dBm)	23.32	23.34	23.36

HSUPA

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121.

Sub-test	β_c	β_d	β_d (S F)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (S F)	β_{ed} (code s)	CM (2) (d B)	MP R (d B)	AG(4) Inde x	E-TF CI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/25	1039/25	4	1	1.0	2.0	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	$\beta_{ed1}:47/15$ $\beta_{ed2}:47/15$	4	2	2.0	2.0	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	2.0	21	81

Note1: $\Delta ACK, \Delta NACK$ and $\Delta CQI = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note2: CM=1 for $\beta_c/\beta_d = 12/15, \beta_{hs}/\beta_c = 24/15$. For all other combinations of

DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note3: 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 $\beta_d=15/15$.

Note4: 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 $\beta_d=15/15$.

NOTE5: Testing UE using E-DPDCH Physical layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

NOTE6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Measured Results

Mode	HSUPA Band II			HSUPA Band IV		
Channel	9262	9400	9538	1312	1412	1513
Frequency (MHz)	1852.4	1880	1907.6	1712.6	1740.0	1752.4
sub-test1(dBm)	20.63	20.62	20.63	22.34	22.22	22.24
sub-test2(dBm)	20.61	20.64	20.65	22.31	22.23	22.21
sub-test3(dBm)	20.62	20.61	20.63	22.36	22.23	22.21
sub-test4(dBm)	20.64	20.64	20.64	22.32	22.21	22.21
sub-test5(dBm)	20.65	20.63	20.62	22.35	22.23	22.21

Mode	HSUPA Band V		
Channel	4132	4183	4233
Frequency (MHz)	826.4	836.4	846.6
sub-test1(dBm)	23.35	23.33	23.35
sub-test2(dBm)	23.37	23.33	23.32
sub-test3(dBm)	23.35	23.34	23.33
sub-test4(dBm)	23.37	23.34	23.35
sub-test5(dBm)	23.33	23.32	23.36

Mode	HSPA+ Band II	
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1852.4	9262	20.62
1880.0	9400	20.61
1907.6	9538	20.64

Mode	HSPA+ Band IV	
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
1712.4	1312	22.39
1732.4	1412	22.22
1752.6	1513	22.21

Mode	HSPA+ Band V	
Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
826.4	4132	23.32
836.6	4183	23.33
846.6	4233	23.34

Note: UMTS SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

6.4 LTE Measurement result

LTE Band2

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1850.7	18607	1.4	1	0	21.9	
				1	5	21.9	
				3	2	22.1	
				6	0	21.1	
	1880	18900		1	0	22.1	
				1	5	22.1	
				3	2	22.1	
				6	0	21.3	
	1909.3	19193		1	0	22.2	
				1	5	22.2	
				3	2	22.3	
				6	0	21.3	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	1850.7	18607	1.4	1	0	20.6	
				1	5	20.6	
				3	2	20.8	
				6	0	19.8	
	1880	18900		1	0	20.8	
				1	5	20.8	
				3	2	21.5	
				6	0	20.1	
	1909.3	19193		1	0	20.7	
				1	5	20.7	
				3	2	21.0	
				6	0	19.9	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	1850.7	18607	1.4	1	0	20.5	
				1	5	20.5	
				3	2	21.0	
				6	0	19.8	
	1880	18900		1	0	20.9	
				1	5	20.9	
				3	2	21.1	
				6	0	19.9	
	1909.3	19193		1	0	20.9	
				1	5	20.9	
				3	2	21.1	
				6	0	20.1	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1851.5	18615	3	1	0	21.9	
				1	14	21.9	
				8	4	21.0	
				15	0	20.8	
	1880	18900		1	0	22.0	
				1	14	22.0	
				8	4	21.1	
				15	0	21.0	
	1908.5	19185		1	0	22.1	
				1	14	22.1	
				8	4	21.2	
				15	0	21.1	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	1851.5	18615	3	1	0	20.4	
				1	14	20.4	
				8	4	19.9	
				15	0	19.8	
	1880	18900		1	0	20.9	
				1	14	20.9	
				8	4	20.0	
				15	0	20.1	
	1908.5	19185		1	0	20.7	
				1	14	20.7	
				8	4	20.0	
				15	0	20.0	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	1851.5	18615	3	1	0	20.4	
				1	14	20.4	
				8	4	19.6	
				15	0	20.1	
	1880	18900		1	0	20.8	
				1	14	20.8	
				8	4	19.9	
				15	0	19.8	
	1908.5	19185		1	0	20.9	
				1	14	20.9	
				8	4	20.0	
				15	0	20.0	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1852.5	18625	5	1	0	21.8	
				1	24	21.8	
				12	6	20.8	
				25	0	20.8	
	1880	18900		1	0	21.8	
				1	24	21.8	
				12	6	21.0	
				25	0	21.0	
	1907.5	19175		1	0	22.1	
				1	24	22.1	
				12	6	21.1	
				25	0	21.1	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	1852.5	18625	5	1	0	20.2	
				1	24	20.2	
				12	6	19.7	
				25	0	19.8	
	1880	18900		1	0	20.3	
				1	24	20.3	
				12	6	19.9	
				25	0	20.1	
	1907.5	19175		1	0	20.5	
				1	24	20.5	
				12	6	20.0	
				25	0	20.0	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	1852.5	18625	5	1	0	20.5	
				1	24	20.5	
				12	6	19.6	
				25	0	19.7	
	1880	18900		1	0	20.6	
				1	24	20.6	
				12	6	20.0	
				25	0	20.1	
	1907.5	19175		1	0	20.6	
				1	24	20.6	
				12	6	20.1	
				25	0	20.1	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1855	18650	10	1	0	21.9	
				1	49	21.9	
				24	12	20.9	
				50	0	20.8	
				1	0	22.0	
	1880	18900		1	49	22.0	
				24	12	21.1	
				50	0	21.0	
				1	0	22.1	
				1	49	22.1	
16QAM	1905	19150		24	12	21.1	
				50	0	21.1	
				1	0	20.2	
				1	49	20.2	
				24	12	20.0	
	1855	18650		50	0	19.8	
				1	0	20.6	
				1	49	20.6	
				24	12	20.1	
				50	0	20.1	
64QAM	1905	19150		1	0	20.6	
				1	49	20.6	
				24	12	20.1	
				50	0	19.9	
				1	0	20.5	
	1855	18650		1	49	20.5	
				24	12	20.0	
				50	0	19.8	
				1	0	20.4	
				1	49	20.4	
64QAM	1880	18900		24	12	20.0	
				50	0	20.0	
				1	0	20.3	
				1	49	20.3	
				24	12	20.0	
	1905	19150		50	0	20.1	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1857.5	18675	15	1	0	22.0	
				1	74	22.0	
				40	18	21.0	
				75	0	20.8	
	1880	18900		1	0	22.1	
				1	74	22.1	
				40	18	21.1	
				75	0	21.0	
	1902.5	19125		1	0	22.1	
				1	74	22.1	
				40	18	21.2	
				75	0	21.0	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	1857.5	18675	15	1	0	20.2	
				1	74	20.2	
				40	18	19.7	
				75	0	19.8	
	1880	18900		1	0	20.3	
				1	74	20.3	
				40	18	20.1	
				75	0	20.0	
	1902.5	19125		1	0	20.7	
				1	74	20.7	
				40	18	20.0	
				75	0	20.0	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	1857.5	18675	15	1	0	20.2	
				1	74	20.2	
				40	18	19.9	
				75	0	19.8	
	1880	18900		1	0	20.4	
				1	74	20.4	
				40	18	20.2	
				75	0	20.0	
	1902.5	19125		1	0	20.1	
				1	74	20.1	
				40	18	19.9	
				75	0	19.9	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1860	18700	20	1	0	22.0	
				1	99	22.0	
				50	25	21.1	
				100	0	21.0	
				1	0	22.3	
	1880	18900		1	99	22.3	
				50	25	21.2	
				100	0	21.0	
				1	0	22.2	
				1	99	22.2	
16QAM	1860	18700	20	50	25	21.1	
				100	0	21.1	
				1	0	20.8	
				1	99	20.6	
				50	25	20.0	
	1880	18900		100	0	19.9	
				1	0	20.6	
				1	99	20.8	
				50	25	20.0	
				100	0	20.0	
64QAM	1860	18700	20	1	0	20.7	
				1	99	20.6	
				50	25	20.2	
				100	0	19.1	
				1	0	20.2	
	1880	18900		1	99	20.8	
				50	25	19.9	
				100	0	19.9	
				1	0	20.5	
				1	99	20.5	
	1900	19100		50	25	20.1	
				100	0	19.9	
				1	0	20.2	
				1	99	20.4	
				50	25	20.0	

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Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1710.7	19957	1.4	1	0	21.0	
				1	5	21.0	
				3	2	21.0	
				6	0	20.1	
	1732.5	20175		1	0	20.9	
				1	5	20.9	
				3	2	20.9	
				6	0	19.9	
	1754.3	20393		1	0	20.8	
				1	5	20.7	
				3	2	20.8	
				6	0	19.8	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	1710.7	19957	1.4	1	0	19.8	
				1	5	19.8	
				3	2	20.0	
				6	0	19.1	
	1732.5	20175		1	0	19.7	
				1	5	19.7	
				3	2	19.9	
				6	0	19.0	
	1754.3	20393		1	0	19.6	
				1	5	19.3	
				3	2	19.7	
				6	0	18.6	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	1710.7	19957	1.4	1	0	19.6	
				1	5	19.6	
				3	2	20.1	
				6	0	19.4	
	1732.5	20175		1	0	19.6	
				1	5	19.5	
				3	2	20.1	
				6	0	19.3	
	1754.3	20393		1	0	19.5	
				1	5	19.3	
				3	2	19.9	
				6	0	19.0	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1711.5	19965	3	1	0	21.0	
				1	14	21.1	
				8	4	20.1	
				15	0	20.1	
	1732.5	20175		1	0	21.1	
				1	14	20.9	
				8	4	20.1	
				15	0	20.2	
	1753.5	20385		1	0	20.7	
				1	14	20.6	
				8	4	19.8	
				15	0	19.8	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	1711.5	19965	3	1	0	19.4	
				1	14	19.6	
				8	4	19.1	
				15	0	19.1	
	1732.5	20175		1	0	19.8	
				1	14	19.2	
				8	4	19.2	
				15	0	18.9	
	1753.5	20385		1	0	19.2	
				1	14	19.1	
				8	4	18.7	
				15	0	18.7	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	1711.5	19965	3	1	0	19.7	
				1	14	19.7	
				8	4	19.0	
				15	0	19.1	
	1732.5	20175		1	0	19.9	
				1	14	19.9	
				8	4	19.1	
				15	0	19.2	
	1753.5	20385		1	0	19.3	
				1	14	19.1	
				8	4	18.5	
				15	0	18.7	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1712.5	19975	5	1	0	20.9	
				1	24	21.0	
				12	6	20.0	
				25	0	20.0	
	1732.5	20175		1	0	20.8	
				1	24	20.7	
				12	6	20.0	
				25	0	20.0	
	1752.5	20375		1	0	20.9	
				1	24	21.0	
				12	6	20.0	
				25	0	20.0	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	1712.5	19975	5	1	0	19.3	
				1	24	19.6	
				12	6	18.9	
				25	0	19.0	
	1732.5	20175		1	0	19.4	
				1	24	19.5	
				12	6	19.2	
				25	0	19.0	
	1752.5	20375		1	0	19.4	
				1	24	19.2	
				12	6	18.8	
				25	0	19.0	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	1712.5	19975	5	1	0	19.7	
				1	24	19.7	
				12	6	18.8	
				25	0	18.9	
	1732.5	20175		1	0	19.4	
				1	24	19.3	
				12	6	19.1	
				25	0	19.0	
	1752.5	20375		1	0	19.1	
				1	24	19.2	
				12	6	18.6	
				25	0	18.8	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1715	20000	10	1	0	21.0	
				1	49	21.0	
				24	12	20.2	
				50	0	20.1	
	1732.5	20175		1	0	21.0	
				1	49	20.7	
				24	12	20.0	
				50	0	19.9	
	1750	20350		1	0	20.9	
				1	49	20.9	
				24	12	20.0	
				50	0	20.0	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	1715	20000	10	1	0	19.7	
				1	49	19.7	
				24	12	19.0	
				50	0	19.1	
	1732.5	20175		1	0	19.7	
				1	49	19.4	
				24	12	19.0	
				50	0	19.0	
	1750	20350		1	0	19.3	
				1	49	19.5	
				24	12	19.0	
				50	0	19.0	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	1715	20000	10	1	0	19.6	
				1	49	19.7	
				24	12	19.2	
				50	0	19.3	
	1732.5	20175		1	0	19.5	
				1	49	19.0	
				24	12	19.1	
				50	0	19.0	
	1750	20350		1	0	19.0	
				1	49	19.4	
				24	12	19.2	
				50	0	19.0	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1717.5	20025	15	1	0	21.0	
				1	74	21.0	
				40	18	20.2	
				75	0	20.2	
				1	0	21.1	
	1732.5	20175		1	74	20.8	
				40	18	20.1	
				75	0	20.0	
				1	0	20.8	
				1	74	20.8	
16QAM	1717.5	20025	15	40	18	20.0	
				75	0	19.9	
				1	0	19.8	
				1	74	19.8	
				40	18	19.1	
	1732.5	20175		75	0	19.3	
				1	0	19.8	
				1	74	19.4	
				40	18	19.1	
				75	0	19.0	
64QAM	1717.5	20025	15	1	0	19.6	
				1	74	19.5	
				40	18	19.0	
				75	0	19.0	
				1	0	19.8	
	1732.5	20175		1	74	19.7	
				40	18	19.1	
				75	0	19.4	
				1	0	19.7	
				1	74	19.3	
1747.5	1747.5	20325		40	18	19.1	
				75	0	19.0	
				1	0	19.6	
				1	74	19.5	
				40	18	19.0	
				75	0	19.0	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1720	20050	20	1	0	21.0	
				1	99	21.0	
				50	25	20.2	
				100	0	20.1	
				1	0	21.4	
	1732.5	20175		1	99	21.4	
				50	25	20.2	
				100	0	20.1	
				1	0	21.2	
				1	99	21.2	
16QAM	1720	20050	20	50	25	20.2	
				100	0	20.0	
				1	0	19.6	
				1	99	19.8	
				50	25	19.1	
	1732.5	20175		100	0	19.3	
				1	0	19.4	
				1	99	18.9	
				50	25	19.0	
				100	0	19.0	
64QAM	1720	20050	20	1	0	19.6	
				1	99	19.5	
				50	25	19.0	
				100	0	19.1	
				1	0	19.6	
	1732.5	20175		1	99	18.8	
				50	25	19.0	
				100	0	19.1	
				1	0	19.6	
				1	99	19.5	
	1745	20300		50	25	19.1	
				100	0	18.9	

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Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	824.7	20407	1.4	1	0	24.0	
				1	5	24.0	
				3	2	24.0	
				6	0	23.0	
				1	0	24.0	
				1	5	23.9	
	836.5	20525		3	2	23.9	
				6	0	22.8	
				1	0	24.0	
				1	5	23.9	
				3	2	24.0	
				6	0	22.9	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	824.7	20407	1.4	1	0	22.6	
				1	5	22.5	
				3	2	22.9	
				6	0	21.8	
				1	0	22.1	
				1	5	22.5	
	836.5	20525		3	2	22.7	
				6	0	21.8	
				1	0	22.5	
				1	5	22.5	
				3	2	22.8	
				6	0	21.8	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	824.7	20407	1.4	1	0	22.4	
				1	5	22.6	
				3	2	23.0	
				6	0	22.2	
				1	0	22.3	
				1	5	22.2	
	836.5	20525		3	2	23.0	
				6	0	22.8	
				1	0	22.3	
				1	5	22.2	
				3	2	22.8	
				6	0	22.2	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	825.5	20415	3	1	0	24.0	
				1	14	24.0	
				8	4	24.0	
				15	0	23.1	
	836.5	20525		1	0	24.0	
				1	14	24.0	
				8	4	23.0	
				15	0	23.0	
	847.5	20635		1	0	23.9	
				1	14	24.0	
				8	4	23.0	
				15	0	23.0	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	825.5	20415	3	1	0	22.5	
				1	14	22.6	
				8	4	22.0	
				15	0	22.0	
	836.5	20525		1	0	22.4	
				1	14	22.3	
				8	4	22.0	
				15	0	21.9	
	847.5	20635		1	0	22.2	
				1	14	22.2	
				8	4	21.9	
				15	0	21.9	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	825.5	20415	3	1	0	22.5	
				1	14	22.7	
				8	4	22.0	
				15	0	22.0	
	836.5	20525		1	0	22.5	
				1	14	22.3	
				8	4	22.1	
				15	0	21.8	
	847.5	20635		1	0	22.2	
				1	14	22.2	
				8	4	21.9	
				15	0	21.8	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	826.5	20425	5	1	0	23.9	
				1	24	24.0	
				12	6	24.0	
				25	0	23.0	
				1	0	23.8	
	836.5	20525		1	24	23.9	
				12	6	23.9	
				25	0	23.0	
				1	0	23.9	
				1	24	24.0	
16QAM	846.5	20625	5	12	6	23.9	
				25	0	23.0	
				1	0	23.9	
				1	24	24.0	
				12	6	23.9	
	826.5	20425		25	0	22.4	
				1	24	22.6	
				12	6	21.8	
				25	0	21.7	
				1	0	22.1	
64QAM	836.5	20525	5	1	24	22.0	
				12	6	21.8	
				25	0	21.9	
				1	0	22.2	
				1	24	22.6	
	846.5	20625		12	6	21.7	
				25	0	21.8	
				1	0	22.2	
				1	24	22.6	
				12	6	21.7	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	829	20450	10	1	0	24.0	
				1	49	24.0	
				24	12	23.1	
				50	0	23.1	
				1	0	24.1	
	836.5	20525		1	49	24.1	
				24	12	23.2	
				50	0	23.0	
				1	0	24.1	
				1	49	24.1	
16QAM	844	20600		24	12	23.1	
				50	0	23.1	
				1	0	22.6	
				1	49	23.1	
				24	12	21.8	
	829	20450		50	0	22.2	
				1	0	22.6	
				1	49	22.7	
				24	12	22.1	
				50	0	22.1	
64QAM	844	20600		1	0	22.6	
				1	49	23.1	
				24	12	22.2	
				50	0	22.0	
				1	0	22.7	
	836.5	20525		1	49	22.6	
				24	12	22.1	
				50	0	22.2	
				1	0	22.7	
				1	49	22.9	
				24	12	22.2	
				50	0	22.0	
				1	0	22.4	
				1	49	22.7	
				24	12	21.9	
				50	0	22.1	

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Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	2502.5	20775	5	1	0	21.8	
				1	24	21.8	
				12	6	20.6	
				25	0	20.7	
	2535	21100		1	0	21.9	
				1	24	22.1	
				12	6	20.9	
				25	0	21.0	
	2567.5	21425		1	0	22.2	
				1	24	22.1	
				12	6	21.2	
				25	0	21.1	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	2502.5	20775	5	1	0	20.4	
				1	24	20.7	
				12	6	19.3	
				25	0	19.6	
	2535	21100		1	0	20.4	
				1	24	20.4	
				12	6	19.6	
				25	0	19.9	
	2567.5	21425		1	0	20.6	
				1	24	20.7	
				12	6	20.0	
				25	0	20.2	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	2502.5	20775	5	1	0	19.8	
				1	24	20.0	
				12	6	19.5	
				25	0	19.6	
	2535	21100		1	0	20.1	
				1	24	20.7	
				12	6	19.7	
				25	0	20.0	
	2567.5	21425		1	0	20.7	
				1	24	20.7	
				12	6	20.1	
				25	0	20.3	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	2505	20800	10	1	0	21.9	
				1	49	22.0	
				24	12	20.7	
				50	0	20.7	
				1	0	22.2	
	2535	21100		1	49	22.2	
				24	12	21.1	
				50	0	21.1	
				1	0	22.2	
				1	49	22.7	
16QAM	2505	20800	10	24	12	21.2	
				50	0	21.0	
				1	0	20.3	
				1	49	20.6	
				24	12	19.7	
	2535	21100		50	0	19.7	
				1	0	20.7	
				1	49	20.7	
				24	12	19.8	
				50	0	20.0	
64QAM	2505	20800	10	1	0	20.6	
				1	49	20.8	
				24	12	20.2	
				50	0	20.1	
				1	0	20.4	
	2535	21100		1	49	20.7	
				24	12	19.7	
				50	0	19.7	
				1	0	20.4	
				1	49	20.8	
	2565	21400		24	12	20.0	
				50	0	20.0	
				1	0	20.7	
				1	49	20.9	
				24	12	20.3	
				50	0	20.1	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	2507.5	20825	15	1	0	21.9	
				1	74	22.1	
				40	18	20.7	
				75	0	20.8	
	2535	21100		1	0	22.3	
				1	74	22.3	
				40	18	21.0	
				75	0	21.1	
	2562.5	21375		1	0	22.3	
				1	74	22.8	
				40	18	21.2	
				75	0	21.2	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	2507.5	20825	15	1	0	20.5	
				1	74	20.6	
				40	18	19.6	
				75	0	19.7	
	2535	21100		1	0	20.6	
				1	74	20.8	
				40	18	19.7	
				75	0	19.9	
	2562.5	21375		1	0	20.8	
				1	74	20.9	
				40	18	19.9	
				75	0	20.1	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	2507.5	20825	15	1	0	20.4	
				1	74	20.6	
				40	18	19.6	
				75	0	19.6	
	2535	21100		1	0	20.6	
				1	74	20.8	
				40	18	19.7	
				75	0	19.8	
	2562.5	21375		1	0	20.8	
				1	74	21.0	
				40	18	19.9	
				75	0	20.0	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	2510	20850	20	1	0	22.1	
				1	99	22.1	
				50	25	21.0	
				100	0	22.1	
	2535	21100		1	0	22.3	
				1	99	22.3	
				50	25	21.3	
				100	0	21.3	
	2560	21350		1	0	22.4	
				1	99	22.4	
				50	25	21.4	
				100	0	21.5	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	2510	20850	20	1	0	20.5	
				1	99	21.1	
				50	25	19.6	
				100	0	19.8	
	2535	21100		1	0	20.7	
				1	99	20.9	
				50	25	20.1	
				100	0	20.1	
	2560	21350		1	0	20.9	
				1	99	21.0	
				50	25	20.3	
				100	0	20.2	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	2510	20850	20	1	0	20.4	
				1	99	20.9	
				50	25	19.9	
				100	0	20.0	
	2535	21100		1	0	20.9	
				1	99	21.1	
				50	25	20.0	
				100	0	20.0	
	2560	21350		1	0	20.9	
				1	99	20.7	

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Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	699.7	23017	1.4	1	0	23.1	
				1	5	23.2	
				3	2	23.1	
				6	0	22.2	
				1	0	23.1	
				1	5	23.2	
	707.5	23095		3	2	23.1	
				6	0	22.2	
				1	0	23.1	
				1	5	23.2	
				3	2	23.1	
				6	0	22.2	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	699.7	23017	1.4	1	0	22.7	
				1	5	22.7	
				3	2	22.3	
				6	0	21.4	
				1	0	22.7	
				1	5	22.7	
	707.5	23095		3	2	22.3	
				6	0	21.4	
				1	0	22.7	
				1	5	22.7	
				3	2	22.3	
				6	0	21.4	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	699.7	23017	1.4	1	0	22.7	
				1	5	22.8	
				3	2	22.3	
				6	0	21.2	
				1	0	22.7	
				1	5	22.8	
	707.5	23095		3	2	22.3	
				6	0	21.2	
				1	0	22.7	
				1	5	22.8	
				3	2	22.3	
				6	0	21.2	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	700.5	23025	3	1	0	23.2	
				1	14	23.3	
				8	4	22.3	
				15	0	22.3	
	707.5	23095		1	0	23.2	
				1	14	23.3	
				8	4	22.3	
				15	0	22.3	
	714.5	23165		1	0	23.2	
				1	14	23.3	
				8	4	22.3	
				15	0	22.3	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	700.5	23025	3	1	0	22.7	
				1	14	22.8	
				8	4	21.4	
				15	0	21.3	
	707.5	23095		1	0	22.7	
				1	14	22.8	
				8	4	21.4	
				15	0	21.3	
	714.5	23165		1	0	22.7	
				1	14	22.8	
				8	4	21.4	
				15	0	21.3	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	700.5	23025	3	1	0	22.8	
				1	14	22.9	
				8	4	21.4	
				15	0	21.3	
	707.5	23095		1	0	22.8	
				1	14	22.9	
				8	4	21.4	
				15	0	21.3	
	714.5	23165		1	0	22.8	
				1	14	22.9	
				8	4	21.4	
				15	0	21.3	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	701.5	23035	5	1	0	23.2	
				1	24	23.3	
				12	6	22.3	
				25	0	22.3	
				1	0	23.2	
	707.5	23095		1	24	23.3	
				12	6	22.3	
				25	0	22.3	
				1	0	23.2	
				1	24	23.3	
16QAM	713.5	23155	5	12	6	22.3	
				25	0	22.3	
				1	0	23.2	
				1	24	23.3	
				12	6	22.3	
	701.5	23035		25	0	21.3	
				1	0	22.7	
				1	24	22.8	
				12	6	21.4	
				25	0	21.3	
64QAM	707.5	23095	5	1	0	22.7	
				1	24	22.8	
				12	6	21.4	
				25	0	21.3	
				1	0	22.7	
	713.5	23155		1	24	22.8	
				12	6	21.4	
				25	0	21.3	
				1	0	22.8	
				1	24	22.9	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	704	23060	10	1	0	23.5	
				1	49	23.5	
				24	12	22.3	
				50	0	22.3	
				1	0	23.5	
	707.5	23095		1	49	23.5	
				24	12	22.3	
				50	0	22.3	
				1	0	23.5	
				1	49	23.5	
16QAM	704	23060	10	24	12	22.3	
				50	0	22.3	
				1	0	22.8	
				1	49	22.9	
				24	12	21.2	
	707.5	23095		50	0	21.3	
				1	0	22.8	
				1	49	22.9	
				24	12	21.2	
				50	0	21.3	
64QAM	704	23060	10	1	0	22.8	
				1	49	23.0	
				24	12	21.2	
				50	0	21.2	
				1	0	22.8	
	707.5	23095		1	49	23.0	
				24	12	21.2	
				50	0	21.2	
				1	0	22.8	
				1	49	23.0	
	711	23130		24	12	21.2	
				50	0	21.2	

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Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1710.7	131979	1.4	1	0	20.7	
				1	5	20.7	
				3	2	20.8	
				6	0	19.9	
				1	0	20.6	
				1	5	20.5	
	1745	132322		3	2	20.6	
				6	0	19.6	
				1	0	20.2	
				1	5	20.2	
				3	2	20.3	
				6	0	19.4	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
16QAM	1710.7	131979	1.4	1	0	19.4	
				1	5	19.6	
				3	2	19.7	
				6	0	18.8	
				1	0	19.4	
				1	5	19.3	
	1745	132322		3	2	19.7	
				6	0	18.7	
				1	0	18.8	
				1	5	18.9	
				3	2	19.3	
				6	0	18.8	
Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
64QAM	1710.7	131979	1.4	1	0	19.4	
				1	5	19.5	
				3	2	19.7	
				6	0	18.6	
				1	0	19.4	
				1	5	19.2	
	1745	132322		3	2	19.7	
				6	0	18.8	
				1	0	18.8	
				1	5	18.7	
				3	2	19.3	
				6	0	18.7	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1711.5	131987	3	1	0	20.8	
				1	14	20.9	
				8	4	19.9	
				15	0	19.8	
				1	0	20.7	
	1745	132322		1	14	20.8	
				8	4	20.8	
				15	0	19.8	
				1	0	20.3	
				1	14	20.2	
16QAM	1778.5	132657		8	4	19.6	
				15	0	19.4	
				1	0	19.5	
				1	14	19.7	
				8	4	18.8	
	1711.5	131987		15	0	18.8	
				1	0	19.2	
				1	14	19.2	
				8	4	18.6	
				15	0	18.7	
64QAM	1745	132322		1	0	18.6	
				1	14	18.6	
				8	4	18.3	
				15	0	18.3	
				1	0	19.6	
	1778.5	132657		1	14	19.7	
				8	4	18.8	
				15	0	18.7	
				1	0	19.2	
				1	14	19.4	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1712.5	131997	5	1	0	19.7	
				1	24	19.7	
				12	6	19.8	
				25	0	19.8	
				1	0	19.5	
	1745	132322		1	24	19.6	
				12	6	19.7	
				25	0	19.7	
				1	0	19.3	
				1	24	19.9	
16QAM	1777.5	132647		12	6	19.4	
				25	0	19.3	
				1	0	19.3	
				1	24	19.6	
				12	6	18.6	
	1712.5	131997		25	0	18.7	
				1	0	19.2	
				1	24	19.1	
				12	6	18.5	
				25	0	18.6	
64QAM	1745	132322		1	0	18.7	
				1	24	18.6	
				12	6	18.3	
				25	0	18.3	
				1	0	19.4	
	1777.5	132647		1	24	19.6	
				12	6	18.6	
				25	0	18.5	
				1	0	19.2	
				1	24	19.1	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1715	132022	10	1	0	20.1	
				1	49	20.2	
				24	12	20.0	
				50	0	20.2	
				1	0	20.8	
	1745	132322		1	49	20.6	
				24	12	19.9	
				50	0	19.9	
				1	0	20.5	
				1	49	20.2	
16QAM	1715	132022	10	24	12	19.6	
				50	0	19.0	
				1	0	19.5	
				1	49	19.3	
				24	12	19.0	
	1745	132322		50	0	18.8	
				1	0	19.3	
				1	49	18.8	
				24	12	18.5	
				50	0	18.4	
64QAM	1715	132022	10	1	0	19.5	
				1	49	19.6	
				24	12	19.1	
				50	0	19.0	
				1	0	19.4	
	1745	132322		1	49	19.3	
				24	12	19.1	
				50	0	18.7	
				1	0	19.3	
				1	49	18.8	
	1775	132622		24	12	18.4	
				50	0	18.4	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1717.5	132047	15	1	0	21.0	
				1	74	21.0	
				40	18	20.2	
				75	0	21.0	
				1	0	20.7	
	1745	132322		1	74	20.6	
				40	18	19.8	
				75	0	19.9	
				1	0	20.5	
				1	74	20.1	
16QAM	1717.5	132047	15	40	18	19.4	
				75	0	19.6	
				1	18	19.2	
				75	0	19.0	
				1	0	19.4	
	1745	132322		1	74	19.3	
				40	18	19.2	
				75	0	18.6	
				1	0	19.3	
				1	74	18.8	
64QAM	1717.5	132047	15	40	18	18.4	
				75	0	18.5	
				1	0	19.5	
				1	74	19.6	
				40	18	19.1	
	1745	132322		75	0	19.0	
				1	0	19.5	
				1	74	19.3	
				40	18	19.2	
				75	0	18.7	
1772.5	1772.5	132597		1	0	19.3	
				1	74	18.7	
				40	18	18.4	
				75	0	18.4	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	
QPSK	1720	132072	20	1	0	21.1	
				1	99	21.1	
				50	25	20.3	
				100	0	20.2	
				1	0	21.0	
	1745	132322		1	99	21.0	
				50	25	20.0	
				100	0	19.8	
				1	0	20.7	
				1	99	20.7	
16QAM	1770	132572		50	25	19.8	
				100	0	19.7	
				1	0	20.7	
				1	99	20.7	
				50	25	19.8	
	1720	132072		100	0	19.0	
				1	0	19.5	
				1	99	19.6	
				50	25	19.0	
				100	0	19.0	
64QAM	1745	132322		1	0	19.5	
				1	99	19.1	
				50	25	18.8	
				100	0	18.6	
				1	0	19.3	
	1770	132572		1	99	19.4	
				50	25	18.8	
				100	0	18.6	
				1	0	19.3	
				1	99	19.4	

6.5 Bluetooth Measurement result

Modulation type	Test Result (dBm)		
	2402MHz (Ch0)	2441MHz (Ch39)	2480MHz (Ch78)
GFSK	5.07	5.32	4.73
$\pi/4$ DQPSK	3.36	3.23	2.46
8DPSK	3.26	2.25	2.24
GFSK(BLE)	2402MHz (Ch0)	2440MHz (Ch19)	2480MHz (Ch39)
	-2.92	-2.19	-2.98

6.6 Wi-Fi Measurement result

WIFI 2.4GHz

Modulation type	Average power output (dBm)		
	2412MHz	2437MHz	2462MHz
11b	12.48	11.96	12.44
11g	9.56	9.74	9.72
11n HT20	7.62	7.23	7.58

6.7 Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

According to the KDB447498 4.3.1 (1)

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f} (\text{GHz})] \leq 3.0$ for 1-g SAR, where

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

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

This is equivalent to $[(\text{max. power of channel, including tune-up tolerance, mW}) / (60 \cdot \sqrt{f(\text{GHz})} \text{ mW})] \cdot [20 \text{ mm} / (\text{min. test separation distance, mm})] \leq 1.0$ for 1-g SAR; also see Appendix A for approximate exclusion threshold values at selected frequencies and distances.

According to the KDB447498 appendix A

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	<i>SAR Test Exclusion Threshold (mW)</i>
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

Summary of Transmitters

Band/Mode	Position	Max. RF output power (mW)	SAR test exclusion Threshold (mW)	SAR Required
(2.4~2.4835) GHz Bluetooth	Head	3.40	10	No
	Body	3.40	19	No
(2.4~2.4835) GHz Wi-Fi	Head	17.70	10	Yes
	Body	17.70	19	Yes

6.8 RF exposure conditions

Refer to the follow picture "Antenna Locations & Separation Distances" for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.



Up antenna support: GSM850/1900

WCDMA IV/V

LTE 4/5/12/66

Down antenna support: GSM850/1900

WCDMA II/IV/V

LTE 2/4/5/7/12/66

6.8.1 Head Exposure Conditions

Up Antenna

For WWAN

Test Configurations	SAR Required	Note
Left Touch	yes	/
Left Tilt (15°)	yes	/
Right Touch	yes	/
Right Tilt (15°)	yes	/

For WLAN

Test Configurations	SAR Required	Note
Left Touch	yes	/
Left Tilt (15°)	yes	/
Right Touch	yes	/
Right Tilt (15°)	yes	/

Down Antenna

For WWAN

Test Configurations	SAR Required	Note
Left Touch	yes	/
Left Tilt (15°)	yes	/
Right Touch	yes	/
Right Tilt (15°)	yes	/

6.8.2 Body Exposure conditions

Up Antenna

For WWAN

Test Configurations	SAR Required	Note
Back	yes	/
Front	yes	/

For WLAN

Test Configurations	SAR Required	Note
Back	yes	/
Front	yes	/

Down Antenna

For WWAN

Test Configurations	SAR Required	Note
Back	yes	/
Front	yes	/

6.8.3 Hotspot Exposure conditions

Up Antenna

For WWAN

Test Configurations	Antenna-to-edge/surface	SAR Required
Back	<25 mm	Yes
Front	<25 mm	Yes
Top	<25 mm	Yes
Bottom	>25 mm	No
Right	<25 mm	Yes
Left	<25 mm	Yes

For WLAN

Test Configurations	Antenna-to-edge/surface	SAR Required
Back	<25 mm	Yes
Front	<25 mm	Yes
Top	<25 mm	Yes
Bottom	>25 mm	No
Left	>25 mm	No
Right	<25 mm	Yes

Down Antenna

For WWAN

Test Configurations	Antenna-to-edge/surface	SAR Required
Back	<25 mm	Yes
Front	<25 mm	Yes
Top	>25 mm	No
Bottom	<25 mm	Yes
Left	<25 mm	Yes
Right	<25 mm	Yes

Note: For hotspot mode, it's not necessary test Rear and Front position cause we already test the these position without hotspot mode in Body Exposure conditions, Normally if the hotspot mode opened, the technology "power reduction" used for mobile, so we consider the worst condition, and remain the data of body worn as hotspots mode.

6.9 System Checking

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system checking results (dielectric parameters and SAR values) are given in the table below.

Date Tested	System dipole	T.S. Liquid	SAR measured (normalized to 1W)		Target (Ref. Value)	Delta (%)	Tolerance (%)
2019.02.28	D750V3	Head	1g	8.44	8.26	2.2	±10
2019.03.01	D835V2	Head	1g	8.68	9.52	-8.8	±10
2019.03.02	D1800V2	Head	1g	38.12	39.30	-3.0	±10
2019.03.03	D2000V2	Head	1g	38.60	40.30	-4.2	±10
2019.03.04	D2450V2	Head	1g	52.80	53.60	-1.4	±10

Date Tested	System dipole	T.S. Liquid	SAR measured (normalized to 1W)		Target (Ref. Value)	Delta (%)	Tolerance (%)
2019.02.28	D750V3	Body	1g	8.24	8.26	-0.2	±10
2019.03.01	D835V2	Body	1g	8.76	9.44	-7.2	±10
2019.03.02	D1800V2	Body	1g	38.40	39.50	-2.7	±10
2019.03.03	D2000V2	Body	1g	38.84	40.30	-3.6	±10
2019.03.04	D2450V2	Body	1g	52.96	54.40	-2.6	±10

Plots of the system checking scans are given in Appendix A.

Tissue Simulants used in the Measurements

For the measurement of the following parameters the SPEAG DAKS-3.5 dielectric parameter probe is used, representing the open-ended coaxial probe measurement procedure.

Date Tested	Freq. (MHz)	Liquid parameters	measured	Target	Delta (%)	Tolerance (%)
2019.02.28	Head 750	ϵ_r	42.07	41.90	0.4	± 5
		$\sigma [S/m]$	0.92	0.89	3.0	± 5
2019.03.01	Head 835	ϵ_r	41.53	41.50	0.1	± 5
		$\sigma [S/m]$	0.91	0.90	1.1	± 5
2019.03.02	Head 1800	ϵ_r	40.01	40.00	0.0	± 5
		$\sigma [S/m]$	1.40	1.40	0.0	± 5
2019.03.03	Head 2000	ϵ_r	39.82	40.00	-0.5	± 5
		$\sigma [S/m]$	1.38	1.40	-1.1	± 5
2019.03.04	Head 2450	ϵ_r	39.58	39.20	1.0	± 5
		$\sigma [S/m]$	1.85	1.80	2.8	± 5

Date Tested	Freq. (MHz)	Liquid parameters	measured	Target	Delta (%)	Tolerance (%)
2019.02.28	Body 750	ϵ_r	53.28	55.50	-4.0	± 5
		$\sigma [S/m]$	0.98	0.96	1.7	± 5
2019.03.01	Body 835	ϵ_r	55.24	55.20	0.1	± 5
		$\sigma [S/m]$	0.97	0.97	0.0	± 5
2019.03.02	Body 1800	ϵ_r	53.29	53.30	0.0	± 5
		$\sigma [S/m]$	1.50	1.52	-1.3	± 5
2019.03.03	Body 2000	ϵ_r	52.60	53.30	-1.3	± 5
		$\sigma [S/m]$	1.59	1.52	4.3	± 5
2019.03.04	Body 2450	ϵ_r	51.15	52.70	-2.9	± 5
		$\sigma [S/m]$	2.02	1.95	3.6	± 5

6.10 SAR TEST RESULT

In order to determine the largest value of the peak spatial-average SAR of a handset, all device positions, configurations, and operational modes should be tested for each frequency band according to Steps 1 to 3 below.

Step 1: The tests should be performed at the channel that is closest to the center of the transmit frequency band.

- a) All device positions (cheek and tilt, for both left and right sides of the SAM phantom),
- b) All configurations for each device position in a), e.g., antenna extended and retracted, and
- c) All operational modes for each device position in item a) and configuration in item b) in each frequency band, e.g., analog and digital, If more than three frequencies need to be tested (i.e., $N_c > 3$), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

Step 2: For the condition providing the highest peak spatial-average SAR determined in Step 1 for each frequency, perform all tests at all other test frequency channels, e.g., lowest and highest frequencies. In addition, for all other conditions (device position, configuration, and operational mode) where the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies should be tested as well.

Step 3: Examine all data to determine the largest value of the peak.

Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.

Scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.

Reported SAR (W/kg) = Measured SAR (W/kg) * Scaling Factor

2. Per KDB 447498 D01v06, for each exposure position, if the highest output channel reported SAR $\leq 0.8\text{W/kg}$, other channels SAR testing are not necessary.
3. The distance between the EUT and the phantom bottom is 10mm.

The measured and reported Head/body SAR values for the test device are tabulated below:

Up Antenna

Mode: GSM 850(GPRS)

f_L (MHz)=824.2MHz f_M (MHz)=836.5MHz f_H (MHz)= 848.8MHz

SAR Values (850MHz Band)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)	
position	mode					1g Average	1g Average	
Left cheek	GPRS 2TX (head)	L	30.68	31.00	1.08	---	---	
		M	30.72	31.00	1.07	0.742	0.794	
		H	30.75	31.00	1.06	---	---	
Left Tilted		L	30.68	31.00	1.08	---	---	
		M	30.72	31.00	1.07	0.636	0.681	
		H	30.75	31.00	1.06	---	---	
Right cheek		L1	30.68	31.00	1.08	0.961	1.038	
		M1	30.72	31.00	1.07	0.998	1.068	
		H1	30.75	31.00	1.06	0.932	0.988	
		L2	30.68	31.00	1.08	0.965	1.042	
		M2	30.72	31.00	1.07	0.948	1.014	
		H2	30.75	31.00	1.06	0.937	0.993	
Right Tilted		L1	30.68	31.00	1.08	0.905	0.977	
		M1	30.72	31.00	1.07	0.954	1.021	
		H1	30.75	31.00	1.06	0.937	0.993	
		L2	30.68	31.00	1.08	0.912	0.985	
		M2	30.72	31.00	1.07	0.947	1.013	
		H2	30.75	31.00	1.06	0.925	0.981	
Back	GPRS 2TX (body-worn)	L	30.68	31.00	1.08	---	---	
		M	30.72	31.00	1.07	0.201	0.215	
		H	30.75	31.00	1.06	---	---	
Front		L	30.68	31.00	1.08	---	---	
		M	30.72	31.00	1.07	0.125	0.134	
		H	30.75	31.00	1.06	---	---	
Top	GPRS 2TX (hotspot)	L	30.68	31.00	1.08	---	---	
		M	30.72	31.00	1.07	0.115	0.123	
		H	30.75	31.00	1.06	---	---	
Right		L	30.68	31.00	1.08	---	---	
		M	30.72	31.00	1.07	0.096	0.103	
		H	30.75	31.00	1.06	---	---	
Left		L	30.68	31.00	1.08	---	---	
		M	30.72	31.00	1.07	0.094	0.101	
		H	30.75	31.00	1.06	---	---	

Mode: GSM1900(GPRS)

fL (MHz)=1850.2MHz fM (MHz)=1880.0MHz fH (MHz)=1909.8MHz

SAR Values (1900MHz Band)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Left cheek	GPRS 2TX (head)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.531	0.600
		H	27.12	28.00	1.22	---	---
		L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.621	0.702
		H	27.12	28.00	1.22	---	---
Right cheek	GPRS 2TX (head)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.283	0.320
		H	27.12	28.00	1.22	---	---
		L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.407	0.460
		H	27.12	28.00	1.22	---	---
Right Tilted	GPRS 2TX (body-worn)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.251	0.284
		H	27.12	28.00	1.22	---	---
		L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.136	0.154
		H	27.12	28.00	1.22	---	---
Back	GPRS 2TX (body-worn)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.251	0.284
		H	27.12	28.00	1.22	---	---
		L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.136	0.154
		H	27.12	28.00	1.22	---	---
Front	GPRS 2TX (hotspot)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.301	0.340
		H	27.12	28.00	1.22	---	---
		L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.049	0.055
		H	27.12	28.00	1.22	---	---
Top	GPRS 2TX (hotspot)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.301	0.340
		H	27.12	28.00	1.22	---	---
		L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.049	0.055
		H	27.12	28.00	1.22	---	---
Right	GPRS 2TX (hotspot)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.049	0.055
		H	27.12	28.00	1.22	---	---
		L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.058	0.066
		H	27.12	28.00	1.22	---	---
Left	GPRS 2TX (hotspot)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.058	0.066
		H	27.12	28.00	1.22	---	---

Mode: WCDMA BAND4

fL (MHz)= 1712.4MHz fM (MHz)= 1732.4MHz fH (MHz)= 1752.6MHz

SAR Values (WCDMA BAND4)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)	
position	mode					1g Average	1g Average	
Left cheek	12.2KRM C (head)	L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.121	0.144	
		H	22.21	23.00	1.20	---	---	
Left Tilted		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.086	0.103	
		H	22.21	23.00	1.20	---	---	
Right cheek		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.557	0.663	
		H	22.21	23.00	1.20	---	---	
Right Tilted		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.485	0.577	
		H	22.21	23.00	1.20	---	---	
Back	12.2KRM C (body-worn)	L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.109	0.130	
		H	22.21	23.00	1.20	---	---	
Front		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.076	0.091	
		H	22.21	23.00	1.20	---	---	
Top	12.2KRM C (hotspot)	L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.028	0.033	
		H	22.21	23.00	1.20	---	---	
Right		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.011	0.014	
		H	22.21	23.00	1.20	---	---	
Left		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.036	0.043	
		H	22.21	23.00	1.20	---	---	

Mode: WCDMA BAND5

fL (MHz)=826.4MHz fM (MHz)=836.4MHz fH (MHz)= 846.6MHz

SAR Values (WCDMA BAND5)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)	
position	mode					1g Average	1g Average	
Left cheek	12.2KRM C (head)	L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.720	0.734	
		H	23.39	23.50	1.03	---	---	
Left Tilted		L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.670	0.683	
		H	23.39	23.50	1.03	---	---	
Right cheek		L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.781	0.797	
		H	23.39	23.50	1.03	---	---	
Right Tilted		L1	23.45	23.50	1.01	0.911	0.920	
		M1	23.42	23.50	1.02	0.959	0.978	
		H1	23.39	23.50	1.03	0.924	0.952	
		L2	23.45	23.50	1.01	0.902	0.911	
		M2	23.42	23.50	1.02	0.946	0.965	
		H2	23.39	23.50	1.03	0.923	0.951	
Back	12.2KRM C (body-worn)	L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.229	0.234	
		H	23.39	23.50	1.03	---	---	
Front		L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.162	0.165	
		H	23.39	23.50	1.03	---	---	
Top	12.2KRM C (hotspot)	L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.158	0.161	
		H	23.39	23.50	1.03	---	---	
Right		L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.080	0.081	
		H	23.39	23.50	1.03	---	---	
Left		L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.085	0.087	
		H	23.39	23.50	1.03	---	---	

Mode: LTE Band 4

fL (MHz)= 1710.7MHz fM (MHz)= 1732.5MHz fH (MHz)= 1754.3MHz

SAR Values (LTE BAND4)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Left cheek		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.770	0.785
		H	21.20	21.50	1.07	---	---
		L1	21.10	21.50	1.10	0.841	0.942
		M1	21.40	21.50	1.02	0.916	0.934
		H1	21.20	21.50	1.07	0.870	0.931
Left Tilted		L2	21.10	21.50	1.10	0.843	0.944
		M2	21.40	21.50	1.02	0.907	0.925
		H2	21.20	21.50	1.07	0.872	0.933
		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.891	0.909
		H	21.20	21.50	1.07	---	---
Right cheek		L1	21.10	21.50	1.10	0.877	0.982
		M1	21.40	21.50	1.02	0.938	0.957
		H1	21.20	21.50	1.07	0.861	0.921
		L2	21.10	21.50	1.10	0.862	0.965
		M2	21.40	21.50	1.02	0.926	0.945
		H2	21.20	21.50	1.07	0.863	0.923
Back		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.308	0.314
		H	21.20	21.50	1.07	---	---
Front		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.194	0.198
		H	21.20	21.50	1.07	---	---
Top		L1	21.10	21.50	1.10	0.785	0.879
		M1	21.40	21.50	1.02	0.852	0.869
		H1	21.20	21.50	1.07	0.801	0.857
		L2	21.10	21.50	1.10	0.781	0.875
		M2	21.40	21.50	1.02	0.849	0.866
		H2	21.20	21.50	1.07	0.800	0.856
Right		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.017	0.017
		H	21.20	21.50	1.07	---	---
Left		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.060	0.062
		H	21.20	21.50	1.07	---	---

Left cheek	20BW 50%RB (head)	L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.603	0.645	
		H	20.20	20.50	1.07	---	---	
Left Tilted		L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.739	0.791	
		H	20.20	20.50	1.07	---	---	
Right cheek		L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.645	0.690	
		H	20.20	20.50	1.07	---	---	
Right Tilted		L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.725	0.776	
		H	20.20	20.50	1.07	---	---	
Back	20BW 50%RB (body-worn)	L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.238	0.255	
		H	20.20	20.50	1.07	---	---	
Front		L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.152	0.163	
		H	20.20	20.50	1.07	---	---	
Top	20BW 50%RB (hotspot)	L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.706	0.755	
		L	20.20	20.50	1.07	---	---	
Left Tilted	20BW 100%RB (head)	L	20.10	20.50	1.10	---	---	
		M	20.10	20.50	1.10	0.725	0.798	
		L	20.00	20.50	1.12	---	---	
Right Tilted		L	20.10	20.50	1.10	---	---	
		M	20.10	20.50	1.10	0.618	0.680	
		L	20.00	20.50	1.12	---	---	
Top	20BW 100%RB (hotspot)	L	20.10	20.50	1.10	---	---	
		M	20.10	20.50	1.10	0.624	0.686	
		L	20.00	20.50	1.12	---	---	

Mode: LTE Band 5

fL (MHz)=829 MHz fM (MHz)=836.5MHz fH (MHz)= 844MHz

SAR Values (LTE BAND5)

Limit of SAR (W/kg) : <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)	
position	mode					1g Average	1g Average	
Left cheek	10BW 1RB (head)	L	24.00	24.50	1.12	---	---	
		M	24.10	24.50	1.10	0.697	0.767	
		H	24.10	24.50	1.10	---	---	
Left Tilted		L	24.00	24.50	1.12	---	---	
		M	24.10	24.50	1.10	0.674	0.741	
		H	24.10	24.50	1.10	---	---	
Right cheek		L1	24.00	24.50	1.12	0.807	0.904	
		M1	24.10	24.50	1.10	0.871	0.958	
		H1	24.10	24.50	1.10	0.816	0.898	
		L2	24.00	24.50	1.12	0.811	0.908	
		M2	24.10	24.50	1.10	0.821	0.903	
		H2	24.10	24.50	1.10	0.813	0.894	
Right Tilted	10BW 1RB (body-worn)	L	24.00	24.50	24.00	---	---	
		M	24.10	24.50	24.10	0.606	0.667	
		H	24.10	24.50	24.10	---	---	
Back		L	24.00	24.50	24.00	---	---	
		M	24.10	24.50	24.10	0.232	0.255	
		H	24.10	24.50	24.10	---	---	
Front		L	24.00	24.50	24.00	---	---	
		M	24.10	24.50	24.10	0.121	0.133	
		H	24.10	24.50	24.10	---	---	
Top	10BW 1RB (hotspot)	L	24.00	24.50	24.00	---	---	
		M	24.10	24.50	24.10	0.169	0.186	
		H	24.10	24.50	24.10	---	---	
Right		L	24.00	24.50	24.00	---	---	
		M	24.10	24.50	24.10	0.077	0.085	
		H	24.10	24.50	24.10	---	---	
Left		L	24.00	24.50	24.00	---	---	
		M	24.10	24.50	24.10	0.083	0.091	
		H	24.10	24.50	24.10	---	---	

Left cheek	10BW 50%RB (head)	L	23.10	23.50	1.10	---	---
		M	23.20	23.50	1.07	0.596	0.638
		H	23.10	23.50	1.10	---	---
Left Tilted		L	23.10	23.50	1.10	---	---
		M	23.20	23.50	1.07	0.563	0.602
		H	23.10	23.50	1.10	---	---
Right cheek		L	23.10	23.50	1.10	---	---
		M	23.20	23.50	1.07	0.728	0.779
		H	23.10	23.50	1.10	---	---
Right Tilted		L	23.10	23.50	1.10	---	---
		M	23.20	23.50	1.07	0.742	0.794
		H	23.10	23.50	1.10	---	---
Back	10BW 50%RB (body-worn)	L	23.10	23.50	1.10	---	---
		M	23.20	23.50	1.07	0.206	0.220
		H	23.10	23.50	1.10	---	---
Front		L	23.10	23.50	1.10	---	---
		M	23.20	23.50	1.07	0.103	0.110
		H	23.10	23.50	1.10	---	---
Right cheek	10BW 100%RB (head)	L	23.10	23.50	1.10	---	---
		M	23.00	23.50	1.12	0.710	0.795
		H	23.10	23.50	1.10	---	---

Mode: LTE Band 12

fL (MHz)=704 MHz fM (MHz)=707.5MHz fH (MHz)= 711MHz

SAR Values (LTE BAND12)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	position					1g Average	1g Average
Left cheek	10BW 1RB (head)	L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.018	0.025
		H	23.50	25.00	1.41	---	---
		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.019	0.027
		H	23.50	25.00	1.41	---	---
Right cheek	10BW 1RB (head)	L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.034	0.048
		H	23.50	25.00	1.41	---	---
		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.036	0.051
		H	23.50	25.00	1.41	---	---
Right Tilted	10BW 1RB (body-worn)	L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.006	0.008
		H	23.50	25.00	1.41	---	---
		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.006	0.008
		H	23.50	25.00	1.41	---	---
Back	10BW 1RB (body-worn)	L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.006	0.008
		H	23.50	25.00	1.41	---	---
		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.006	0.008
		H	23.50	25.00	1.41	---	---
Front	10BW 1RB (hotspot)	L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.005	0.008
		H	23.50	25.00	1.41	---	---
		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.008	0.011
		H	23.50	25.00	1.41	---	---
Top	10BW 1RB (hotspot)	L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.005	0.008
		H	23.50	25.00	1.41	---	---
		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.008	0.011
		H	23.50	25.00	1.41	---	---
Right	10BW 1RB (hotspot)	L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.011	0.015
		H	23.50	25.00	1.41	---	---
		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.011	0.015
		H	23.50	25.00	1.41	---	---
Left	10BW 1RB (hotspot)	L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.011	0.015
		H	23.50	25.00	1.41	---	---
		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.011	0.015
		H	23.50	25.00	1.41	---	---

Left cheek	10BW 50%RB (head)	L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.029	0.043	
		H	22.30	24.00	1.48	---	---	
Left Tilted		L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.019	0.028	
		H	22.30	24.00	1.48	---	---	
Right cheek		L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.031	0.046	
		H	22.30	24.00	1.48	---	---	
Right Tilted		L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.031	0.046	
		H	22.30	24.00	1.48	---	---	
Back	10BW 50%RB (body-worn)	L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.008	0.012	
		H	22.30	24.00	1.48	---	---	
Front		L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.005	0.008	
		H	22.30	24.00	1.48	---	---	

Mode: LTE Band 66

fL (MHz)=1720 MHz fM (MHz)=1745MHz fH (MHz)= 1770MHz

SAR Values (LTE BAND66)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)	
position	position					1g Average	1g Average	
Left cheek	20BW 1RB (head)	L	21.10	21.50	1.10	---	---	
		M	21.00	21.50	1.12	0.704	0.788	
		H	20.70	21.50	1.20	---	---	
Left Tilted		L	21.10	21.50	1.10	---	---	
		M	21.00	21.50	1.12	0.711	0.796	
		H	20.70	21.50	1.20	---	---	
Right cheek		L1	21.10	21.50	1.10	0.976	1.074	
		M1	21.00	21.50	1.12	0.982	1.100	
		H1	20.70	21.50	1.20	0.941	1.129	
		L2	21.10	21.50	1.10	0.974	1.071	
		M2	21.00	21.50	1.12	1.000	1.120	
		H2	20.70	21.50	1.20	0.944	1.133	
Right Tilted		L1	21.10	21.50	1.10	0.998	1.098	
		M1	21.00	21.50	1.12	1.110	1.243	
		H1	20.70	21.50	1.20	0.986	1.183	
		L2	21.10	21.50	1.10	0.981	1.079	
		M2	21.00	21.50	1.12	1.030	1.154	
		H2	20.70	21.50	1.20	0.977	1.172	
Back	20BW 1RB (body-worn)	L	21.10	21.50	1.10	---	---	
		M	21.00	21.50	1.12	0.704	0.788	
		H	20.70	21.50	1.20	---	---	
Front		L	21.10	21.50	1.10	---	---	
		M	21.00	21.50	1.12	0.417	0.467	
		H	20.70	21.50	1.20	---	---	
Top	20BW 1RB (hotspot)	L	21.10	21.50	1.10	---	---	
		M	21.00	21.50	1.12	0.334	0.374	
		H	20.70	21.50	1.20	---	---	
Right		L	21.10	21.50	1.10	---	---	
		M	21.00	21.50	1.12	0.153	0.171	
		H	20.70	21.50	1.20	---	---	
Left		L	21.10	21.50	1.10	---	---	
		M	21.00	21.50	1.12	0.313	0.351	
		H	20.70	21.50	1.20	---	---	

Left cheek	20BW 50%RB (head)	L	20.30	20.50	1.05	---	---	
		M	20.00	20.50	1.12	0.611	0.684	
		H	19.80	20.50	1.17	---	---	
Left Tilted		L	20.30	20.50	1.05	---	---	
		M	20.00	20.50	1.12	0.684	0.766	
		H	19.80	20.50	1.17	---	---	
Right cheek		L	20.30	20.50	1.05	---	---	
		M	20.00	20.50	1.12	0.701	0.785	
		H	19.80	20.50	1.17	---	---	
Right Tilted		L1	20.30	20.50	1.05	0.704	0.739	
		M1	20.00	20.50	1.12	0.767	0.859	
		H1	19.80	20.50	1.17	0.672	0.786	
		L2	20.30	20.50	1.05	---	---	
		M2	20.00	20.50	1.12	0.752	0.842	
		H2	19.80	20.50	1.17	---	---	
Back	20BW 50%RB (body-worn)	L	20.30	20.50	1.05	---	---	
		M	20.00	20.50	1.12	0.600	0.672	
		H	19.80	20.50	1.17	---	---	
Front		L	20.30	20.50	1.05	---	---	
		M	20.00	20.50	1.12	0.329	0.368	
		H	19.80	20.50	1.17	---	---	
Right cheek	20BW 100%RB (head)	L	20.20	20.50	1.07	---	---	
		M	19.80	20.50	1.17	0.678	0.793	
		H	19.70	20.50	1.20	---	---	
Right Tilted		L	20.20	20.50	1.07	---	---	
		M	19.80	20.50	1.17	0.680	0.796	
		H	19.70	20.50	1.20	---	---	

Mode: Wi-Fi 2.4GHz

fL (MHz)=2412MHz fM (MHz)=2437MHz fH (MHz)= 2462MHz

SAR Values (Wi-Fi 802.11b)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Left cheek	802.11b (head)	L	12.48	12.50	1.00	---	---
		M	11.96	12.50	1.13	0.168	0.190
		H	12.44	12.50	1.01	---	---
		L	12.48	12.50	1.00	---	---
		M	11.96	12.50	1.13	0.163	0.184
		H	12.44	12.50	1.01	---	---
Right cheek	802.11b (head)	L	12.48	12.50	1.00	---	---
		M	11.96	12.50	1.13	0.280	0.316
		H	12.44	12.50	1.01	---	---
		L	12.48	12.50	1.00	---	---
		M	11.96	12.50	1.13	0.272	0.307
		H	12.44	12.50	1.01	---	---
Right Tilted	802.11b (body-worn)	L	12.48	12.50	1.00	---	---
		M	11.96	12.50	1.13	0.142	0.160
		H	12.44	12.50	1.01	---	---
		L	12.48	12.50	1.00	---	---
		M	11.96	12.50	1.13	0.120	0.136
		H	12.44	12.50	1.01	---	---
Top	802.11b (hotspot)	L	12.48	12.50	1.00	---	---
		M	11.96	12.50	1.13	0.045	0.051
		H	12.44	12.50	1.01	---	---
		L	12.48	12.50	1.00	---	---
		M	11.96	12.50	1.13	0.064	0.072
		H	12.44	12.50	1.01	---	---

Down Antenna

Mode: GSM 850(GPRS)

$f_L(\text{MHz})=824.2\text{MHz}$ $f_M(\text{MHz})=836.5\text{MHz}$ $f_H(\text{MHz})= 848.8\text{MHz}$

SAR Values (850MHz Band)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Left cheek	GPRS 2TX (head)	L	30.68	31.00	1.08	---	---
		M	30.72	31.00	1.07	0.103	0.110
		H	30.75	31.00	1.06	---	---
		L	30.68	31.00	1.08	---	---
		M	30.72	31.00	1.07	0.049	0.052
		H	30.75	31.00	1.06	---	---
Right cheek	GPRS 2TX (head)	L	30.68	31.00	1.08	---	---
		M	30.72	31.00	1.07	0.134	0.143
		H	30.75	31.00	1.06	---	---
		L	30.68	31.00	1.08	---	---
		M	30.72	31.00	1.07	0.056	0.060
		H	30.75	31.00	1.06	---	---
Right Tilted	GPRS 2TX (body-worn)	L	30.68	31.00	1.08	---	---
		M	30.72	31.00	1.07	0.185	0.198
		H	30.75	31.00	1.06	---	---
		L	30.68	31.00	1.08	---	---
		M	30.72	31.00	1.07	0.162	0.173
		H	30.75	31.00	1.06	---	---
Bottom	GPRS 2TX (hotspot)	L	30.68	31.00	1.08	---	---
		M	30.72	31.00	1.07	0.158	0.169
		H	30.75	31.00	1.06	---	---
		L	30.68	31.00	1.08	---	---
		M	30.72	31.00	1.07	0.183	0.196
		H	30.75	31.00	1.06	---	---
Left	GPRS 2TX (hotspot)	L	30.68	31.00	1.08	---	---
		M	30.72	31.00	1.07	0.092	0.098
		H	30.75	31.00	1.06	---	---

Mode: GSM1900(GPRS)

fL (MHz)=1850.2MHz fM (MHz)=1880.0MHz fH (MHz)=1909.8MHz

SAR Values (1900MHz Band)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Left cheek	GPRS 2TX (head)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.099	0.112
		H	27.12	28.00	1.22	---	---
		L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.037	0.042
		H	27.12	28.00	1.22	---	---
Right cheek	GPRS 2TX (head)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.048	0.055
		H	27.12	28.00	1.22	---	---
		L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.044	0.050
		H	27.12	28.00	1.22	---	---
Right Tilted	GPRS 2TX (body-worn)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.579	0.654
		H	27.12	28.00	1.22	---	---
		L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.380	0.429
		H	27.12	28.00	1.22	---	---
Back	GPRS 2TX (body-worn)	L1	27.74	28.00	1.06	0.912	0.967
		M1	27.46	28.00	1.13	1.010	1.141
		H1	27.12	28.00	1.22	0.837	1.021
		L2	27.74	28.00	1.06	0.920	0.975
		M2	27.46	28.00	1.13	0.982	1.110
		H2	27.12	28.00	1.22	0.833	1.016
Front	GPRS 2TX (hotspot)	L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.037	0.042
		H	27.12	28.00	1.22	---	---
		L	27.74	28.00	1.06	---	---
		M	27.46	28.00	1.13	0.101	0.114
		H	27.12	28.00	1.22	---	---

Mode: WCDMA BAND2

fL (MHz)=1852.4MHz fM (MHz)=1880MHz fH (MHz)= 1907.6MHz

SAR Values (WCDMA BAND2)

Limit of SAR (W/kg) :< 1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Left cheek	12.2KRCM (head)	L	20.74	21.00	1.06	---	---
		M	20.66	21.00	1.08	0.083	0.090
		H	20.68	21.00	1.08	---	---
		L	20.74	21.00	1.06	---	---
		M	20.66	21.00	1.08	0.055	0.060
		H	20.68	21.00	1.08	---	---
Right cheek	12.2KRCM (head)	L	20.74	21.00	1.06	---	---
		M	20.66	21.00	1.08	0.074	0.079
		H	20.68	21.00	1.08	---	---
		L	20.74	21.00	1.06	---	---
		M	20.66	21.00	1.08	0.073	0.079
		H	20.68	21.00	1.08	---	---
Right Tilted	12.2KRCM (body-worn)	L	20.74	21.00	1.06	---	---
		M	20.66	21.00	1.08	0.632	0.683
		H	20.68	21.00	1.08	---	---
		L	20.74	21.00	1.06	---	---
		M	20.66	21.00	1.08	0.273	0.295
		H	20.68	21.00	1.08	---	---
Bottom	12.2KRCM (hotspot)	L1	20.74	21.00	1.06	0.911	0.966
		M1	20.66	21.00	1.08	1.040	1.123
		H1	20.68	21.00	1.08	0.937	1.012
		L2	20.74	21.00	1.06	0.926	0.982
		M2	20.66	21.00	1.08	1.020	1.102
		H2	20.68	21.00	1.08	0.941	1.016
Right	12.2KRCM (hotspot)	L	20.74	21.00	1.06	---	---
		M	20.66	21.00	1.08	0.052	0.056
		H	20.68	21.00	1.08	---	---
		L	20.74	21.00	1.06	---	---
Left	12.2KRCM (hotspot)	M	20.66	21.00	1.08	0.167	0.180
		H	20.68	21.00	1.08	---	---

Mode: WCDMA BAND4

fL (MHz)= 1712.4MHz fM (MHz)= 1732.4MHz fH (MHz)= 1752.6MHz

SAR Values (WCDMA BAND4)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)	
position	mode					1g Average	1g Average	
Left cheek	12.2KRM C (head)	L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.000	0.000	
		H	22.21	23.00	1.20	---	---	
Left Tilted		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.000	0.000	
		H	22.21	23.00	1.20	---	---	
Right cheek		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.000	0.000	
		H	22.21	23.00	1.20	---	---	
Right Tilted		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.000	0.000	
		H	22.21	23.00	1.20	---	---	
Back	12.2KRM C (body-worn)	L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.120	0.143	
		H	22.21	23.00	1.20	---	---	
Front		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.081	0.097	
		H	22.21	23.00	1.20	---	---	
Bottom	12.2KRM C (hotspot)	L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.153	0.182	
		H	22.21	23.00	1.20	---	---	
Right		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.008	0.009	
		H	22.21	23.00	1.20	---	---	
Left		L	22.42	23.00	1.14	---	---	
		M	22.25	23.00	1.19	0.004	0.005	
		H	22.21	23.00	1.20	---	---	

Mode: WCDMA BAND5

fL (MHz)=826.4MHz fM (MHz)=836.4MHz fH (MHz)= 846.6MHz

SAR Values (WCDMA BAND5)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)	
position	mode					1g Average	1g Average	
Left cheek	12.2KRMC (head)	L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.132	0.135	
		H	23.39	23.50	1.03	---	---	
Left Tilted		L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.073	0.074	
		H	23.39	23.50	1.03	---	---	
Right cheek		L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.150	0.153	
		H	23.39	23.50	1.03	---	---	
Right Tilted		L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.066	0.067	
		H	23.39	23.50	1.03	---	---	
Back	12.2KRMC (body-worn)	L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.178	0.182	
		H	23.39	23.50	1.03	---	---	
Front		L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.221	0.225	
		H	23.39	23.50	1.03	---	---	
Bottom	12.2KRMC (hotspot)	L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.185	0.189	
		H	23.39	23.50	1.03	---	---	
Right		L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.189	0.193	
		H	23.39	23.50	1.03	---	---	
Left		L	23.45	23.50	1.01	---	---	
		M	23.42	23.50	1.02	0.113	0.115	
		H	23.39	23.50	1.03	---	---	

Mode: LTE Band 2

fL (MHz)= 1860MHz fM (MHz)= 1880MHz fH (MHz)= 1900MHz

SAR Values (LTE BAND2)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)	
position	mode					1g Average	1g Average	
Left cheek	20BW 1RB (head)	L	22.00	22.50	1.12	---	---	
		M	22.30	22.50	1.05	0.089	0.093	
		H	22.20	22.50	1.07	---	---	
Left Tilted		L	22.00	22.50	1.12	---	---	
		M	22.30	22.50	1.05	0.037	0.039	
		H	22.20	22.50	1.07	---	---	
Right cheek		L	22.00	22.50	1.12	---	---	
		M	22.30	22.50	1.05	0.055	0.058	
		H	22.20	22.50	1.07	---	---	
Right Tilted		L	22.00	22.50	1.12	---	---	
		M	22.30	22.50	1.05	0.053	0.056	
		H	22.20	22.50	1.07	---	---	
Back	20BW 1RB (body-worn)	L	22.00	22.50	1.12	---	---	
		M	22.30	22.50	1.05	0.610	0.641	
		H	22.20	22.50	1.07	---	---	
Front		L	22.00	22.50	1.12	---	---	
		M	22.30	22.50	1.05	0.207	0.217	
		H	22.20	22.50	1.07	---	---	
Bottom	20BW 1RB (hotspot)	L1	22.00	22.50	1.12	1.073	1.202	
		M1	22.30	22.50	1.05	1.250	1.313	
		H1	22.20	22.50	1.07	1.140	1.220	
		L2	22.00	22.50	1.12	1.164	1.304	
		M2	22.30	22.50	1.05	1.220	1.281	
		H2	22.00	22.50	1.12	1.132	1.211	
Right		L	22.00	22.50	1.12	---	---	
		M	22.30	22.50	1.05	0.036	0.038	
		H	22.20	22.50	1.07	---	---	
Left		L	22.00	22.50	1.12	---	---	
		M	22.30	22.50	1.05	0.075	0.079	
		H	22.20	22.50	1.07	---	---	

Left cheek	20BW 50%RB (head)	L	21.10	21.50	1.10	---	---
		M	21.20	21.50	1.07	0.072	0.077
		H	21.10	21.50	1.10	---	---
Left Tilted		L	21.10	21.50	1.10	---	---
		M	21.20	21.50	1.07	0.033	0.035
		H	21.10	21.50	1.10	---	---
Right cheek		L	21.10	21.50	1.10	---	---
		M	21.20	21.50	1.07	0.046	0.049
		H	21.10	21.50	1.10	---	---
Right Tilted		L	21.10	21.50	1.10	---	---
		M	21.20	21.50	1.07	0.042	0.045
		H	21.10	21.50	1.10	---	---
Back	20BW 50%RB (body-worn)	L	21.10	21.50	1.10	---	---
		M	21.20	21.50	1.07	0.563	0.602
		H	21.10	21.50	1.10	---	---
Front		L	21.10	21.50	1.10	---	---
		M	21.20	21.50	1.07	0.168	0.180
		H	21.10	21.50	1.10	---	---
Bottom	20BW 50%RB (hotspot)	L	21.10	21.50	1.10	---	---
		M	21.20	21.50	1.07	0.740	0.792
		H	21.10	21.50	1.10	---	---
Bottom	20BW 100%RB (hotspot)	L	21.00	21.50	1.12	---	---
		M	21.00	21.50	1.12	0.711	0.796
		H	21.10	21.50	1.10	---	---

Mode: LTE Band 4

fL (MHz)= 1710.7MHz fM (MHz)= 1732.5MHz fH (MHz)= 1754.3MHz

SAR Values (LTE BAND4)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Left cheek		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.000	0.000
		H	21.20	21.50	1.07	---	---
Left Tilted		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.000	0.000
		H	21.20	21.50	1.07	---	---
Right cheek		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.000	0.000
		H	21.20	21.50	1.07	---	---
Right Tilted		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.000	0.000
		H	21.20	21.50	1.07	---	---
Back		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.056	0.057
		H	21.20	21.50	1.07	---	---
Front		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.036	0.037
		H	21.20	21.50	1.07	---	---
Bottom		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.084	0.085
		H	21.20	21.50	1.07	---	---
Right		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.007	0.007
		H	21.20	21.50	1.07	---	---
Left		L	21.10	21.50	1.10	---	---
		M	21.40	21.50	1.02	0.002	0.002
		H	21.20	21.50	1.07	---	---

Left cheek	20BW 50%RB (head)	L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.000	0.000	
		H	20.20	20.50	1.07	---	---	
Left Tilted		L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.000	0.000	
		H	20.20	20.50	1.07	---	---	
Right cheek		L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.000	0.000	
		H	20.20	20.50	1.07	---	---	
Right Tilted		L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.000	0.000	
		H	20.20	20.50	1.07	---	---	
Back	20BW 50%RB (body-worn)	L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.044	0.047	
		H	20.20	20.50	1.07	---	---	
Front		L	20.20	20.50	1.07	---	---	
		M	20.20	20.50	1.07	0.034	0.037	
		H	20.20	20.50	1.07	---	---	

Mode: LTE Band 5

fL (MHz)=829 MHz fM (MHz)=836.5MHz fH (MHz)= 844MHz

SAR Values (LTE BAND5)

Limit of SAR (W/kg) : <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)	
position	mode					1g Average	1g Average	
Left cheek	10BW 1RB (head)	L	24.00	24.50	1.12	---	---	
		M	24.10	24.50	1.10	0.095	0.105	
		H	24.10	24.50	1.10	---	---	
Left Tilted		L	24.00	24.50	1.12	---	---	
		M	24.10	24.50	1.10	0.056	0.062	
		H	24.10	24.50	1.10	---	---	
Right cheek		L	24.00	24.50	1.12	---	---	
		M	24.10	24.50	1.10	0.103	0.113	
		H	24.10	24.50	1.10	---	---	
Right Tilted		L	24.00	24.50	1.12	---	---	
		M	24.10	24.50	1.10	0.066	0.073	
		H	24.10	24.50	1.10	---	---	
Back	10BW 1RB (body-worn)	L	24.00	24.50	1.12	---	---	
		M	24.10	24.50	1.10	0.234	0.257	
		H	24.10	24.50	1.10	---	---	
Front		L	24.00	24.50	1.12	---	---	
		M	24.10	24.50	1.10	0.171	0.188	
		H	24.10	24.50	1.10	---	---	
Bottom	10BW 1RB (hotspot)	L	24.00	24.50	1.12	---	---	
		M	24.10	24.50	1.10	0.142	0.156	
		H	24.10	24.50	1.10	---	---	
Right		L	24.00	24.50	1.12	---	---	
		M	24.10	24.50	1.10	0.155	0.171	
		H	24.10	24.50	1.10	---	---	
Left		L	24.00	24.50	1.12	---	---	
		M	24.10	24.50	1.10	0.089	0.098	
		H	24.10	24.50	1.10	---	---	

Left cheek	10BW 50%RB (head)	L	23.10	23.50	1.10	---	---	
		M	23.20	23.50	1.07	0.080	0.086	
		H	23.10	23.50	1.10	---	---	
Left Tilted		L	23.10	23.50	1.10	---	---	
		M	23.20	23.50	1.07	0.043	0.046	
		H	23.10	23.50	1.10	---	---	
Right cheek		L	23.10	23.50	1.10	---	---	
		M	23.20	23.50	1.07	0.082	0.088	
		H	23.10	23.50	1.10	---	---	
Right Tilted		L	23.10	23.50	1.10	---	---	
		M	23.20	23.50	1.07	0.055	0.058	
		H	23.10	23.50	1.10	---	---	
Back	10BW 50%RB (body-worn)	L	23.10	23.50	1.10	---	---	
		M	23.20	23.50	1.07	0.194	0.208	
		H	23.10	23.50	1.10	---	---	
Front		L	23.10	23.50	1.10	---	---	
		M	23.20	23.50	1.07	0.140	0.150	
		H	23.10	23.50	1.10	---	---	

Mode: LTE Band 7

fL (MHz)=2510 MHz fM (MHz)=2535MHz fH (MHz)= 2560MHz

SAR Values (LTE BAND7)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	position					1g Average	1g Average
Left cheek		L	22.10	23.00	1.23	---	---
		M	22.30	23.00	1.17	0.060	0.070
		H	22.40	23.00	1.15	---	---
Left Tilted		L	22.10	23.00	1.23	---	---
		M	22.30	23.00	1.17	0.072	0.085
		H	22.40	23.00	1.15	---	---
Right cheek		L	22.10	23.00	1.23	---	---
		M	22.30	23.00	1.17	0.100	0.117
		H	22.40	23.00	1.15	---	---
Right Tilted		L	22.10	23.00	1.23	---	---
		M	22.30	23.00	1.17	0.064	0.075
		H	22.40	23.00	1.15	---	---
Back		L	22.10	23.00	1.23	---	---
		M	22.30	23.00	1.17	0.494	0.578
		H	22.40	23.00	1.15	---	---
Front		L	22.10	23.00	1.23	---	---
		M	22.30	23.00	1.17	0.147	0.172
		H	22.40	23.00	1.15	---	---
Bottom		L	22.10	23.00	1.23	---	---
		M	22.30	23.00	1.17	0.642	0.751
		H	22.40	23.00	1.15	---	---
Right		L	22.10	23.00	1.23	---	---
		M	22.30	23.00	1.17	0.098	0.114
		H	22.40	23.00	1.15	---	---
Left		L	22.10	23.00	1.23	---	---
		M	22.30	23.00	1.17	0.050	0.059
		H	22.40	23.00	1.15	---	---

Left cheek	20BW 50%RB (head)	L	21.00	22.00	1.26	---	---	
		M	21.30	22.00	1.17	0.047	0.055	
		H	21.40	22.00	1.15	---	---	
Left Tilted		L	21.00	22.00	1.26	---	---	
		M	21.30	22.00	1.17	0.062	0.072	
		H	21.40	22.00	1.15	---	---	
Right cheek		L	21.00	22.00	1.26	---	---	
		M	21.30	22.00	1.17	0.051	0.060	
		H	21.40	22.00	1.15	---	---	
Right Tilted		L	21.00	22.00	1.26	---	---	
		M	21.30	22.00	1.17	0.054	0.063	
		H	21.40	22.00	1.15	---	---	
Back	20BW 50%RB (body-worn)	L	21.00	22.00	1.26	---	---	
		M	21.30	22.00	1.17	0.186	0.218	
		H	21.40	22.00	1.15	---	---	
Front		L	21.00	22.00	1.26	---	---	
		M	21.30	22.00	1.17	0.122	0.143	
		H	21.40	22.00	1.15	---	---	

Mode: LTE Band 12

fL (MHz)=704 MHz fM (MHz)=707.5MHz fH (MHz)= 711MHz

SAR Values (LTE BAND12)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	position					1g Average	1g Average
Left cheek		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.106	0.149
		H	23.50	25.00	1.41	---	---
Left Tilted		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.070	0.098
		H	23.50	25.00	1.41	---	---
Right cheek		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.115	0.162
		H	23.50	25.00	1.41	---	---
Right Tilted		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.071	0.101
		H	23.50	25.00	1.41	---	---
Back		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.256	0.361
		H	23.50	25.00	1.41	---	---
Front		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.181	0.255
		H	23.50	25.00	1.41	---	---
Bottom		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.053	0.075
		H	23.50	25.00	1.41	---	---
Right		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.281	0.396
		H	23.50	25.00	1.41	---	---
Left		L	23.50	25.00	1.41	---	---
		M	23.50	25.00	1.41	0.236	0.333
		H	23.50	25.00	1.41	---	---

Left cheek	10BW 50%RB (head)	L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.094	0.139	
		H	22.30	24.00	1.48	---	---	
Left Tilted		L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.057	0.084	
		H	22.30	24.00	1.48	---	---	
Right cheek		L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.097	0.143	
		H	22.30	24.00	1.48	---	---	
Right Tilted		L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.061	0.090	
		H	22.30	24.00	1.48	---	---	
Back	10BW 50%RB (body-worn)	L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.211	0.312	
		H	22.30	24.00	1.48	---	---	
Front		L	22.30	24.00	1.48	---	---	
		M	22.30	24.00	1.48	0.150	0.222	
		H	22.30	24.00	1.48	---	---	

Mode: LTE Band 66

fL (MHz)=1720MHz fM (MHz)=1745MHz fH (MHz)= 1770MHz

SAR Values (LTE BAND66)

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	position					1g Average	1g Average
Left cheek		L	21.10	21.50	1.10	---	---
		M	21.00	21.50	1.12	0.000	0.000
		H	20.70	21.50	1.20	---	---
Left Tilted		L	21.10	21.50	1.10	---	---
		M	21.00	21.50	1.12	0.000	0.000
		H	20.70	21.50	1.20	---	---
Right cheek		L	21.10	21.50	1.10	---	---
		M	21.00	21.50	1.12	0.000	0.000
		H	20.70	21.50	1.20	---	---
Right Tilted		L	21.10	21.50	1.10	---	---
		M	21.00	21.50	1.12	0.000	0.000
		H	20.70	21.50	1.20	---	---
Back		L	21.10	21.50	1.10	---	---
		M	21.00	21.50	1.12	0.110	0.123
		H	20.70	21.50	1.20	---	---
Front		L	21.10	21.50	1.10	---	---
		M	21.00	21.50	1.12	0.079	0.088
		H	20.70	21.50	1.20	---	---
Bottom		L	21.10	21.50	1.10	---	---
		M	21.00	21.50	1.12	0.177	0.198
		H	20.70	21.50	1.20	---	---
Right		L	21.10	21.50	1.10	---	---
		M	21.00	21.50	1.12	0.009	0.010
		H	20.70	21.50	1.20	---	---
Left		L	21.10	21.50	1.10	---	---
		M	21.00	21.50	1.12	0.001	0.001
		H	20.70	21.50	1.20	---	---

Left cheek	20BW 50%RB (head)	L	20.30	20.50	1.05	---	---	
		M	20.00	20.50	1.12	0.000	0.000	
		H	19.80	20.50	1.17	---	---	
Left Tilted		L	20.30	20.50	1.05	---	---	
		M	20.00	20.50	1.12	0.000	0.000	
		H	19.80	20.50	1.17	---	---	
Right cheek		L	20.30	20.50	1.05	---	---	
		M	20.00	20.50	1.12	0.000	0.000	
		H	19.80	20.50	1.17	---	---	
Right Tilted		L	20.30	20.50	1.05	---	---	
		M	20.00	20.50	1.12	0.000	0.000	
		H	19.80	20.50	1.17	---	---	
Back	20BW 50%RB (body-worn)	L	20.30	20.50	1.05	---	---	
		M	20.00	20.50	1.12	0.093	0.104	
		H	19.80	20.50	1.17	---	---	
Front		L	20.30	20.50	1.05	---	---	
		M	20.00	20.50	1.12	0.066	0.074	
		H	19.80	20.50	1.17	---	---	

6.11 SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. 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.

The following procedures are applied to determine if repeated measurements are required.

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

The Highest Reported SAR configuration in Each Frequency Band

Frequency band	Air interface	Head(w/kg)	Body(w/kg)
850 MHz	GSM850 WCDMA BAND5 LTE BAND5	<0.8	<0.8
1800/1900 MHz	GSM1900 WCDMA BAND2 WCDMA BAND4 LTE BAND4 LTE BAND2	<0.8	>0.8
2.4 GHz	WIFI LTE BAND7	<0.8	>0.8

6.12 Simultaneous Transmission SAR Analysis

Up Antenna

The sum of SAR values for GSM & Wi-Fi

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY WORN	MAXIMUM SAR VALUE FOR HOTSPOT
GSM	1.068	0.284	0.284
Wi-Fi	0.316	0.160	0.160
Sum	1.384	0.444	0.444
Note	Right cheek: GSM850+ wifi2.4G	Back: GSM1900+ wifi2.4G	Back: GSM1900+ wifi2.4G

According to the above tables, the sum of SAR values for GSM and Wi-Fi < 1.6W/kg. So simultaneous transmission SAR are not required for Wi-Fi transmitter.

The sum of SAR values for WCDMA & Wi-Fi

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY	MAXIMUM SAR VALUE FOR HOTSPOT
WCDMA	0.978	0.234	0.234
Wi-Fi	0.307	0.160	0.160
Sum	1.285	0.394	0.394
Note	Right Tilt: WCDMA5 +WIFI 2.4G	Back: WCDMA5+ WIFI 2.4G	Back: WCDMA5+ WIFI 2.4G

According to the above tables, the sum of SAR values for WCDMA and Wi-Fi < 1.6W/kg. So simultaneous transmission SAR are not required for Wi-Fi transmitter.

The sum of SAR values for LTE& Wi-Fi

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY	MAXIMUM SAR VALUE FOR HOTSPOT
LTE	1.243	0.788	0.788
Wi-Fi	0.307	0.160	0.160
Sum	1.550	0.948	0.948
Note	Right Tilt: LTE66 +WIFI 2.4G	Back: LTE66 +WIFI 2.4G	Back: LTE66 +WIFI 2.4G

According to the above tables, the sum of SAR values for LTE and Wi-Fi < 1.6W/kg. So simultaneous transmission SAR are not required for Wi-Fi transmitter.

According to the formula (KDB447498 4.3.2) the Bluetooth SAR as follow:
 $[(\text{max. power of channel, including tune-up tolerance, mw}) / (\text{min. test separation distance, mm})]$
 $[\sqrt{f(\text{GHz})} / x] \text{ W/kg}$ for test separation distances $\leq 50\text{mm}$.

Head:

min. test separation distance = 5mm

Body:

min. test separation distance = 10mm

Where $x=7.5$ for 1-g SAR, and $x=18.75$ for 10-g SAR.

Estimated SAR Bluetooth

Mode	Position	F(GHz)	Distance(mm)	Estimated
Bluetooth	Head	2.441	5	0.142
	Body	2.441	10	0.071

The sum of SAR values for GSM & Bluetooth

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY WORN
GSM	1.068	0.284
Bluetooth	0.142	0.071
Sum	1.210	0.355
Note	Right cheek: GSM850+BT	Back: GSM1900+BT

According to the above tables, the sum of SAR values for GSM and Bluetooth $< 1.6\text{W/kg}$. So simultaneous transmission SAR are not required for Bluetooth transmitter.

The sum of SAR values for WCDMA & Bluetooth

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY WORN
WCDMA	0.978	0.234
Bluetooth	0.142	0.071
Sum	1.120	0.305
Note	Right Tilt: WCDMA5+BT	Back: WCDMA5+BT

According to the above tables, the sum of SAR values for WCDMA and Bluetooth $< 1.6\text{W/kg}$. So simultaneous transmission SAR are not required for Bluetooth transmitter.

The sum of SAR values for LTE& Bluetooth

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY
LTE	1.243	0.788
Bluetooth	0.142	0.071
Sum	1.385	0.859
Note	Right Tilt: LTE66+BT	Back: LTE66 +BT

Down Antenna

The sum of SAR values for GSM & Wi-Fi

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY WORN	MAXIMUM SAR VALUE FOR HOTSPOT
GSM	0.143	0.654	1.141
Wi-Fi	0.316	0.160	0.000
Sum	0.459	0.814	1.141
Note	Right cheek: GSM850+wifi2.4G	Back: GSM1900+wifi2.4G	Bottom GSM1900+wifi2.4G

According to the above tables, the sum of SAR values for GSM and Wi-Fi < 1.6W/kg. So simultaneous transmission SAR are not required for Wi-Fi transmitter.

The sum of SAR values for WCDMA & Wi-Fi

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY	MAXIMUM SAR VALUE FOR HOTSPOT
WCDMA	0.153	0.683	1.123
Wi-Fi	0.316	0.160	0.000
Sum	0.469	0.843	1.123
Note	Right cheek: WCDMA5 +WIFI 2.4G	Back: WCDMA2+ WIFI 2.4G	Bottom: WCDMA2+ WIFI 2.4G

According to the above tables, the sum of SAR values for WCDMA and Wi-Fi < 1.6W/kg. So simultaneous transmission SAR are not required for Wi-Fi transmitter.

The sum of SAR values for LTE& Wi-Fi

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY	MAXIMUM SAR VALUE FOR HOTSPOT
LTE	0.162	0.641	1.313
Wi-Fi	0.316	0.160	0.000
Sum	0.478	0.801	1.313
Note	Right cheek: LTE12 +WIFI 2.4G	Back: LTE2 +WIFI 2.4G	Bottom: LTE2 +WIFI 2.4G

According to the above tables, the sum of SAR values for LTE and Wi-Fi < 1.6W/kg. So simultaneous transmission SAR are not required for Wi-Fi transmitter.

According to the formula (KDB447498 4.3.2) the Bluetooth SAR as follow:
 $[(\text{max. power of channel, including tune-up tolerance, mw}) / (\text{min. test separation distance, mm})]$
 $[\sqrt{f(\text{GHz})} / x] \text{ W/kg}$ for test separation distances $\leq 50\text{mm}$.

Head:

min. test separation distance = 5mm

Body:

min. test separation distance = 10mm

Where $x=7.5$ for 1-g SAR, and $x=18.75$ for 10-g SAR.

Estimated SAR Bluetooth

Mode	Position	F(GHz)	Distance(mm)	Estimated
Bluetooth	Head	2.441	5	0.142
	Body	2.441	10	0.071

The sum of SAR values for GSM & Bluetooth

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY WORN
GSM	0.143	0.654
Bluetooth	0.142	0.071
Sum	0.285	0.725
Note	Right cheek: GSM850+BT	Back: GSM1900+BT

According to the above tables, the sum of SAR values for GSM and Bluetooth $< 1.6\text{W/kg}$. So simultaneous transmission SAR are not required for Bluetooth transmitter.

The sum of SAR values for WCDMA & Bluetooth

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY WORN
WCDMA	0.153	0.683
Bluetooth	0.142	0.071
Sum	0.295	0.754
Note	Right cheek: WCDMA5+BT	Back: WCDMA2+BT

According to the above tables, the sum of SAR values for WCDMA and Bluetooth $< 1.6\text{W/kg}$. So simultaneous transmission SAR are not required for Bluetooth transmitter.

The sum of SAR values for LTE& Bluetooth

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY WORN
LTE	0.162	0.641
Bluetooth	0.142	0.071
Sum	0.304	0.712
Note	Right cheek: LTE12+BT	Back: LTE2 +BT

7 MEASUREMENT UNCERTAINTY

(0.3 - 3 GHz range)								
Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.0 %	N	1	1	1	±6.0 %	±6.0 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Modulation Response ^m	±2.4 %	R	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.4 %	R	$\sqrt{3}$	1	1	±0.2 %	±0.2 %	∞
Probe Positioning	±2.9 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Max. SAR Eval.	±2.0 %	R	$\sqrt{3}$	1	1	±1.2 %	±1.2 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Power Scaling ^p	±0 %	R	$\sqrt{3}$	1	1	±0.0 %	±0.0 %	∞
Phantom and Setup								
Phantom Uncertainty	±6.1 %	R	$\sqrt{3}$	1	1	±3.5 %	±3.5 %	∞
SAR correction	±1.9 %	R	$\sqrt{3}$	1	0.84	±1.1 %	±0.9 %	∞
Liquid Conductivity (mea.) ^{DARK}	±2.5 %	R	$\sqrt{3}$	0.78	0.71	±1.1 %	±1.0 %	∞
Liquid Permittivity (mea.) ^{DARK}	±2.5 %	R	$\sqrt{3}$	0.26	0.26	±0.3 %	±0.4 %	∞
Temp. unc. - Conductivity ^{BB}	±3.4 %	R	$\sqrt{3}$	0.78	0.71	±1.5 %	±1.4 %	∞
Temp. unc. - Permittivity ^{BB}	±0.4 %	R	$\sqrt{3}$	0.23	0.26	±0.1 %	±0.1 %	∞
Combined Std. Uncertainty						±11.2 %	±11.1 %	361
Expanded STD Uncertainty						±22.3 %	±22.2 %	

(3 - 6 GHz range)								
Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.55 %	N	1	1	1	±6.55 %	±6.55 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±2.0 %	R	$\sqrt{3}$	1	1	±1.2 %	±1.2 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Modulation Response ^m	±2.4 %	R	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Probe Positioning	±6.7 %	R	$\sqrt{3}$	1	1	±3.9 %	±3.9 %	∞
Max. SAR Eval.	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Power Scaling ^p	±0 %	R	$\sqrt{3}$	1	1	±0.0 %	±0.0 %	∞
Phantom and Setup								
Phantom Uncertainty	±6.6 %	R	$\sqrt{3}$	1	1	±3.8 %	±3.8 %	∞
SAR correction	±1.9 %	R	$\sqrt{3}$	1	0.84	±1.1 %	±0.9 %	∞
Liquid Conductivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.78	0.71	±1.1 %	±1.0 %	∞
Liquid Permittivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.26	0.26	±0.3 %	±0.4 %	∞
Temp. unc. - Conductivity ^{BB}	±3.4 %	R	$\sqrt{3}$	0.78	0.71	±1.5 %	±1.4 %	∞
Temp. unc. - Permittivity ^{BB}	±0.4 %	R	$\sqrt{3}$	0.23	0.26	±0.1 %	±0.1 %	∞
Combined Std. Uncertainty						±12.3 %	±12.2 %	748
Expanded STD Uncertainty						±24.6 %	±24.5 %	

8 TEST EQUIPMENTS

The measurements were performed using an automated near-field scanning system, DASY5, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements was the 'advanced extrapolation' algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Model	Serial Number	Calibration date	Calibration Due data
DAE	DAE4	546	2018.10.15	2019.10.14
Dosimetric E-field Probe	ES3DV3	3127	2018.11.02	2019.11.01
Dipole Validation Kit	D750V3	1101	2017.09.13	2020.09.12
Dipole Validation Kit	D835V2	4d023	2017.09.13	2020.09.12
Dipole Validation Kit	D1800V2	2d084	2017.09.15	2020.09.14
Dipole Validation Kit	D2000V2	1009	2018.02.01	2021.01.31
Dipole Validation Kit	D2450V2	738	2017.09.18	2020.09.17

According to KDB 865664 D01 section 3.2.2, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the **SAR target, impedance and return loss** of a dipole have remain stable according to the following requirements.

- 1) The test laboratory must ensure that the required supporting information and documentation are included in the SAR report to qualify for the three-year extended calibration interval; otherwise, the IEEE Std 1528-2013 recommended annual calibration applies.
- 2) Immediate re-calibration is required for the following conditions.
 - a) After a dipole is damaged and properly repaired to meet required specifications.
 - b) When the measured SAR deviates from the calibrated SAR value by more than 10% due to changes in physical, mechanical, electrical or other relevant dipole conditions; i.e., the error is not introduced by incorrect measurement procedures or other issues relating to the SAR measurement system.
 - c) When the most recent return-loss result, measured at least annually, deviates by more than 20% from the previous measurement (i.e. value in dB×0.2) or not meeting the required 20 dB minimum return-loss requirement.
 - d) When the most recent measurement of the real or imaginary parts of the impedance, measured at least annually, deviates by more than 5 Ω from the previous measurement.

Dipole 750

SAR target

Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

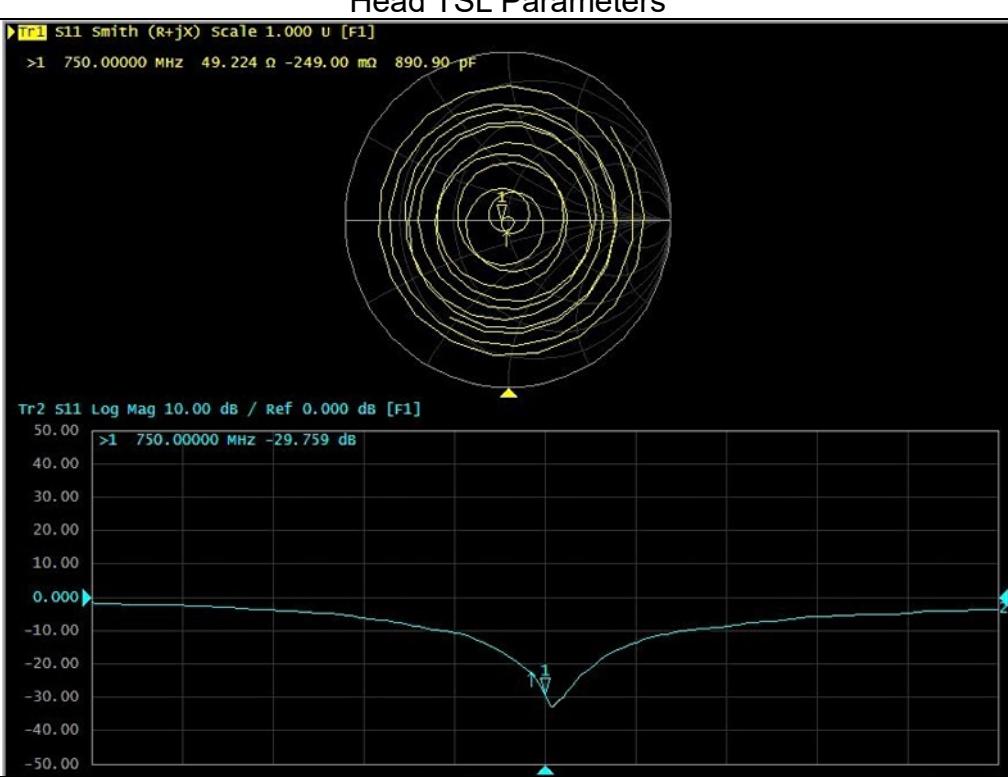
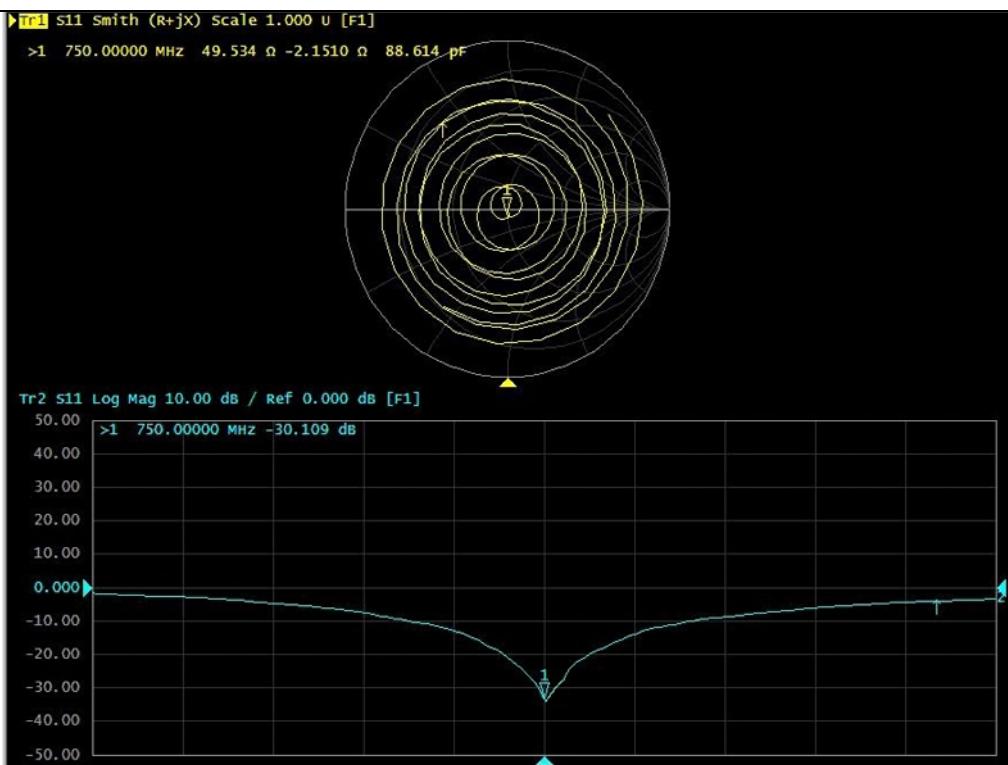
Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance (measured on 2018.8.20), deviates within 5Ω from the previous measurement. (Data from the last calibration report)

The most recent return-loss result (measured on 2018.8.20) deviates within 20% from the previous measurement. (Data from the last calibration report)

Head TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	Deviation
Impedance	$53.9\Omega+0.24j\Omega$	$49.5\Omega-2.15j\Omega$	<5Ω
Return loss	-28.4dB	-29.8dB	<20%

Body TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	Deviation
Impedance	$52.0\Omega-2.22j\Omega$	$49.2\Omega-0.25j\Omega$	<5Ω
Return loss	-30.6dB	-30.1dB	<20%



Dipole 835

SAR target

Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

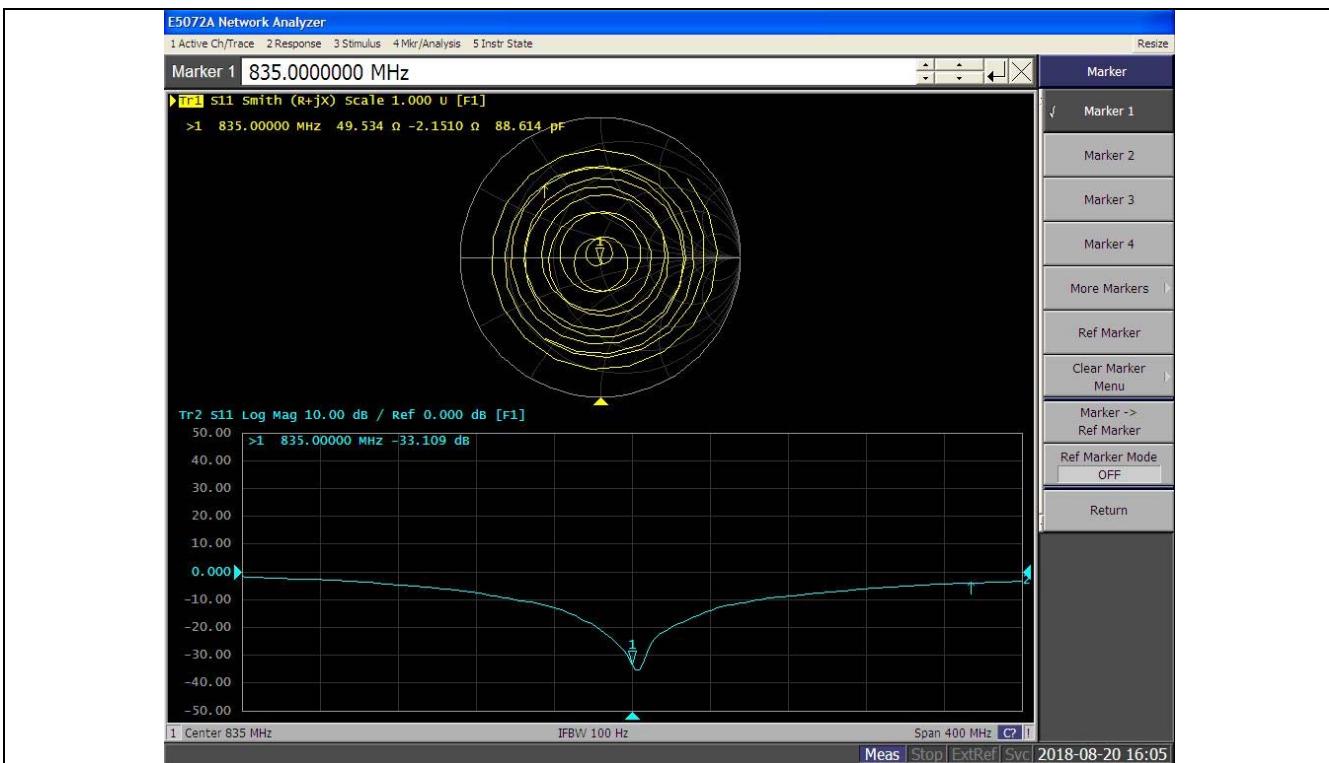
Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance (measured on 2018.8.20), deviates within 5Ω from the previous measurement. (Data from the last calibration report)

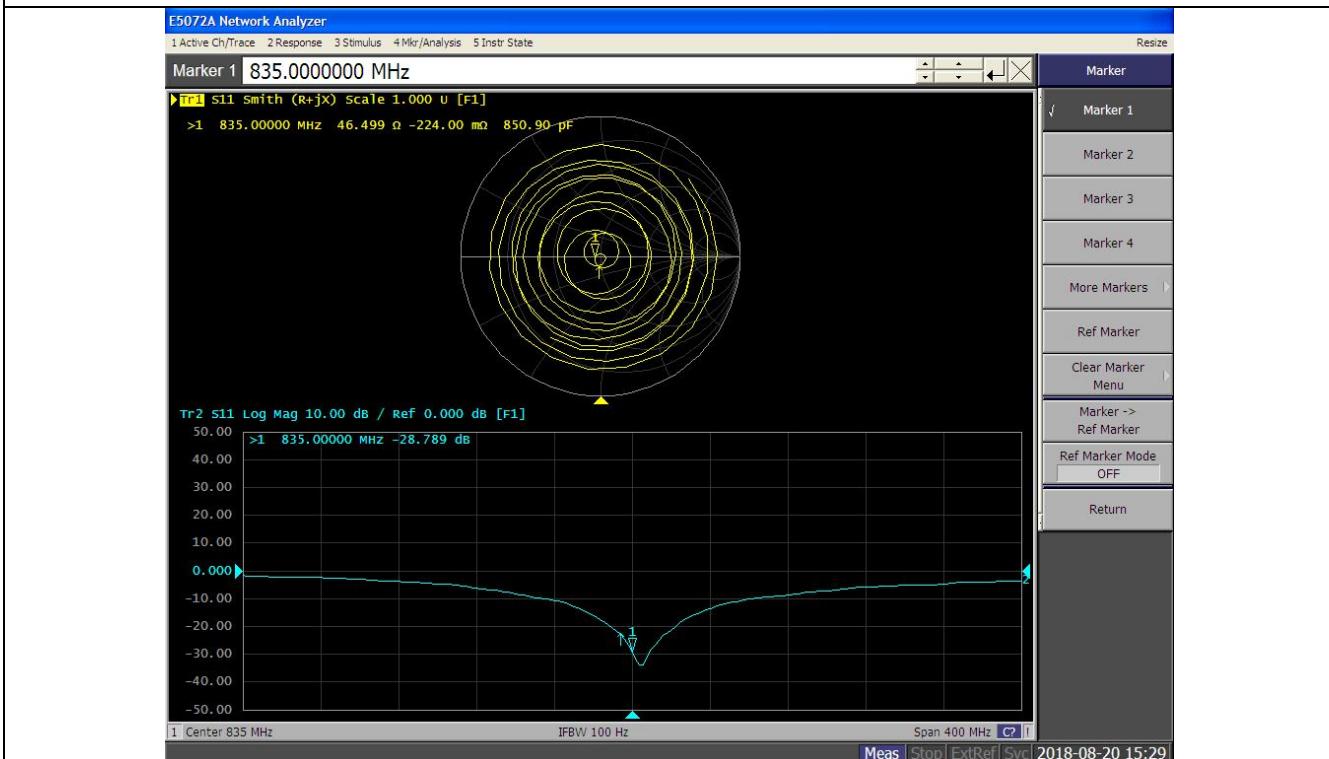
The most recent return-loss result (measured on 2018.8.20) deviates within 20% from the previous measurement. (Data from the last calibration report)

Head TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	deviation
Impedance	$53.9.0\Omega+0.24j\Omega$	$49.5\Omega-2.15j\Omega$	<5Ω
Return loss	-28.4 db	-30.11 db	<20%

Body TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	deviation
Impedance	$52.0\Omega-2.22j\Omega$	$49.24\Omega-0.25j\Omega$	<5Ω
Return loss	-30.6db	-29.76db	<20%



Head TSL Parameters



Body TSL Parameters

Dipole1800

SAR target

Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

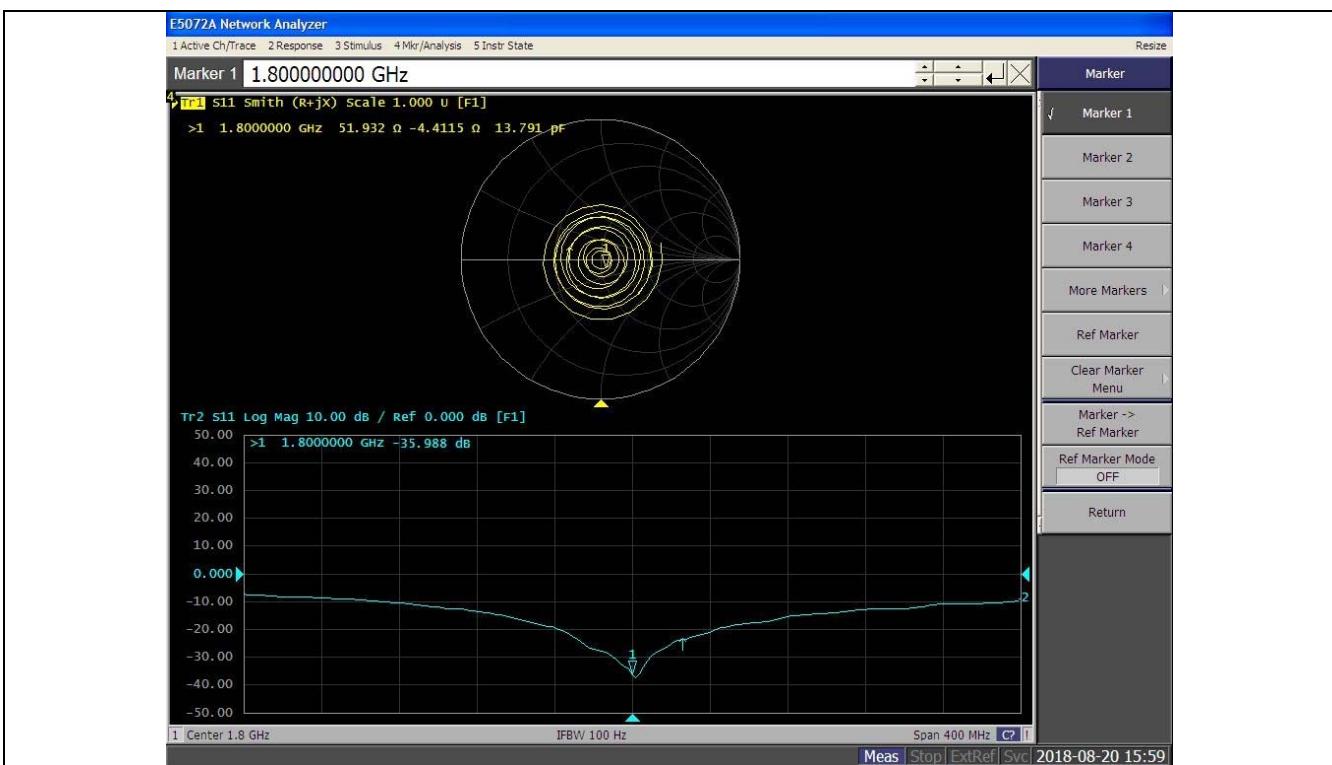
Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance (measured on 2018.8.20), deviates within 5Ω from the previous measurement. (Data from the last calibration report)

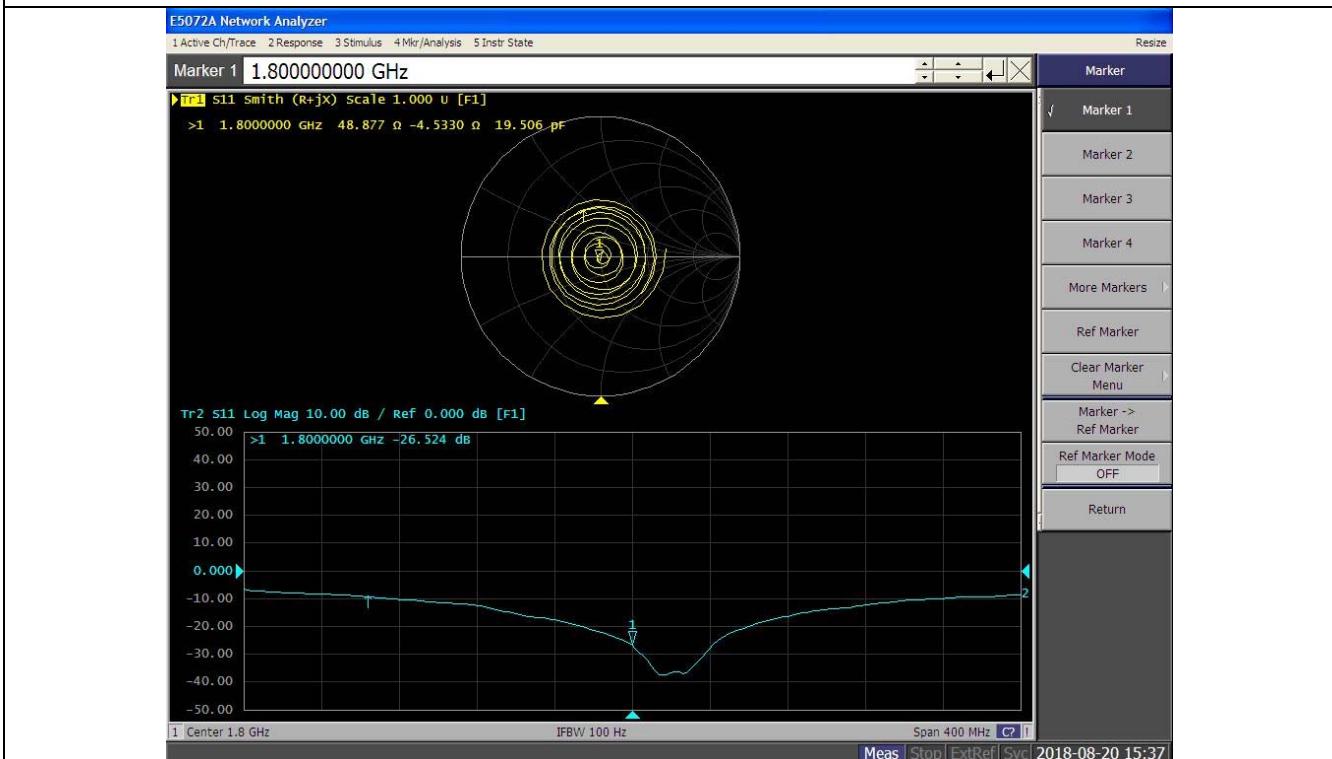
The most recent return-loss result (measured on 2018.8.20) deviates within 20% from the previous measurement. (Data from the last calibration report)

Head TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	deviation
Impedance	$49.3\Omega-1.55j\Omega$	$51.9\Omega-4.41j\Omega$	<5Ω
Return loss	-35.4 db	-36.0db	<20%

Body TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	deviation
Impedance	$46.0\Omega-1.32j\Omega$	$48.9\Omega-4.53j\Omega$	<5Ω
Return loss	-27.1db	-26.5db	<20%



Head TSL Parameters



Body TSL Parameters

Dipole2000

SAR target

Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

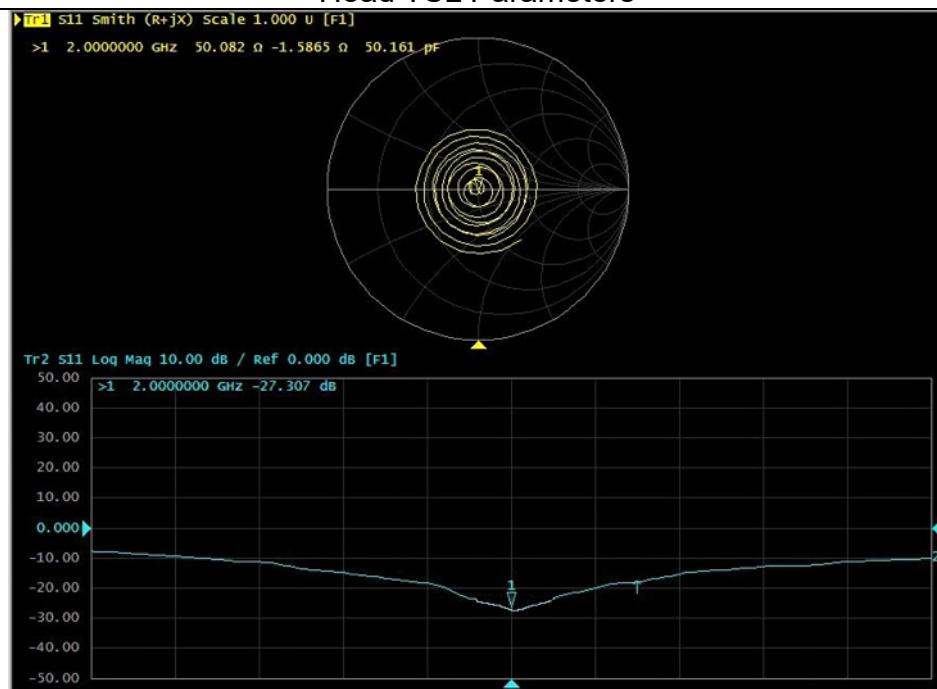
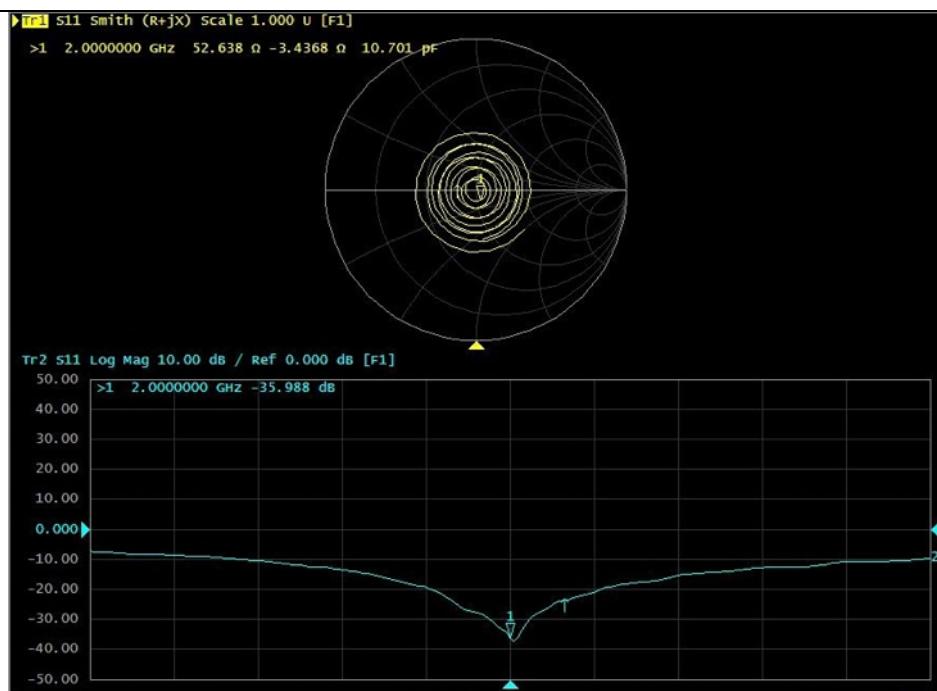
Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance (measured on 2018.8.20), deviates within 5Ω from the previous measurement. (Data from the last calibration report)

The most recent return-loss result (measured on 2018.8.20) deviates within 20% from the previous measurement. (Data from the last calibration report)

Head TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	deviation
Impedance	$49.8\Omega-2.08j\Omega$	$52.64\Omega-3.44j\Omega$	<5Ω
Return loss	-33.6 db	-36.0db	<20%

Body TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	deviation
Impedance	$46.3\Omega-1.63j\Omega$	$50.08\Omega-1.59j\Omega$	<5Ω
Return loss	-27.6db	-27.31db	<20%



Dipole2450

SAR target

Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

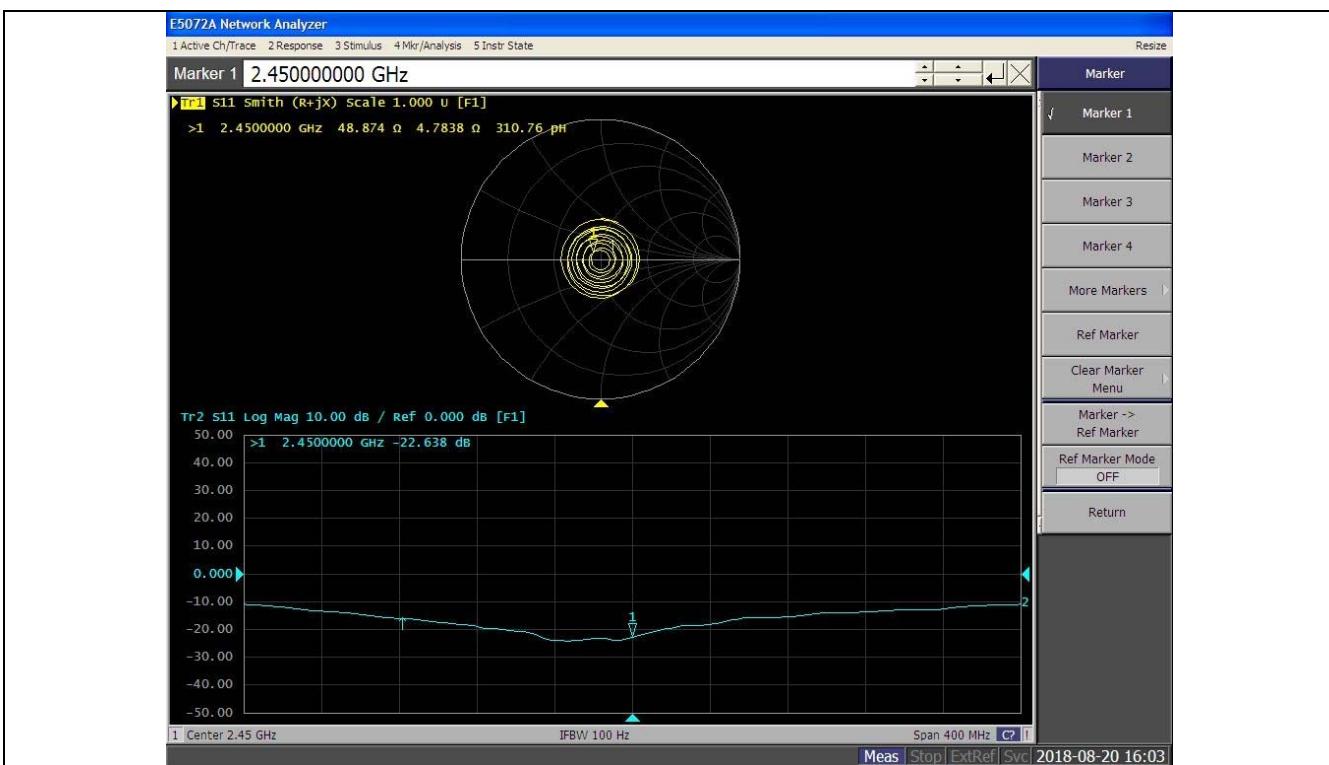
Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance (measured on 2018.8.20), deviates within 5Ω from the previous measurement. (Data from the last calibration report)

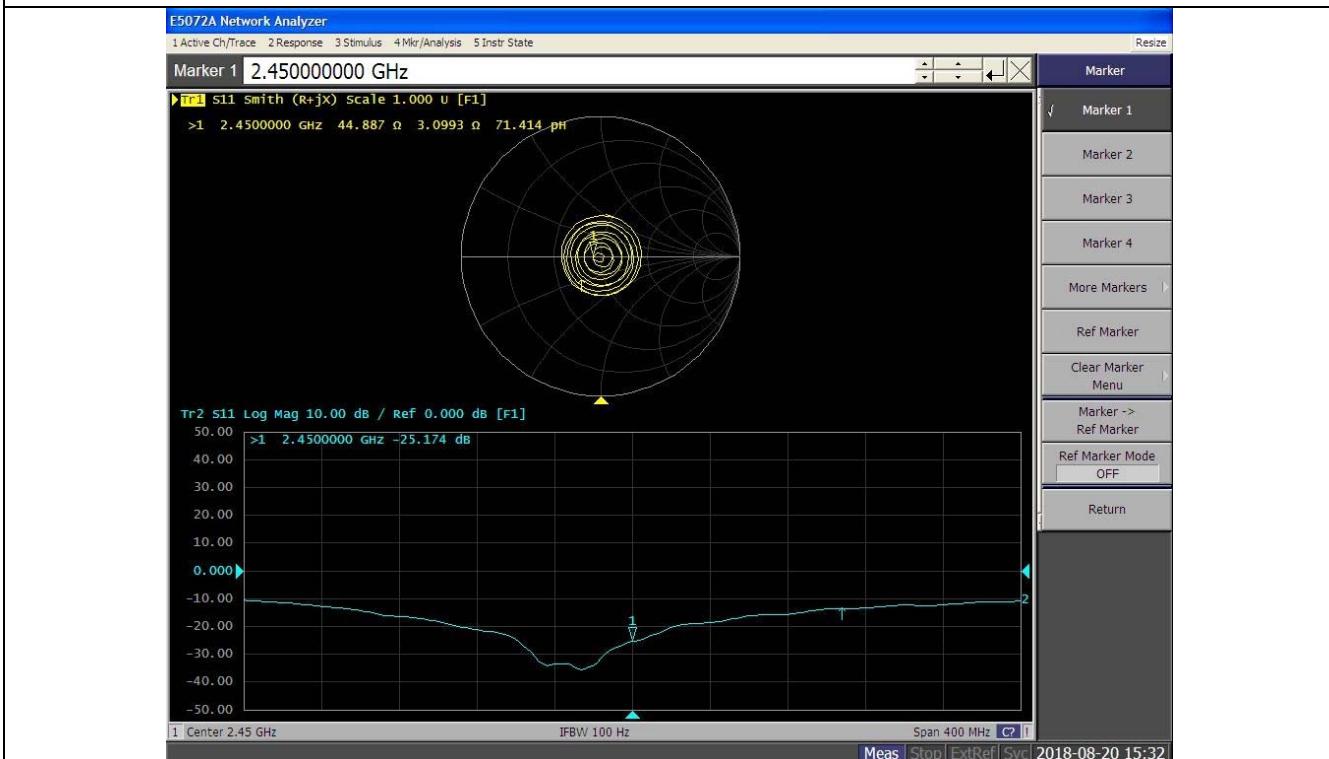
The most recent return-loss result (measured on 2018.8.20) deviates within 20% from the previous measurement. (Data from the last calibration report)

Head TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	deviation
Impedance	$51.3\Omega+5.92j\Omega$	$48.9\Omega+4.78j\Omega$	<5Ω
Return loss	-24.5 db	-22.6db	<20%

Body TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	deviation
Impedance	$47.6\Omega+6.39j\Omega$	$44.9\Omega+3.10j\Omega$	<5Ω
Return loss	-23.1db	-25.2db	<20%



Head TSL Parameters



Body TSL Parameters

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration date	Calibration Due data
Signal Generator	E4428C	MY45280865	2018.08.20	2019.08.19
Signal Generator	SML 03	103514	2018.08.20	2019.08.19
Power meter	E4417A	MY45101182	2018.08.20	2019.08.19
Power Sensor	E4412A	MY41502214	2018.08.20	2019.08.19
Power Sensor	E4412A	MY41502130	2018.08.20	2019.08.19
Power meter	E4417A	MY45101004	2018.08.20	2019.08.19
Power Sensor	E9300B	MY41496001	2018.08.20	2019.08.19
Power Sensor	E9300B	MY41496003	2018.08.20	2019.08.19
Communication Tester	MT8820C	6201300660	2018.08.20	2019.08.19
Vector Network Analyzer	VNA R140	0011213	2018.10.17	2019.10.16
Dielectric Parameter Probe	DAKS-3.5	1042	2018.10.17	2019.10.16
Network Analyzer	E5072A	MY51100334	2018.03.01	2019.02.28

Detailed information of Isotropic E-field Probe Type 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)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
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
Dynamic Range	5 μ W/g to > 100 W/kg; Linearity: ± 0.2 dB
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones

Detailed information of Isotropic E-field Probe Type EX3DV4

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Optical Surface Detection	± 0.3 mm repeatability in air and clear liquids over diffuse reflecting surfaces
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
Dynamic Range	10 μ W/g to > 100 W/kg Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better than 30%.

ANNEX A – TEST PLOTS

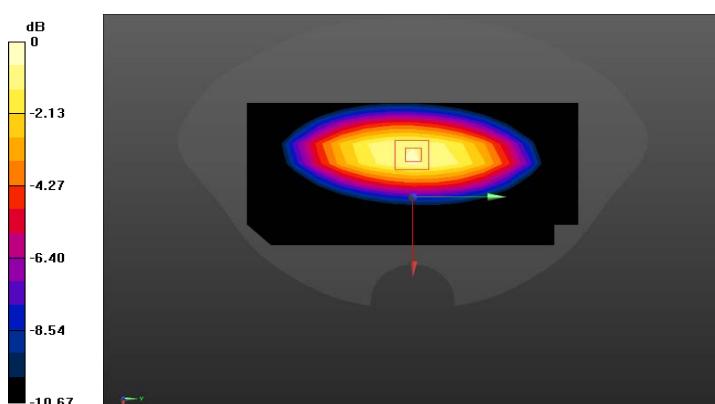
Please refer to the attachment.

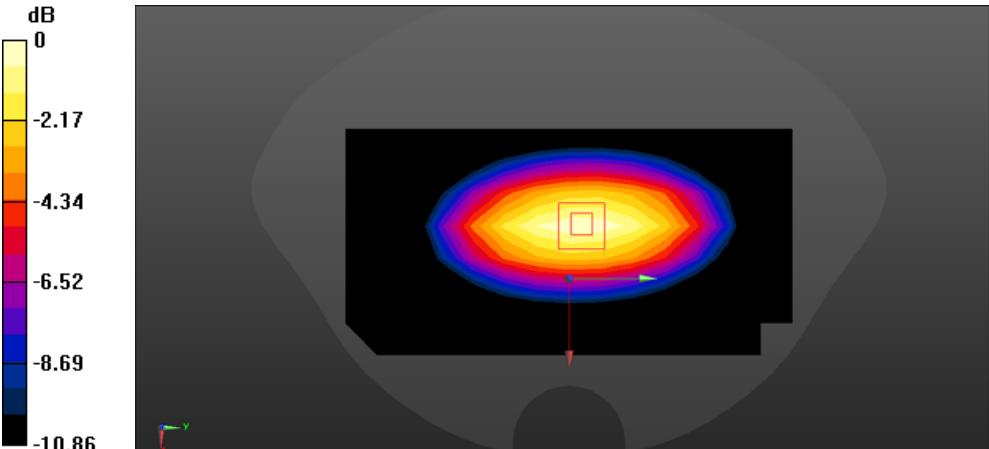
ANNEX B – RELEVANT PAGES FROM CALIBRATION REPORTS

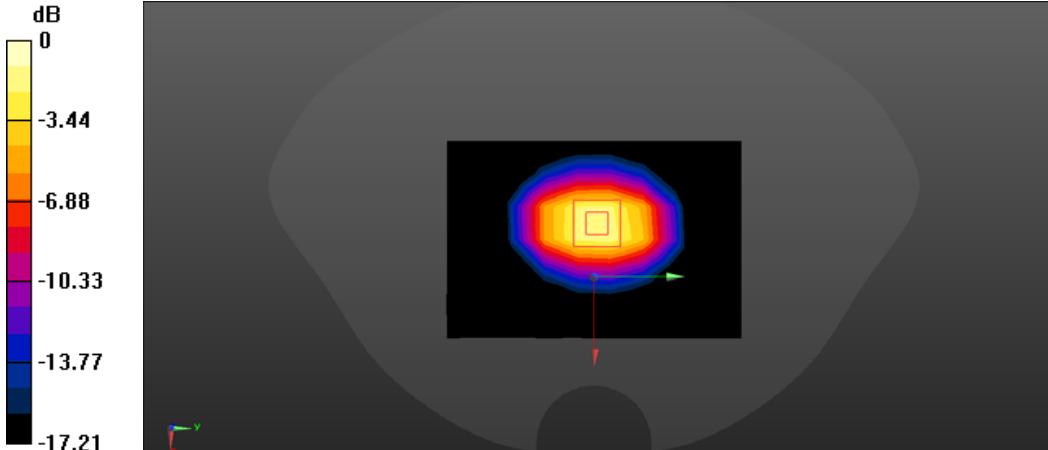
Please refer to the attachment.

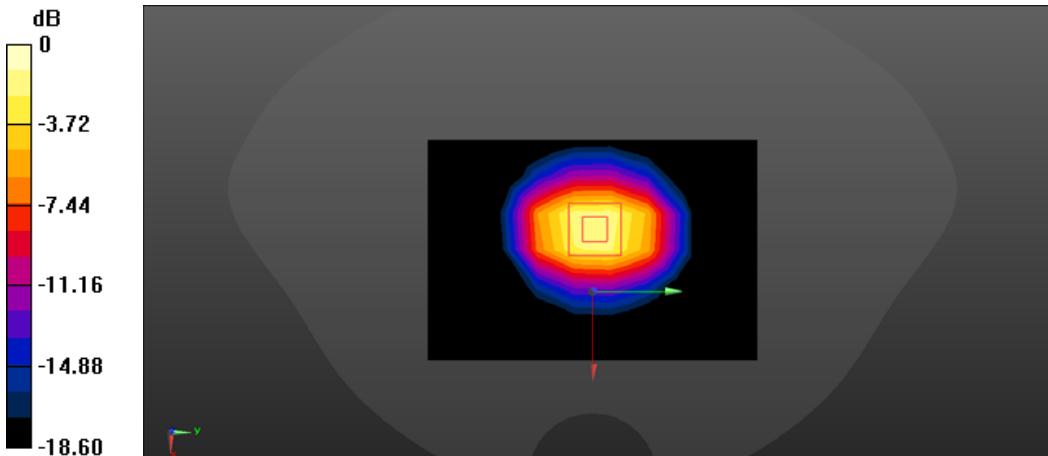
ANNEX A – TEST PLOTS

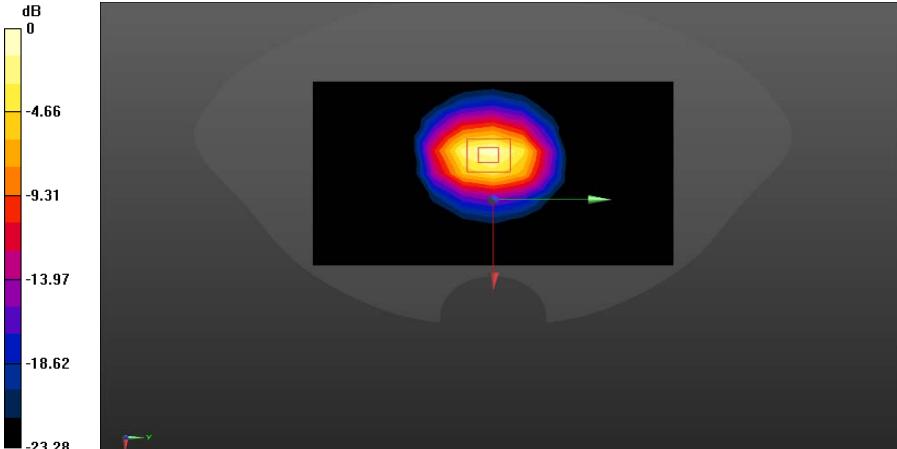
Head liquid

System check	750MHz
<p>Communication System: UID 0, CW (0); Communication System Band: D750 (750.0 MHz); Frequency: 750 MHz; Communication System PAR: 0 dB</p> <p>Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.917 \text{ S/m}$; $\epsilon_r = 42.068$; $\rho = 1000 \text{ kg/m}^3$</p> <p>Phantom section: Flat Section</p> <p>DASY Configuration:</p> <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(6.34, 6.34, 6.34); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection), $z = -3.0, 32.0$ • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx • DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) <p>System Performance Check at Frequencies 750MHz/d=15mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Area Scan (8x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$</p> <p>Maximum value of SAR (measured) = 2.16 W/kg</p> <p>System Performance Check at Frequencies 750MHz/d=15mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$</p> <p>Reference Value = 41.00 V/m; Power Drift = 0.13 dB</p> <p>Peak SAR (extrapolated) = 3.26 W/kg</p> <p>SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.37 W/kg</p> <p>Maximum value of SAR (measured) = 2.49 W/kg</p>  <p style="text-align: center;">$0 \text{ dB} = 2.49 \text{ W/kg} = 3.96 \text{ dBW/kg}$</p>	

System check	835MHz
Communication System: UID 0, CW (0); Frequency: 835 MHz	
Medium parameters used (interpolated): $f = 835 \text{ MHz}$; $\sigma = 0.914 \text{ S/m}$; $\epsilon_r = 41.529$; $\rho = 1000 \text{ kg/m}^3$	
Phantom section: Flat Section	
DASY5 Configuration:	
<ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(6.18, 6.18, 6.18); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Configuration 835/835/Area Scan (8x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$</p> <p>Maximum value of SAR (measured) = 2.87 W/kg</p> <p>Configuration 835/835/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$</p> <p>Reference Value = 52.13 V/m; Power Drift = 0.12 dB</p> <p>Peak SAR (extrapolated) = 3.66 W/kg</p> <p>SAR(1 g) = 2.17 W/kg; SAR(10 g) = 1.45 W/kg</p> <p>Maximum value of SAR (measured) = 2.67 W/kg</p>	
 <p>0 dB = 2.67 W/kg = 4.27 dBW/kg</p>	

System check	1800MHz
<p>Communication System: UID 0, CW (0); Frequency: 1800 MHz Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.401 \text{ S/m}$; $\epsilon_r = 40.012$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(5.07, 5.07, 5.07); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Configuration 1800/1800/Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (measured) = 8.31 W/kg</p> <p>Configuration 1800/1800/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 76.60 V/m; Power Drift = 0.17 dB Peak SAR (extrapolated) = 17.5 W/kg SAR(1 g) = 9.53 W/kg; SAR(10 g) = 4.98 W/kg Maximum value of SAR (measured) = 12.1 W/kg</p>  <p>0 dB = 12.1 W/kg = 10.83 dBW/kg</p>	

System check	2000MHz
<p>Communication System: UID 0, CW (0); Frequency: 2000 MHz Medium parameters used: $f = 2000$ MHz; $\sigma = 1.375$ S/m; $\epsilon_r = 39.815$; $\rho = 1000$ kg/m³ Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(4.96, 4.96, 4.96); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Configuration 2000/2000/Area Scan (7x10x1): Measurement grid: dx=10mm, dy=10mm</p> <p>Maximum value of SAR (measured) = 8.40 W/kg</p> <p>Configuration 2000/2000/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm</p> <p>Reference Value = 76.73 V/m; Power Drift = 0.02 dB</p> <p>Peak SAR (extrapolated) = 18.7 W/kg</p> <p>SAR(1 g) = 9.65 W/kg; SAR(10 g) = 4.86 W/kg</p> <p>Maximum value of SAR (measured) = 12.5 W/kg</p>  <p>0 dB = 12.5 W/kg = 10.97 dBW/kg</p>	

System check	2450MHz
Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz	
Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.846 \text{ S/m}$; $\epsilon_r = 39.582$; $\rho = 1000 \text{ kg/m}^3$	
Phantom section: Flat Section	
DASY Configuration:	
<ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(4.66, 4.66, 4.66); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection), $z = -3.0, 32.0$ Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) System Performance Check at Frequencies 2450MHz Head/d=10mm, Pin=250 mW, dist=4.0mm (EX-Probe)/Area Scan (9x13x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$ Maximum value of SAR (measured) = 21.87 W/kg System Performance Check at Frequencies 2450MHz Head/d=10mm, Pin=250 mW, dist=4.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 98.95 V/m; Power Drift = 0.10 dB Peak SAR (extrapolated) = 27.9 W/kg SAR(1 g) = 13.2 W/kg; SAR(10 g) = 5.99 W/kg Maximum value of SAR (measured) = 12.56 W/kg 	
 $0 \text{ dB} = 12.56 \text{ W/kg} = 10.99 \text{ dBW/kg}$	

Body liquid

System check

750MHz

Communication System: UID 0, CW (0); Communication System Band: D750 (750.0 MHz); Frequency: 750 MHz; Communication System PAR: 0 dB

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.976 \text{ S/m}$; $\epsilon_r = 53.279$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY Configuration:

- Probe: ES3DV3 - SN3127; ConvF(6.34, 6.34, 6.34); Calibrated: 2018/11/2;
- Sensor-Surface: 3mm (Mechanical Surface Detection), $z = -3.0, 32.0$
- Electronics: DAE4 Sn546; Calibrated: 2018/10/15
- Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

System Performance Check at Frequencies 750MHz/d=15mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Area Scan (8x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 2.31 W/kg

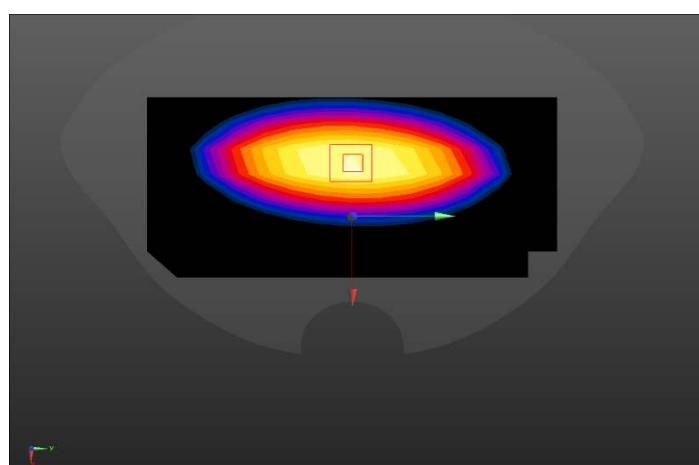
System Performance Check at Frequencies 750MHz/d=15mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

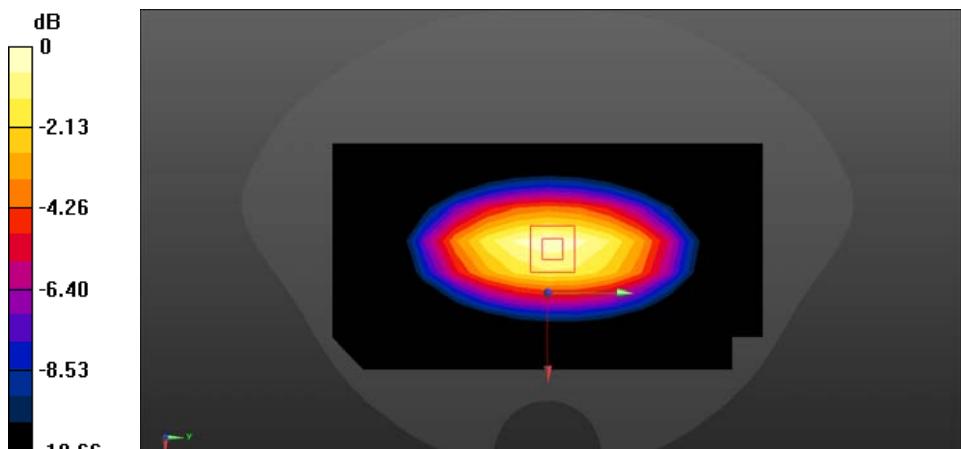
Reference Value = 41.26 V/m; Power Drift = 0.13 dB

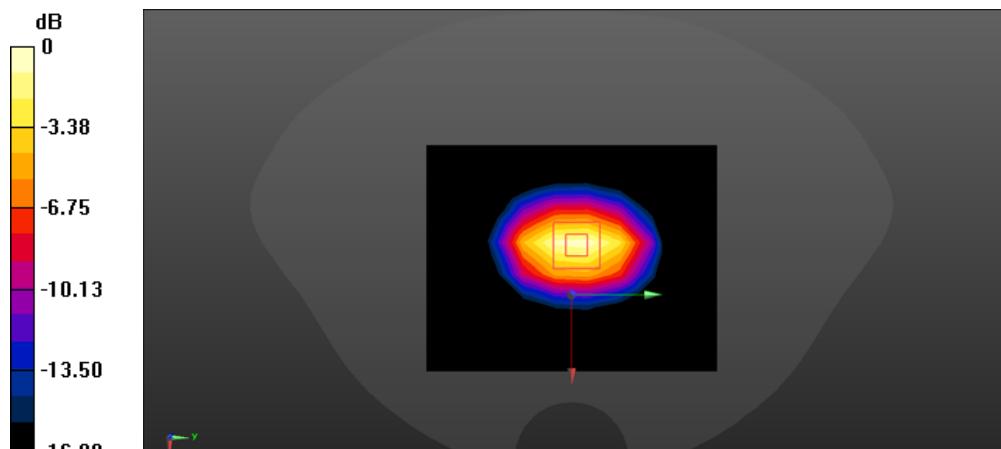
Peak SAR (extrapolated) = 3.45 W/kg

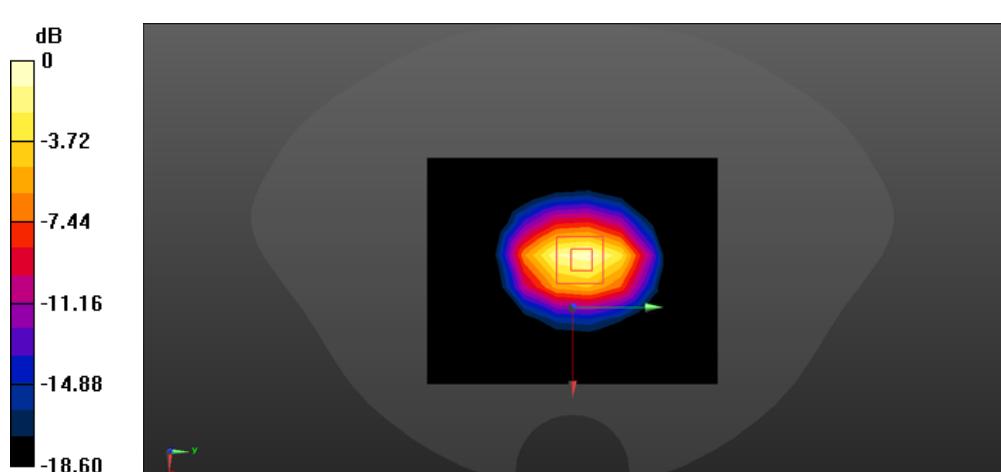
SAR(1 g) = 2.06 W/kg; SAR(10 g) = 1.47 W/kg

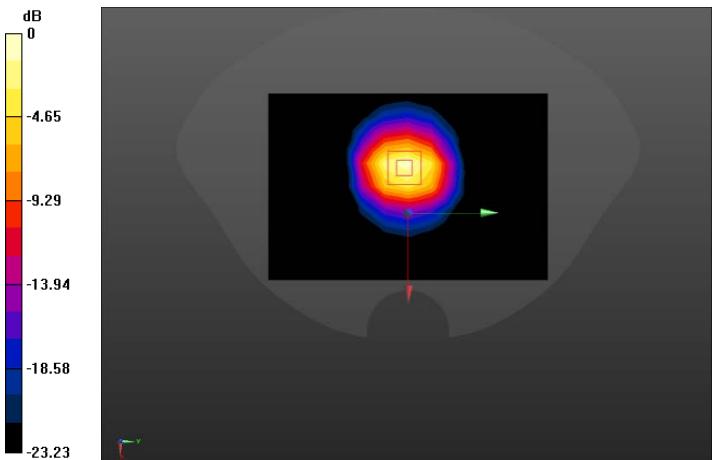
Maximum value of SAR (measured) = 2.66 W/kg



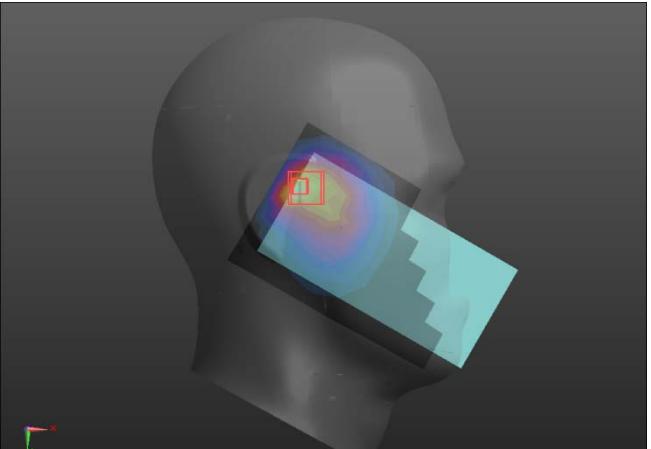
System check	835MHz
Communication System: UID 0, CW (0); Frequency: 835 MHz	
Medium parameters used (interpolated): $f = 835 \text{ MHz}$; $\sigma = 0.966 \text{ S/m}$; $\epsilon_r = 55.236$; $\rho = 1000 \text{ kg/m}^3$	
Phantom section: Flat Section	
DASY5 Configuration:	
<ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(6.13, 6.13, 6.13); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Configuration 835/835/Area Scan (8x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$</p> <p>Maximum value of SAR (measured) = 2.57 W/kg</p> <p>Configuration 835/835/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$</p> <p>Reference Value = 51.34 V/m; Power Drift = 0.19 dB</p> <p>Peak SAR (extrapolated) = 3.26 W/kg</p> <p>SAR(1 g) = 2.19 W/kg; SAR(10 g) = 1.45 W/kg</p> <p>Maximum value of SAR (measured) = 2.58 W/kg</p>	
 <p>0 dB = 2.58 W/kg = 4.11 dBW/kg</p>	

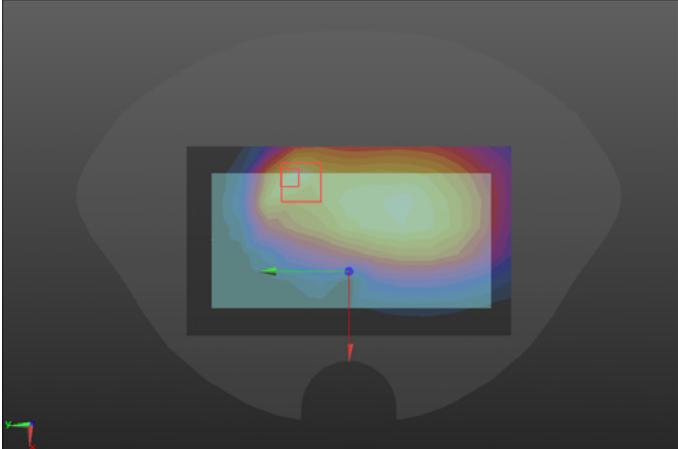
System check	1800MHz
<p>Communication System: UID 0, CW (0); Frequency: 1800 MHz Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.502 \text{ S/m}$; $\epsilon_r = 53.287$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(4.76, 4.76, 4.76); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Configuration 1800/1800/Area Scan (8x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$ Maximum value of SAR (measured) = 11.5 W/kg</p> <p>Configuration 1800/1800/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 80.17 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 17.8 W/kg SAR(1 g) = 9.60 W/kg; SAR(10 g) = 5.03 W/kg Maximum value of SAR (measured) = 12.4 W/kg</p>  <p>0 dB = 12.4 W/kg = 10.93 dBW/kg</p>	

System check	2000MHz
<p>Communication System: UID 0, CW (0); Frequency: 2000 MHz Medium parameters used: $f = 2000$ MHz; $\sigma = 1.586$ S/m; $\epsilon_r = 52.557$; $\rho = 1000$ kg/m³ Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(4.80, 4.80, 4.80); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Configuration 2000/2000/Area Scan (8x10x1): Measurement grid: dx=12mm, dy=12mm</p> <p>Maximum value of SAR (measured) = 11.1 W/kg</p> <p>Configuration 2000/2000/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm</p> <p>Reference Value = 78.14 V/m; Power Drift = 0.05 dB</p> <p>Peak SAR (extrapolated) = 17.8 W/kg</p> <p>SAR(1 g) = 9.71 W/kg; SAR(10 g) = 4.78 W/kg</p> <p>Maximum value of SAR (measured) = 12.1 W/kg</p>  <p>0 dB = 12.1 W/kg = 10.83 dBW/kg</p>	2000MHz

System check	2450MHz
Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz;	
Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 2.017 \text{ S/m}$; $\epsilon_r = 51.146$; $\rho = 1000 \text{ kg/m}^3$	
Phantom section: Flat Section	
DASY Configuration:	
<ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(4.31, 4.31, 4.31); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection), $z = -3.0, 32.0$ Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373) 	
System Performance Check at Frequencies 2450MHz Head/d=10mm, Pin=250 mW, dist=4.0mm (EX-Probe)/Area Scan (9x13x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$ Maximum value of SAR (measured) = 13.4 W/kg	
System Performance Check at Frequencies 2450MHz Head/d=10mm, Pin=250 mW, dist=4.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 62.29 V/m; Power Drift = 0.12 dB Peak SAR (extrapolated) = 29.3 W/kg SAR(1 g) = 13.24 W/kg; SAR(10 g) = 6.11 W/kg Maximum value of SAR (measured) = 18.9 W/kg	
 0 dB = 18.9 W/kg = 12.76 dBW/kg	

GSM (850MHz)

Up Antenna	Right Side	Cheek
<p>Communication System: UID 0, Generic GSM (0); Frequency: 836.6 MHz; Duty Cycle: 2:8 Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.905$ S/m; $\epsilon_r = 41.528$; $\rho = 1000$ kg/m³ Phantom section: Right Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(6.18, 6.18, 6.18); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Right/G850 right cheek/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 1.16 W/kg Right/G850 right cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 30.03 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 1.80 W/kg SAR(1 g) = 0.998 W/kg; SAR(10 g) = 0.572 W/kg Maximum value of SAR (measured) = 1.02 W/kg</p> 		

Down Antenna	Body-worn	Back
<p>Communication System: UID 0, Generic GSM (0); Frequency: 836.6 MHz; Duty Cycle: 2:8</p> <p>Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.976$ S/m; $\epsilon_r = 55.195$; $\rho = 1000$ kg/m³</p> <p>Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(6.13, 6.13, 6.13); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Flat/G850 down Back/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm</p> <p>Maximum value of SAR (measured) = 0.224 W/kg</p> <p>Flat/G850 down Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm</p> <p>Reference Value = 13.63 V/m; Power Drift = -0.19 dB</p> <p>Peak SAR (extrapolated) = 0.346 W/kg</p> <p>SAR(1 g) = 0.185 W/kg; SAR(10 g) = 0.111 W/kg</p> <p>Maximum value of SAR (measured) = 0.230 W/kg</p> 		

GSM (1900MHz)

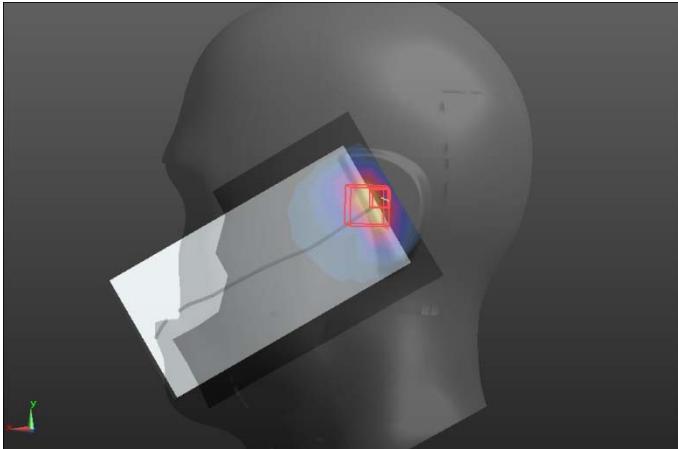
Up Antenna	Left side	Tilt
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz; Duty Cycle: 2:8 Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.4$ S/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m 3 Phantom section: Left Section		

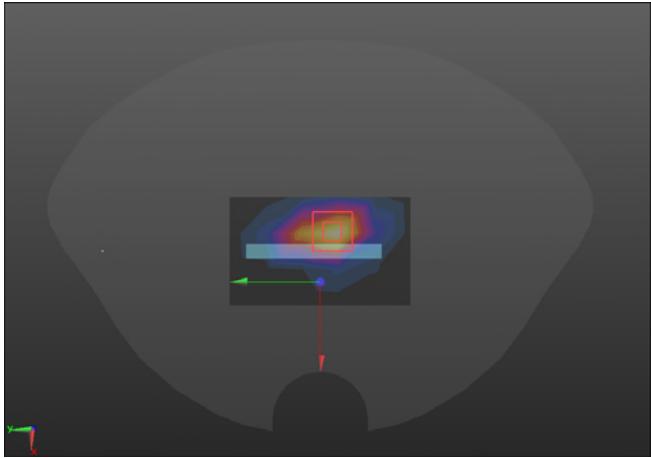
DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(5.07, 5.07, 5.07); Calibrated: 2018/11/2;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2018/10/15
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373)

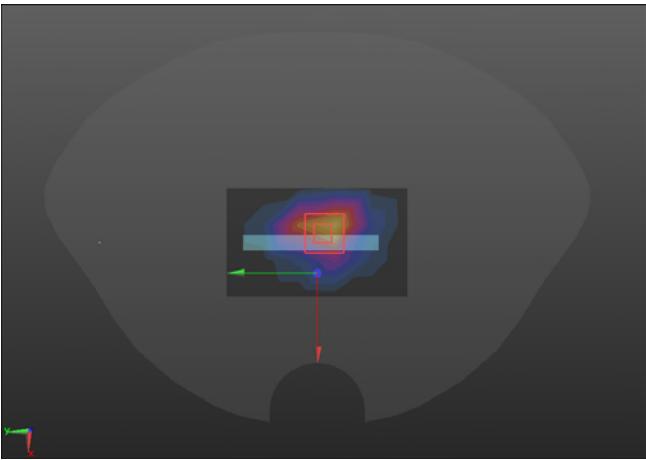
Left/Left tilt/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.08 W/kg

Left/Left tilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.24 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.73 W/kg
SAR(1 g) = 0.621 W/kg; SAR(10 g) = 0.340 W/kg
Maximum value of SAR (measured) = 1.24 W/kg

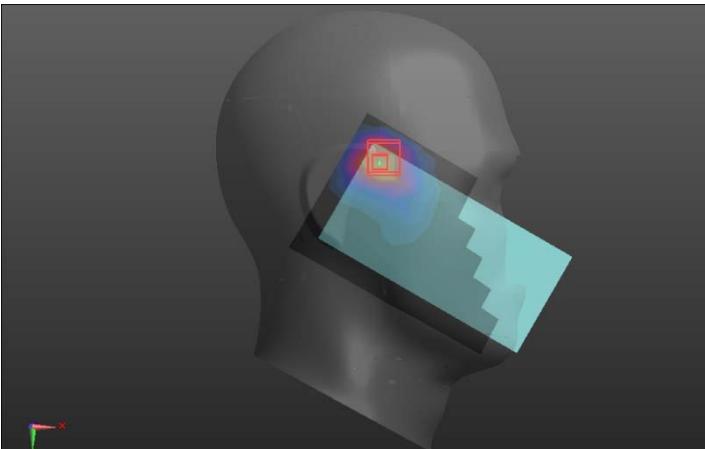


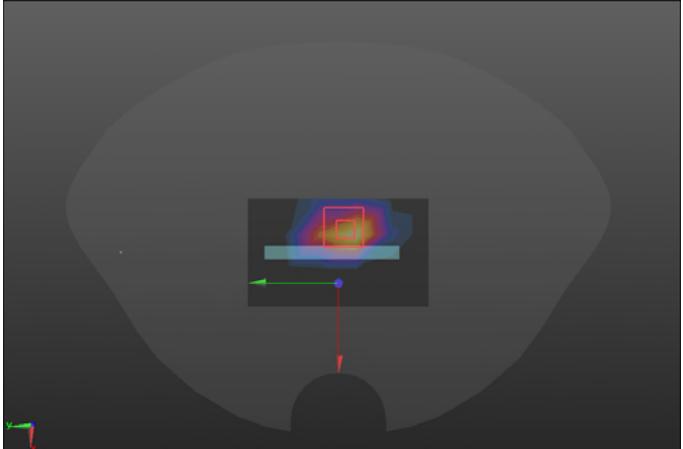
Down Antenna	Hotspot	Bottom
<p>Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz; Duty Cycle: 2:8</p> <p>Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.526$ S/m; $\epsilon_r = 53.291$; $\rho = 1000$ kg/m³</p> <p>Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(4.76, 4.76, 4.76); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Bottom/GPRS1900 Bottom/Area Scan (4x6x1): Measurement grid: dx=20mm, dy=20mm</p> <p>Maximum value of SAR (measured) = 1.23 W/kg</p> <p>Bottom/GPRS1900 Bottom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm</p> <p>Reference Value = 20.95 V/m; Power Drift = 0.11 dB</p> <p>Peak SAR (extrapolated) = 1.73 W/kg</p> <p>SAR(1 g) = 1.01 W/kg; SAR(10 g) = 0.510 W/kg</p> <p>Maximum value of SAR (measured) = 1.21 W/kg</p> 		

WCDMA Band 2

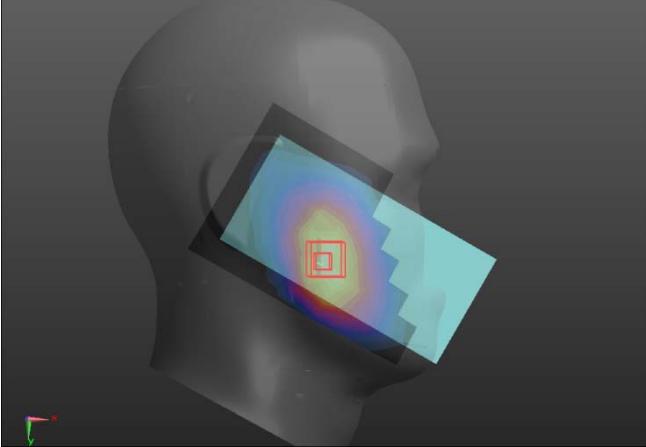
Down Antenna	Hotspot	Bottom
<p>Communication System: UID 0, WCDMA BAND2 (0); Frequency: 1880 MHz; Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.526$ S/m; $\epsilon_r = 53.291$; $\rho = 1000$ kg/m³ Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(4.76, 4.76, 4.76); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Bottom/WCDMA band2 Bottom/Area Scan (4x6x1): Measurement grid: dx=20mm, dy=20mm Maximum value of SAR (measured) = 0.972 W/kg Bottom/WCDMA band2 Bottom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 27.40 V/m; Power Drift = 0.13 dB Peak SAR (extrapolated) = 1.92 W/kg SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.530 W/kg Maximum value of SAR (measured) = 1.14 W/kg</p> 		

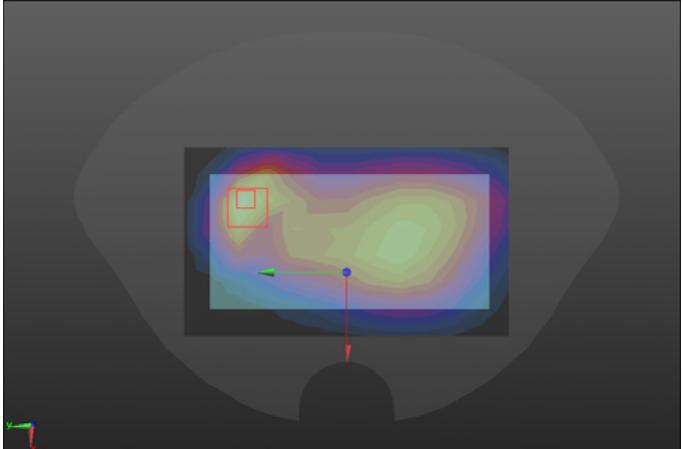
WCDMA Band 4

Up Antenna	Right side	cheek
Communication System: UID 0, WCDMA BAND4 (0); Frequency: 1732.4 MHz; Duty Cycle: 1:1		
Medium parameters used (interpolated): $f = 1732.4$ MHz; $\sigma = 1.375$ S/m; $\epsilon_r = 40.07$; $\rho = 1000$ kg/m ³		
Phantom section: Right Section		
DASY5 Configuration:		
<ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(5.07, 5.07, 5.07); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Right/W4 right cheek up NV/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm</p> <p>Maximum value of SAR (measured) = 0.554 W/kg</p> <p>Right/W4 right cheek up NV/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm</p> <p>Reference Value = 7.013 V/m; Power Drift = -0.12 dB</p> <p>Peak SAR (extrapolated) = 0.872 W/kg</p> <p>SAR(1 g) = 0.557 W/kg; SAR(10 g) = 0.372 W/kg</p> <p>Maximum value of SAR (measured) = 0.645 W/kg</p>		
		

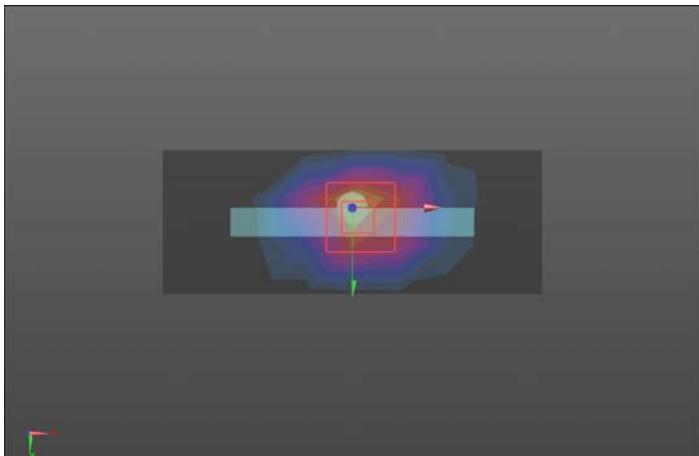
Down Antenna	Hotspot	Bottom
<p>Communication System: UID 0, WCDMA BAND4 (0); Frequency: 1732.4 MHz; Duty Cycle: 1:1</p> <p>Medium parameters used (interpolated): $f = 1732.4$ MHz; $\sigma = 1.477$ S/m; $\epsilon_r = 53.461$; $\rho = 1000$ kg/m³</p> <p>Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(4.76, 4.76, 4.76); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Bottom/W4 down Bottom/Area Scan (4x6x1): Measurement grid: dx=15mm, dy=15mm.</p> <p>Maximum value of SAR (measured) = 0.167 W/kg</p> <p>Bottom/W4 down Bottom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm</p> <p>Reference Value = 6.682 V/m; Power Drift = 0.03 dB</p> <p>Peak SAR (extrapolated) = 0.287 W/kg</p> <p>SAR(1 g) = 0.153 W/kg; SAR(10 g) = 0.077 W/kg</p> <p>Maximum value of SAR (measured) = 0.171 W/kg</p> 		

WCDMA Band 5

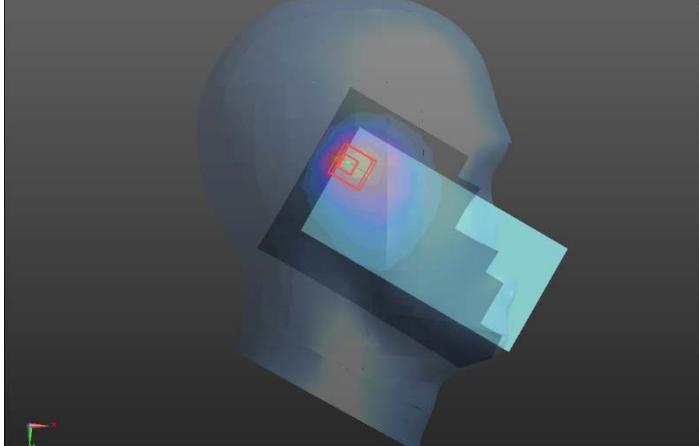
Up Antenna	Right side	Tilt
<p>Communication System: UID 0, WCDMA BAND 5 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1</p> <p>Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.905$ S/m; $\epsilon_r = 41.528$; $\rho = 1000$ kg/m³</p> <p>Phantom section: Right Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(6.18, 6.18, 6.18); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>RightTilt//Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 1.164 W/kg</p> <p>RightTilt//Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 16.386 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 1.204 W/kg SAR(1 g) = 0.959 W/kg; SAR(10 g) = 0.407 W/kg Maximum value of SAR (measured) = 1.169 W/kg</p> 		

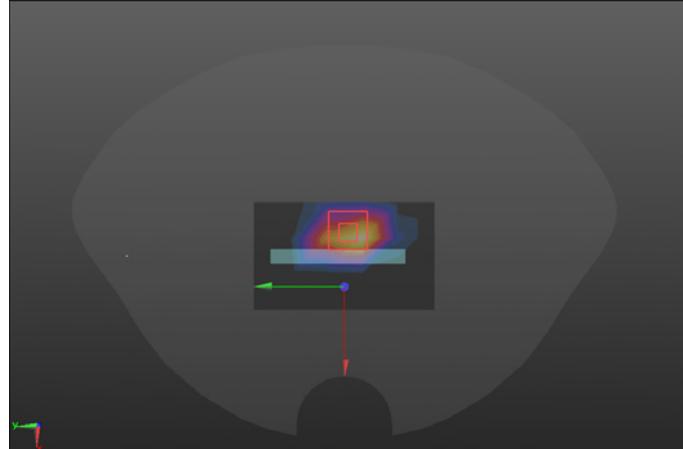
Down Antenna	Body-worn	Front
<p>Communication System: UID 0, WCDMA BAND 5 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1</p> <p>Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.976$ S/m; $\epsilon_r = 55.195$; $\rho = 1000$ kg/m³</p> <p>Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(6.13, 6.13, 6.13); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Flat/W5 down Front/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.207 W/kg</p> <p>Flat/W5 down Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 13.39 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 0.313 W/kg SAR(1 g) = 0.221 W/kg; SAR(10 g) = 0.104 W/kg Maximum value of SAR (measured) = 0.421 W/kg</p> 		

LTE Band 2(20BW 1RB)

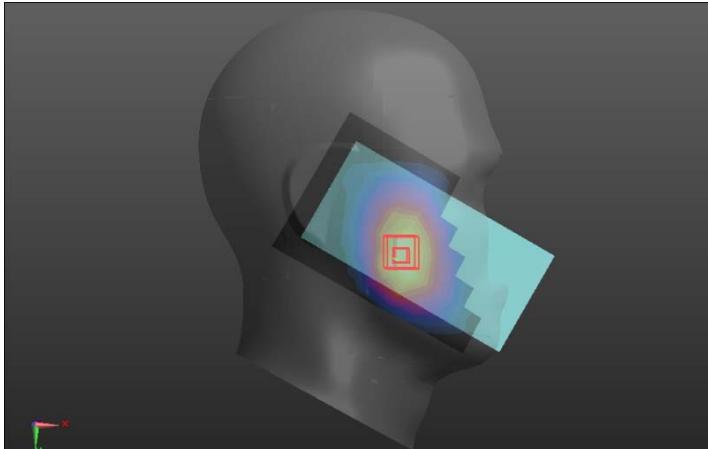
Down Antenna	Hotspot	Bottom
<p>Communication System: UID 0, LTE band 02 (0); Frequency: 1880 MHz; Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 1880$ MHz; $\sigma = 1.526$ S/m; $\epsilon_r = 53.291$; $\rho = 1000$ kg/m³ Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(4.76, 4.76, 4.76); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Flat/LTE2 down BOTTOM/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 2.841 W/kg</p> <p>Flat/LTE2 down BOTTOM/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 14.956 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 2.23 W/kg SAR(1 g) = 1.250 W/kg; SAR(10 g) = 0.761 W/kg Maximum value of SAR (measured) = 2.850 W/kg</p> 		

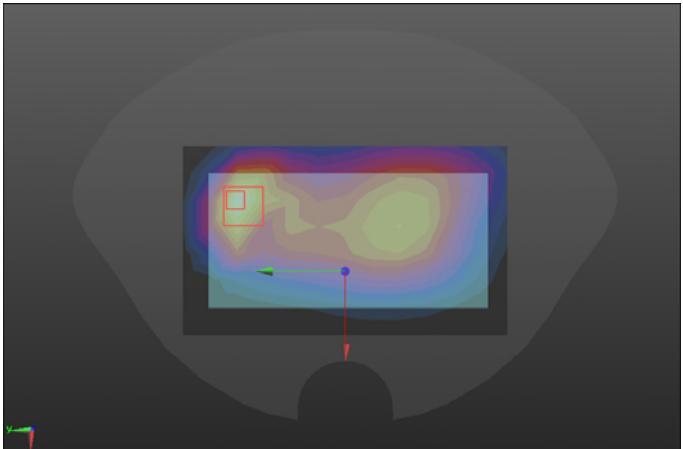
LTE Band 4 (20BW 1RB)

Up Antenna	Right side	Tilt
<p>Communication System: UID 0, LTE band 4 (0); Frequency: 1732.5 MHz; Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 1720$ MHz; $\sigma = 1.477$ S/m; $\epsilon_r = 53.46$; $\rho = 1000$ kg/m³ Phantom section: Right Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(4.76, 4.76, 4.76); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Right tilt/ Area Scan (4x6x1): Measurement grid: dx=20mm, dy=20mm Maximum value of SAR (measured) = 0.990 W/kg</p> <p>Right tilt/ Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 14.854 V/m; Power Drift = 0.06 dB Peak SAR (extrapolated) = 1.160 W/kg SAR(1 g) = 0.877 W/kg; SAR(10 g) = 0.442 W/kg Maximum value of SAR (measured) = 0.901 W/kg</p> 		

Down Antenna	Hotspot	Bottom
<p>Communication System: UID 0, LTE band 4 (0); Frequency: 1732.5 MHz; Duty Cycle: 1:1</p> <p>Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.477$ S/m; $\epsilon_r = 53.46$; $\rho = 1000$ kg/m³</p> <p>Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(4.76, 4.76, 4.76); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Bottom/LTE4 down bottom/Area Scan (4x6x1): Measurement grid: dx=20mm, dy=20mm</p> <p>Maximum value of SAR (measured) = 0.0900 W/kg</p> <p>Bottom/LTE4 down bottom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm</p> <p>Reference Value = 4.854 V/m; Power Drift = 0.06 dB</p> <p>Peak SAR (extrapolated) = 0.160 W/kg</p> <p>SAR(1 g) = 0.084 W/kg; SAR(10 g) = 0.042 W/kg</p> <p>Maximum value of SAR (measured) = 0.0901 W/kg</p> 		

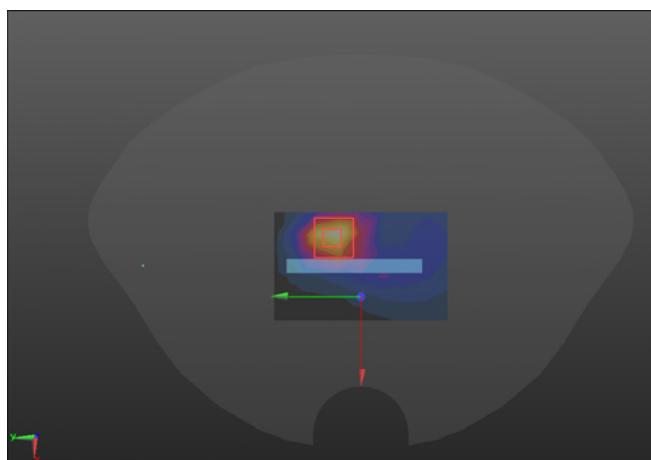
LTE Band 5(10BW 1RB)

Up Antenna	Right side	cheek
<p>Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz; Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 836.5$ MHz; $\sigma = 0.905$ S/m; $\epsilon_r = 41.528$; $\rho = 1000$ kg/m³ Phantom section: Right Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(6.18, 6.18, 6.18); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Right cheek/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.932 W/kg Right cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 9.802 V/m; Power Drift = -0.12 dB Peak SAR (extrapolated) = 0.963 W/kg SAR(1 g) = 0.871 W/kg; SAR(10 g) = 0.487 W/kg Maximum value of SAR (measured) = 0.935 W/kg</p> 		

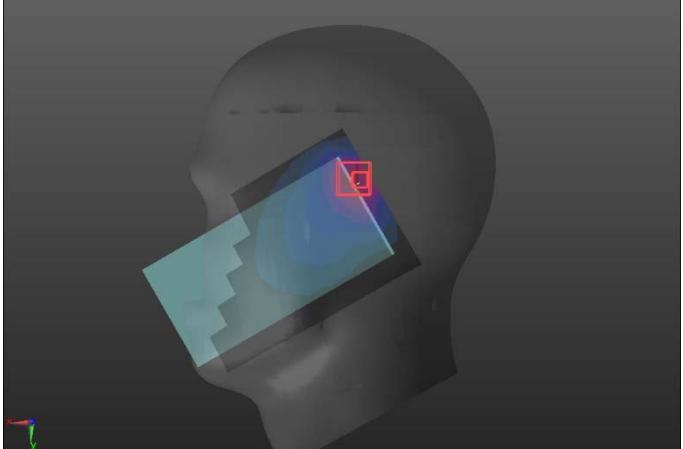
Down Antenna	Body-worn	Back
<p>Communication System: UID 0, LTE Band 5 (0); Frequency: 836.5 MHz; Duty Cycle: 1:1</p> <p>Medium parameters used (interpolated): $f = 836.5 \text{ MHz}$; $\sigma = 0.976 \text{ S/m}$; $\epsilon_r = 55.195$; $\rho = 1000 \text{ kg/m}^3$</p> <p>Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(6.13, 6.13, 6.13); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Flat/LTE5 down Back/Area Scan (8x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$</p> <p>Maximum value of SAR (measured) = 0.219 W/kg</p> <p>Flat/LTE5 down Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$</p> <p>Reference Value = 12.30 V/m; Power Drift = 0.06 dB</p> <p>Peak SAR (extrapolated) = 0.314 W/kg</p> <p>SAR(1 g) = 0.234 W/kg; SAR(10 g) = 0.129 W/kg</p> <p>Maximum value of SAR (measured) = 0.318 W/kg</p> 		

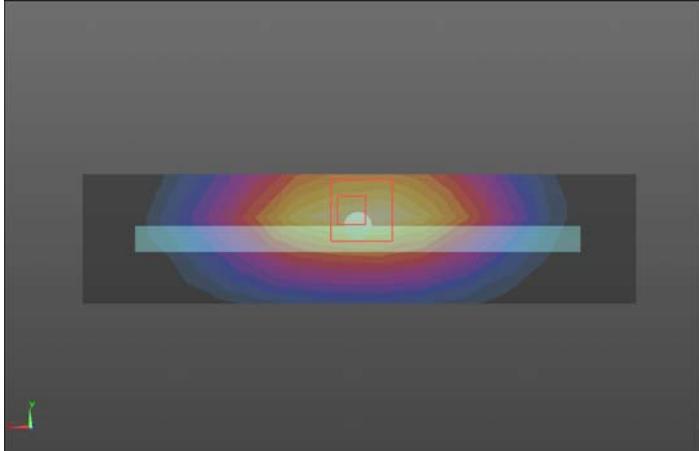
LTE Band 7(20BW 1RB)

Down Antenna	Hotspot	Bottom
Communication System: UID 0, LTE Band 7 (0); Frequency: 2535 MHz; Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 2535$ MHz; $\sigma = 2.067$ S/m; $\epsilon_r = 52.592$; $\rho = 1000$ kg/m ³ Phantom section: Flat Section DASY5 Configuration: <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(4.31, 4.31, 4.31); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) Bottom/LTE7 down bottom NV/Area Scan (6x9x1): Measurement grid: dx=12mm, dy=12mm Maximum value of SAR (measured) = 0.757 W/kg Bottom/LTE7 down bottom NV/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 11.76 V/m; Power Drift = 0.10 dB Peak SAR (extrapolated) = 1.33 W/kg SAR(1 g) = 0.642 W/kg; SAR(10 g) = 0.297 W/kg Maximum value of SAR (measured) = 0.737 W/kg		

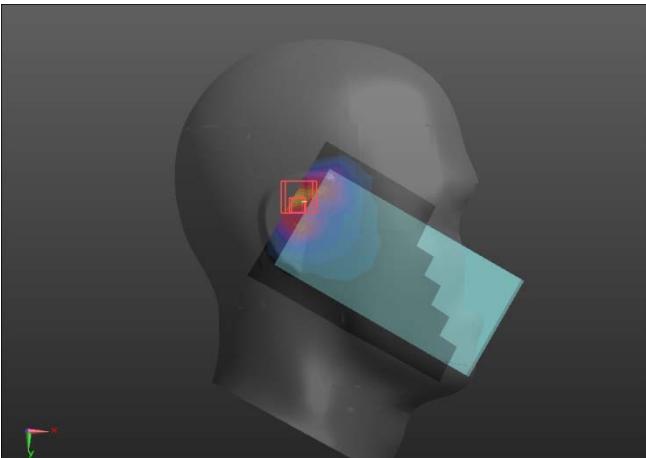


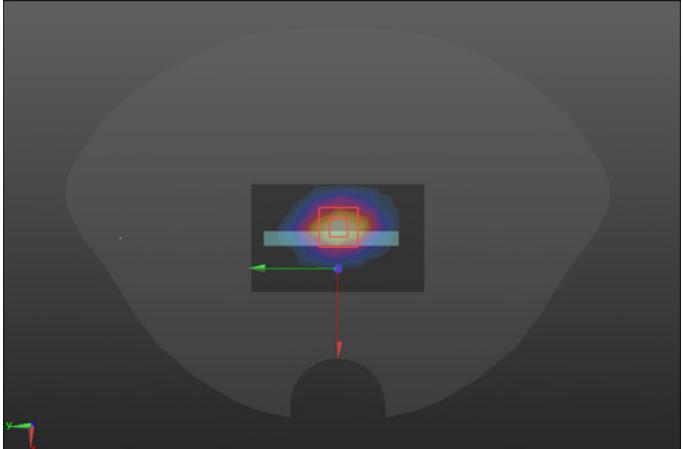
LTE Band12 (10BW 1RB)

Up Antenna	Right side	Tilt
<p>Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz; Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 707.5$ MHz; $\sigma = 0.887$ S/m; $\epsilon_r = 42.115$; $\rho = 1000$ kg/m³ Phantom section: Right Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(6.34, 6.34, 6.34); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Right/LTE12 up Right TILT/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.0238 W/kg</p> <p>Right/LTE12 up Right TILT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 4.830 V/m; Power Drift = 0.12 dB Peak SAR (extrapolated) = 0.0970 W/kg SAR(1 g) = 0.036 W/kg; SAR(10 g) = 0.013 W/kg Maximum value of SAR (measured) = 0.0463 W/kg</p> 		

Down Antenna	Hotspot	Right
Communication System: UID 0, LTE Band 12 (0); Frequency: 707.5 MHz; Duty Cycle: 1:1		
Medium parameters used (interpolated): $f = 707.5 \text{ MHz}$; $\sigma = 0.887 \text{ S/m}$; $\epsilon_r = 42.115$; $\rho = 1000 \text{ kg/m}^3$		
Phantom section: Flat Section		
DASY5 Configuration:		
<ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(6.34, 6.34, 6.34); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Right /Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 0.350 W/kg</p> <p>Right /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 13.370 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 0.44 W/kg</p> <p>SAR(1 g) = 0.281 W/kg; SAR(10 g) = 0.197 W/kg Maximum value of SAR (measured) = 0.359 W/kg</p>		
		

LTE Band 66(20BW 1RB)

Up Antenna	Right side	Tilt
<p>Communication System: UID 0, LTE band 66 (0); Frequency: 1745 MHz; Duty Cycle: 1:1 Medium parameters used (interpolated): $f = 1745$ MHz; $\sigma = 1.383$ S/m; $\epsilon_r = 40.047$; $\rho = 1000$ kg/m³ Phantom section: Right Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> Probe: ES3DV3 - SN3127; ConvF(5.07, 5.07, 5.07); Calibrated: 2018/11/2; Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn546; Calibrated: 2018/10/15 Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Right/LTE66 up Right Tilt/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm Maximum value of SAR (measured) = 1.35 W/kg</p> <p>Right/LTE66 up Right Tilt/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm Reference Value = 27.99 V/m; Power Drift = 0.15 dB Peak SAR (extrapolated) = 2.12 W/kg SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.543 W/kg Maximum value of SAR (measured) = 1.68 W/kg</p> 		

Down Antenna	Hotspot	Bottom
<p>Communication System: UID 0, LTE band 66 (0); Frequency: 1745 MHz; Duty Cycle: 1:1</p> <p>Medium parameters used (interpolated): $f = 1745$ MHz; $\sigma = 1.485$ S/m; $\epsilon_r = 53.422$; $\rho = 1000$ kg/m³</p> <p>Phantom section: Flat Section</p> <p>DASY5 Configuration:</p> <ul style="list-style-type: none"> • Probe: ES3DV3 - SN3127; ConvF(4.76, 4.76, 4.76); Calibrated: 2018/11/2; • Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection) • Electronics: DAE4 Sn546; Calibrated: 2018/10/15 • Phantom: 1659; Type: QD 000 P40 CD; Serial: xxxx • Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) <p>Bottom/LTE66 down bottom/Area Scan (6x9x1): Measurement grid: dx=12mm, dy=12mm.</p> <p>Maximum value of SAR (measured) = 0.1913 W/kg</p> <p>Bottom/LTE66 down bottom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm</p> <p>Reference Value = 7.248 V/m; Power Drift = 0.11 dB</p> <p>Peak SAR (extrapolated) = 0.197 W/kg</p> <p>SAR(1 g) = 0.177 W/kg; SAR(10 g) = 0.087 W/kg</p> <p>Maximum value of SAR (measured) = 0.1807 W/kg</p> 		

WLAN 2.4GHz

Right Side

Cheek

Communication System: UID 0, WIFI 2.4GHz (0); Frequency: 2437 MHz

Medium parameters used (interpolated): $f = 2437$ MHz; $\sigma = 1.788$ S/m; $\epsilon_r = 39.219$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.66, 4.66, 4.66); Calibrated: 2018/11/2;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn546; Calibrated: 2018/10/15
- Phantom: 1660; Type: QD 000 P40 CD; Serial: xxxx
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

2.4G right/Area Scan (9x13x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.61 W/kg

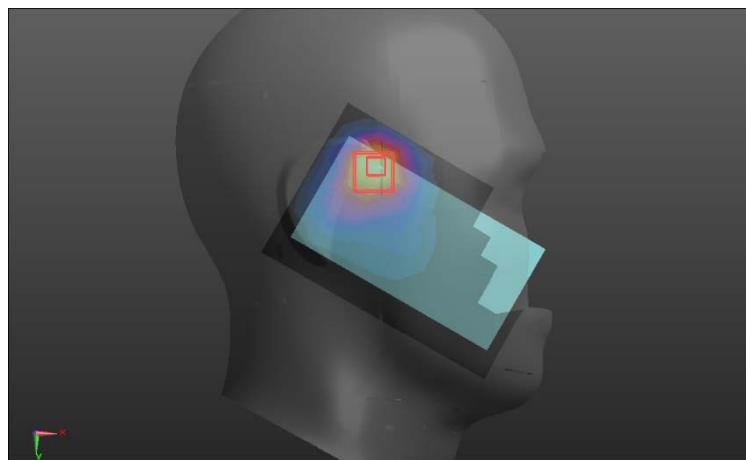
2.4G right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.90 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.64 W/kg

SAR(1 g) = 0.280 W/kg; SAR(10 g) = 0.126 W/kg

Maximum value of SAR (measured) = 0.501 W/kg



ANNEX B – RELEVANT PAGES FROM CALIBRATION REPORTS

DAE4 Sn:546

 <p>In Collaboration with s p e a g CALIBRATION LABORATORY</p> <p>Add: No.51 Xinyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2512 Fax: +86-10-62304613-2504 E-mail: ctt@cttcal.com http://www.cttcal.com</p> <p>Client : SRTC Certificate No: Z18-60400</p> <p>CALIBRATION CERTIFICATE</p> <p>Object DAE4 - SN: 546</p> <p>Calibration Procedure(s) FF-Z11-002-01 Calibration Procedure for the Data Acquisition Electronics (DAE)</p> <p>Calibration date: October 15, 2016</p> <p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility; environment temperature(22±2)°C and humidity<70%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date(Calibrated by, Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Process Calibrator 753</td> <td>1971018</td> <td>20-Jun-18 (CTTL, No.J1BX05034)</td> <td>June-19</td> </tr> </tbody> </table> <p>Calibrated by: Name Yu Zongying Function SAR Test Engineer Signature </p> <p>Reviewed by: Lin Hao SAR Test Engineer </p> <p>Approved by: Qi Dianyuan SAR Project Leader </p> <p>Issued: October 17, 2018</p> <p>This calibration certificate shall not be reproduced except in full without written approval of the laboratory.</p>	Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration	Process Calibrator 753	1971018	20-Jun-18 (CTTL, No.J1BX05034)	June-19	 <p>In Collaboration with s p e a g CALIBRATION LABORATORY</p> <p>Add: No.51 Xinyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2512 Fax: +86-10-62304613-2504 E-mail: ctt@cttcal.com http://www.cttcal.com</p> <p>Glossary: DAE data acquisition electronics Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.</p> <p>Methods Applied and Interpretation of Parameters:</p> <ul style="list-style-type: none"> • DC Voltage Measurement: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range. • Connector angle: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required. • The report provide only calibration results for DAE, it does not contain other performance test results.
Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration						
Process Calibrator 753	1971018	20-Jun-18 (CTTL, No.J1BX05034)	June-19						

Certificate No: Z18-60400 Page 1 of 3 Certificate No: Z18-60400 Page 2 of 3

 <p>In Collaboration with s p e a g CALIBRATION LABORATORY</p> <p>Add: No.51 Xinyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2512 Fax: +86-10-62304613-2504 E-mail: ctt@cttcal.com http://www.cttcal.com</p> <p>DC Voltage Measurement A/D - Converter Resolution nominal 8 bit/V. full range = 8.192V. High Range: ±1LSB = ±8.192V. full range = ±100...+30mV Low Range: ±1LSB = ±8.192V. full range = ±1...+3mV DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Calibration Factors</th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>High Range</td> <td>406.308 ± 0.15% (k=2)</td> <td>404.059 ± 0.15% (k=2)</td> <td>404.180 ± 0.15% (k=2)</td> </tr> <tr> <td>Low Range</td> <td>3.98893 ± 0.7% (k=2)</td> <td>3.98676 ± 0.7% (k=2)</td> <td>3.98021 ± 0.7% (k=2)</td> </tr> </tbody> </table> <p>Connector Angle</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Connector Angle to be used in DASY system</td> <td>238° ± 1°</td> </tr> </table>	Calibration Factors	X	Y	Z	High Range	406.308 ± 0.15% (k=2)	404.059 ± 0.15% (k=2)	404.180 ± 0.15% (k=2)	Low Range	3.98893 ± 0.7% (k=2)	3.98676 ± 0.7% (k=2)	3.98021 ± 0.7% (k=2)	Connector Angle to be used in DASY system	238° ± 1°
Calibration Factors	X	Y	Z											
High Range	406.308 ± 0.15% (k=2)	404.059 ± 0.15% (k=2)	404.180 ± 0.15% (k=2)											
Low Range	3.98893 ± 0.7% (k=2)	3.98676 ± 0.7% (k=2)	3.98021 ± 0.7% (k=2)											
Connector Angle to be used in DASY system	238° ± 1°													

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ES3DV3 Sn:3127

CLIENT INFORMATION		Certificate No.: Z18-60398		
Client	SRTC			
Object	ES3DV3 - SN:3127			
Calibration Procedure(s)	FF-Z11-004-01 Calibration Procedures for Dosimetric E-field Probes			
Calibration date:	November 02, 2018			
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±2)°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	101919	20-Jun-18 (CITL, No.J18X05032)	Jun-19
Power sensor	NRP-Z91	101547	20-Jun-18 (CITL, No.J18X05032)	Jun-19
Power sensor	NRP-Z91	101548	20-Jun-18 (CITL, No.J18X05032)	Jun-19
Reference10dBAttenuator	18N50W-10dB	09-Feb-18(CITL, No.J18X01133)	Feb-20	
Reference20dBAttenuator	18N50W-20dB	09-Feb-18(CITL, No.J18X01132)	Feb-20	
Reference Probe EX3DV3	SN 3846	25-Jan-18(SPEAG No.EX3-3846, Jan18)	Jan-19	
DAE4	SN 777	15-Dec-17(SPEAG, No.DAE-777, Dec17)	Dec-18	
Secondary Standards	Name	Function	Signature	
SignalGeneratorMG3700A	YU Zongying	SAR Test Engineer		
Network Analyzer E5071C	Lin Hao	SAR Test Engineer		
Approved by:	Qi Dianyuan	SAR Project Leader		
Issued: November 04, 2018				
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.				

Certificate No: Z18-60398

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CLIENT INFORMATION		Certificate No.: Z18-60398		
Client	SRTC			
Object	ES3DV3 - SN:3127			
Calibration Procedure(s)	FF-Z11-004-01 Calibration Procedures for Dosimetric E-field Probes			
Calibration date:	November 02, 2018			
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Power sensor	NRP-Z91	101548	20-Jun-18 (CITL, No.J18X05032)	Jun-19
Reference10dBAttenuator	18N50W-10dB	09-Feb-18(CITL, No.J18X01133)	Feb-20	
Reference20dBAttenuator	18N50W-20dB	09-Feb-18(CITL, No.J18X01132)	Feb-20	
Reference Probe EX3DV3	SN 3846	25-Jan-18(SPEAG No.EX3-3846, Jan18)	Jan-19	
DAE4	SN 777	15-Dec-17(SPEAG, No.DAE-777, Dec17)	Dec-18	
Secondary Standards	Name	Function	Signature	
Calibrated by:	YU Zongying	SAR Test Engineer		
Reviewed by:	Lin Hao	SAR Test Engineer		
Approved by:	Qi Dianyuan	SAR Project Leader		
Issued: November 04, 2018				

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Probe ES3DV3

SN: 3127

Calibrated: November 02, 2018

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: Z18-60398

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3127

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μ V/m/Vm) ^a	1.27	1.26	1.21	±10.0%
DCP(mV) ^b	103.3	104.4	105.0	

Modulation Calibration Parameters

UID	Communication System Name	A dB	B dB- μ V	C	D dB	VR mV	Unc ^c (k=2)
0	CW	X 0.0	0.0	1.0	0.00	285.6	±2.2%
		Y 0.0	0.0	1.0		287.9	
		Z 0.0	0.0	1.0		282.9	

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%.

^aThe uncertainties of Norm X, Y, Z do not affect the E-field uncertainty inside TSL (see Page 5 and Page 6).
^bNumerical linearization path uncertainty not required.
^cUncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3127

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz] ^c	Relative Permittivity ^d	Conductivity [S/m] ^e	ConvF X	ConvF Y	ConvF Z	Alpha ^f	Depth ^g (mm)	Uncrt. (k=2)
750	41.9	0.89	6.34	6.34	6.34	0.40	1.35	±12.1%
835	41.5	0.90	6.18	6.18	6.18	0.35	1.58	±12.1%
1810	40.0	1.40	5.07	5.07	5.07	0.66	1.24	±12.1%
2000	40.0	1.40	4.98	4.98	4.98	0.70	1.20	±12.1%
2300	39.5	1.67	4.79	4.79	4.79	0.90	1.08	±12.1%
2450	39.2	1.80	4.66	4.66	4.66	0.90	1.08	±12.1%
2600	39.0	1.96	4.40	4.40	4.40	0.80	1.21	±12.1%

^cFrequency validity above 300 MHz or ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^dAt frequency below 3 GHz, the validity of tissue parameters (x and o) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (x and o) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
^eAlpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3127

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz] ^c	Relative Permittivity ^d	Conductivity [S/m] ^e	ConvF X	ConvF Y	ConvF Z	Alpha ^f	Depth ^g (mm)	Uncrt. (k=2)
750	55.5	0.98	6.33	6.33	0.40	1.40	±12.1%	
835	55.2	0.97	6.13	6.13	0.37	1.62	±12.1%	
1810	53.3	1.52	4.76	4.76	0.65	1.27	±12.1%	
2000	53.3	1.52	4.80	4.80	0.87	1.27	±12.1%	
2300	52.9	1.81	4.46	4.46	0.90	1.15	±12.1%	
2450	52.7	1.95	4.31	4.31	0.78	1.28	±12.1%	
2600	52.5	2.16	4.14	4.14	0.90	1.10	±12.1%	

^cFrequency validity above 300 MHz or ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

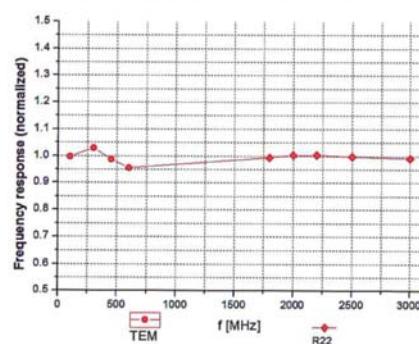
^dAt frequency below 3 GHz, the validity of tissue parameters (x and o) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (x and o) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
^eAlpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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Frequency Response of E-Field
(TEM-Cell: If110 EXX, Waveguide: R22)

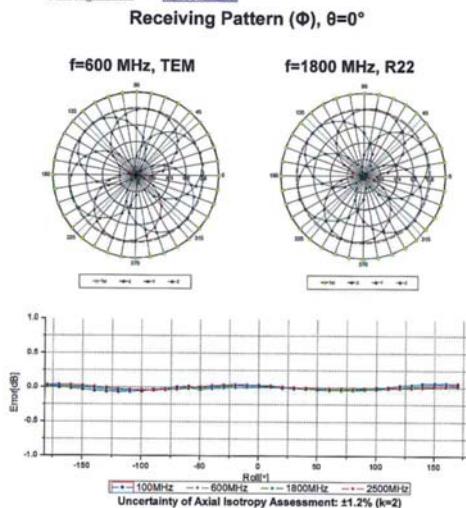


Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

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E-mail: ct@chinattl.com <http://www.chinattl.com>

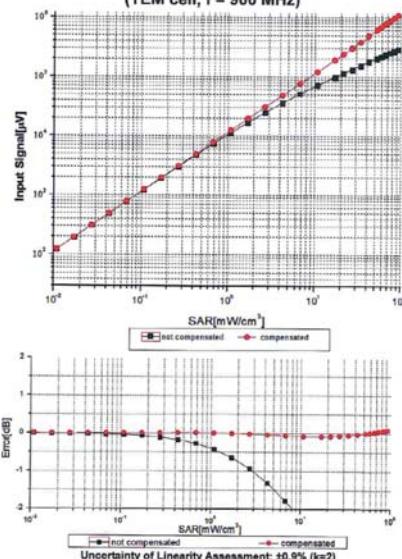


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E-mail: ct@chinattl.com <http://www.chinattl.com>

Dynamic Range f(SAR_{head})
(TEM cell, $f = 900$ MHz)

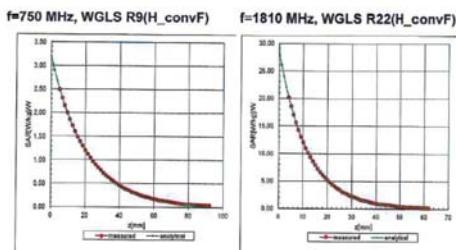


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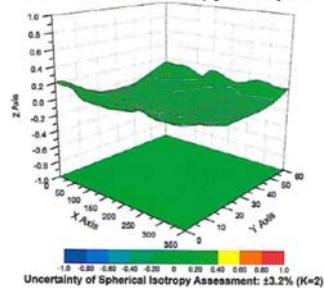
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Conversion Factor Assessment



Deviation from Isotropy in Liquid



Certificate No: Z18-60398

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Tel: +86-10-62304633-2218 Fax: +86-10-62304633-2209
E-mail: ct@chinattl.com <http://www.chinattl.com>

Appendix: Modulation Calibration Parameters

UID	Communication System Name	PAR	A	B	C	VR	Unc. ^E ($k=2$)
			dB	dB·μV	mV		
0	CW	0.00	X 0.0 0.0 1.0 282.3	Y 0.0 0.0 1.0 280.9	Z 0.0 0.0 1.0 275.1		$\pm 2.5\%$
10012	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	1.87	X 2.77 68.02 18.46 143.0	Y 2.75 68.05 18.52 145.0	Z 2.71 67.79 18.25 142.3		$\pm 1.8\%$
10100	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	5.67	X 6.13 66.4 18.97 141.9	Y 6.15 66.49 19.06 144.2	Z 6.09 66.32 18.90 140.9		$\pm 1.9\%$
10108	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	5.80	X 6.09 66.24 19.07 139.5	Y 6.10 66.33 19.15 141.5	Z 6.05 66.19 19.05 138.0		$\pm 1.9\%$
10154	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	5.75	X 5.81 65.85 18.93 136.1	Y 5.82 65.92 19.01 137.8	Z 5.79 65.89 18.97 134.7		$\pm 1.9\%$
10169	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	5.73	X 4.84 65.92 19.20 130.8	Y 4.82 65.98 19.27 131.3	Z 4.80 66.00 19.29 129.1		$\pm 1.9\%$
10175	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	5.72	X 4.88 66.14 19.40 131.6	Y 4.83 66.08 19.33 130.9	Z 4.79 66.02 19.29 129.3		$\pm 1.9\%$
10297	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	5.81	X 6.19 66.61 19.42 141.9	Y 6.13 66.43 19.26 140.7	Z 6.14 66.52 19.33 139.6		$\pm 1.9\%$

Certificate No: Z17-97142

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D750V3 Sn:1101 (1/2)



Client SRTC Certificate No: Z17-97134

CALIBRATION CERTIFICATE

Object	D750V3 - SN: 1101			
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits			
Calibration date	September 13, 2017			
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 NRVd	102196	02-Mar-17 (CTTL, No.J17X01254) Mar-18		
Power sensor NRZ-S	100596	02-Mar-17 (CTTL, No.J17X01254) Mar-18		
Reference Probe EX3DV4	SN 7433	25-Sep-16(SPEAG, No EX3-7433, Sep16)		
DAE4	SN 1331	19-Jan-17(CTTL-SPEAG, No Z17-970115) Jan-18		
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.) Scheduled Calibration		
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL, No.J17X0286) Jan-18		
Network Analyzer E5071C	MY46111013	13-Jan-17 (CTTL, No.J17X00285) Jan-18		
Calibrated by:	Name: Zhao Jing	Function: SAR Test Engineer Signature: [Signature]		
Reviewed by:	Name: Yu Zongying	Function: SAR Test Engineer Signature: [Signature]		
Approved by:	Name: Qi Dianyuan	Function: SAR Project Leader Signature: [Signature]		
Issued: September 16, 2017				
This calibration certificate shall not be reproduced except in full without written approval of the laboratory				

Certificate No: Z17-97134

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Glossary:
 TSL tissue simulating liquid
 ComIF sensitivity in TSL / NORMxyz
 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 2013
- 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 reflection loss. No matching 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	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	16 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	41.9	0.88 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.5 ± 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	2.05 mW/g
SAR for nominal Head TSL parameters	normalized to 1W	8.26 mW/g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.34 mW/g
SAR for nominal Head TSL parameters	normalized to 1W	5.39 mW/g ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.98 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.4 ± 6 %	0.95 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	—	—

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.15 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	8.49 mW/g ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.42 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	5.73 mW/g ± 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	53.9Ω ± 0.24Ω
Return Loss	-28.4dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	52.0Ω ± 2.2Ω
Return Loss	-30.6dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.136 ns
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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 semi rigid 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. This is explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The dipole arms are 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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D750V3 Sn:1101 (2/2)

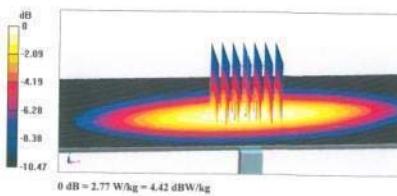


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Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctt@chinet.com http://www.chinet.cn

DASYS Validation Report for Head TSL
Test Laboratory: CTTL, Beijing, China
DUT: Dipole 750 MHz; Type: D750V3 - SN: 1101
Communication System: UUD 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium parameters used: $\epsilon' = 750 \text{ MHz}$; $\sigma = 0.879 \text{ S/m}$; $\epsilon_r = 41.54$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)
DASYS Configuration:

- Probe: EXIDV4 - SN7433; ConvF(0.01, 10.01, 10.01); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASYS2, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Dipole Calibration/Zoom Scan (7x7) (7x7)Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.10 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 3.17 W/kg
SAR(1 g) = 2.08 W/kg; SAR(10 g) = 1.34 W/kg
Maximum value of SAR (measured) = 2.77 W/kg



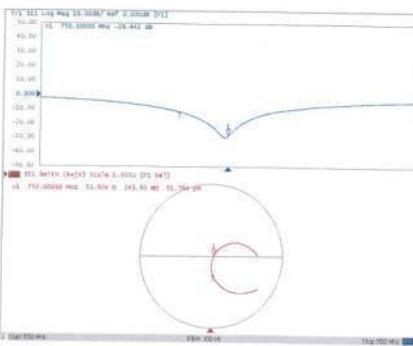
Certificate No: Z17-97134

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Impedance Measurement Plot for Head TSL



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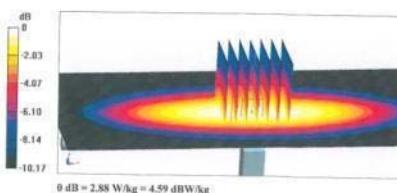


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Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: ctt@chinet.com http://www.chinet.cn

DASYS Validation Report for Body TSL
Test Laboratory: CTTL, Beijing, China
DUT: Dipole 750 MHz; Type: D750V3 - SN: 1101
Communication System: UUD 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium parameters used: $\epsilon' = 750 \text{ MHz}$; $\sigma = 0.946 \text{ S/m}$; $\epsilon_r = 55.41$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)
DASYS Configuration:

- Probe: EXIDV4 - SN7433; ConvF(9.83, 9.83, 9.83); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASYS2, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Dipole Calibration/Zoom Scan (7x7) (7x7)Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.35 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.27 W/kg
SAR(1 g) = 2.15 W/kg; SAR(10 g) = 1.42 W/kg
Maximum value of SAR (measured) = 2.88 W/kg



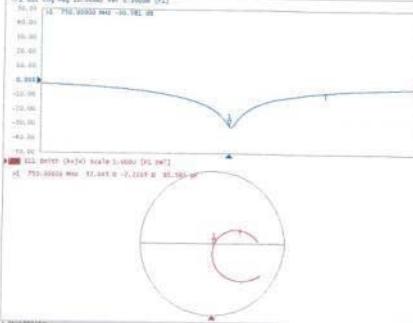
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Impedance Measurement Plot for Body TSL



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D835V2 Sn:4d023

<p>CALIBRATION CERTIFICATE</p> <p>Object: D835V2 - SN: 4d023</p> <p>Calibration Procedure(s): FF-Z11-003-01 Calibration Procedures for dipole validation kits</p> <p>Calibration date: September 13, 2017</p> <p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility environment temperature(22±3)°C and humidity<70%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date(Calibrated by, Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power Meter NRVD</td> <td>102196</td> <td>02-Mar-17 (CRTL, No J17X01254)</td> <td>Mar-18</td> </tr> <tr> <td>Power sensor NRVS</td> <td>100596</td> <td>02-Mar-17 (CRTL, No J17X01254)</td> <td>Mar-18</td> </tr> <tr> <td>Reference Probe EX307V4</td> <td>SN 433</td> <td>26-Sep-16(SPEAG, No EX3-7433, Sep16)</td> <td>Sep-17</td> </tr> <tr> <td>DAE4</td> <td>SN 1331</td> <td>19-Jan-17(CRTL-SPEAG, No Z17-9715)</td> <td>Jan-18</td> </tr> <tr> <td>Secondary Standards</td> <td>ID #</td> <td>Cal Date(Calibrated by, Certificate No.)</td> <td>Scheduled Calibration</td> </tr> <tr> <td>Signal Generator E4438C</td> <td>MY49071430</td> <td>13-Jan-17 (CRTL, No J17X00286)</td> <td>Jan-18</td> </tr> <tr> <td>Network Analyzer E5071C</td> <td>MY46110673</td> <td>13-Jan-17 (CRTL, No J17X00285)</td> <td>Jan-18</td> </tr> </tbody> </table> <p>Calibrated by: Zhao Jing SAR Test Engineer</p> <p>Reviewed by: Yu Zongying SAR Test Engineer</p> <p>Approved by: Qi Dianyuan SAR Project Leader</p> <p>Issued: September 18, 2017</p> <p>This calibration certificate shall not be reproduced except in full without written approval of the laboratory.</p>	Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration	Power Meter NRVD	102196	02-Mar-17 (CRTL, No J17X01254)	Mar-18	Power sensor NRVS	100596	02-Mar-17 (CRTL, No J17X01254)	Mar-18	Reference Probe EX307V4	SN 433	26-Sep-16(SPEAG, No EX3-7433, Sep16)	Sep-17	DAE4	SN 1331	19-Jan-17(CRTL-SPEAG, No Z17-9715)	Jan-18	Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration	Signal Generator E4438C	MY49071430	13-Jan-17 (CRTL, No J17X00286)	Jan-18	Network Analyzer E5071C	MY46110673	13-Jan-17 (CRTL, No J17X00285)	Jan-18	<p>CALIBRATION CERTIFICATE</p> <p>In Collaboration with TTL speag CALIBRATION LABORATORY Add: No.51 Xueyan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62306633-2079 Fax: +86-10-62306633-2504 E-mail: cmt@chinatec.com http://www.chinatec.cn</p> <p>TTL speag CALIBRATION LABORATORY Add: No.51 Xueyan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62306633-3079 Fax: +86-10-62306633-2504 E-mail: cmt@chinatec.com http://www.chinatec.cn</p> <p>Glossary: TSL: tissue simulating liquid ConVF: sensitivity in TSL / NORRx.y.z N/A: not applicable or not measured</p> <p>Calibration is Performed According to the Following Standards:</p> <ol style="list-style-type: none"> IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Specific-Absorption-Rate (SAR) in the Human Head from Wireless Communication Devices: Measurement Techniques", June 2013 IEC 62209-1, "Measurement procedure for the 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 30MHz to 6GHz)", March 2010 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)", July 2016 KDBB65664, SAR Measurement Requirements for 100 MHz to 6 GHz <p>Additional Documentation: e) DASY4/5 System Handbook</p> <p>Methods Applied and Interpretation of Parameters:</p> <ul style="list-style-type: none"> Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in this report are valid at the frequency indicated. Antenna Parameters with TSL: The dipole is mounted with the spacing to point 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 need 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. <p>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%.</p>
Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration																														
Power Meter NRVD	102196	02-Mar-17 (CRTL, No J17X01254)	Mar-18																														
Power sensor NRVS	100596	02-Mar-17 (CRTL, No J17X01254)	Mar-18																														
Reference Probe EX307V4	SN 433	26-Sep-16(SPEAG, No EX3-7433, Sep16)	Sep-17																														
DAE4	SN 1331	19-Jan-17(CRTL-SPEAG, No Z17-9715)	Jan-18																														
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration																														
Signal Generator E4438C	MY49071430	13-Jan-17 (CRTL, No J17X00286)	Jan-18																														
Network Analyzer E5071C	MY46110673	13-Jan-17 (CRTL, No J17X00285)	Jan-18																														

Certificate No: Z17-97135

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Certificate No: Z17-97135

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<p>CALIBRATION CERTIFICATE</p> <p>Measurement Conditions DASY system configuration, as far as not given on page 1.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DASY Version</th> <th>DASY2</th> <th>52.10.0.1446</th> </tr> </thead> <tbody> <tr> <td>Extrapolation</td> <td>Advanced Extrapolation</td> <td></td> </tr> <tr> <td>Phantom</td> <td>Triple Flat Phantom 5.1C</td> <td></td> </tr> <tr> <td>Distance Dipole Center - TSL</td> <td>15 mm</td> <td>with Spacer</td> </tr> <tr> <td>Zoom Scan Resolution</td> <td>dx, dy, dz = 5 mm</td> <td></td> </tr> <tr> <td>Frequency</td> <td>835 MHz ± 1 MHz</td> <td></td> </tr> </tbody> </table> <p>Head TSL parameters The following parameters and calculations were applied.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Temperature</th> <th>Permittivity</th> <th>Conductivity</th> </tr> </thead> <tbody> <tr> <td>Nominal Head TSL parameters</td> <td>22.0 °C</td> <td>41.5</td> <td>0.90 mho/m</td> </tr> <tr> <td>Measured Head TSL parameters</td> <td>(22.0 ± 0.2) °C</td> <td>41.3 ± 6 %</td> <td>0.90 mho/m ± 6 %</td> </tr> <tr> <td>Head TSL temperature change during test</td> <td><1.0 °C</td> <td>----</td> <td>----</td> </tr> </tbody> </table> <p>SAR result with Head TSL SAR averaged over 1 cm³ (1 g) of Head TSL</p> <table border="1" style="width: 100%; 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The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited at 100W signal. 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.</p> <p>Additional EUT Data</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Manufactured by</th> <th>SPEAG</th> </tr> </thead> </table>	DASY Version	DASY2	52.10.0.1446	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			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	41.3 ± 6 %	0.90 mho/m ± 6 %	Head TSL temperature change during test	<1.0 °C	----	----	Condition		SAR measured	250 mW input power	2.35 mW / g	SAR for nominal Head TSL parameters	normalized to 1W	9.37 mW / g ± 18.8 % (k=2)	Condition		SAR measured	250 mW input power	1.52 mW / g	SAR for nominal Head TSL parameters	normalized to 1W	6.08 mW / g ± 18.7 % (k=2)	Impedance, transformed to feed point	51.00- 2.79jΩ	Return Loss	-30.7dB	Impedance, transformed to feed point	46.60- 3.61jΩ	Return Loss	-25.8dB	Electrical Delay (one direction)	1.495 ns	Manufactured by	SPEAG
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D835V2 Sn:4d023

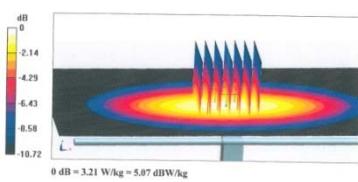


Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304613-2079 Fax: +86-10-62304633-2504
E-mail: ctfl@chinatl.com http://www.chinatl.cn

DASY5 Validation Report for Head TSL
Test Laboratory: CTTL, Beijing, China
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d023
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $\epsilon = 835 \text{ F/m}$; $\sigma = 0.903 \text{ S/m}$; $\tau_e = 41.34$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

- Probe: EX3DV4 - SN7433; ConvF(9.82, 9.82, 9.82); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.28V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.65 W/kg
 $\text{SAR}(1 \text{ g}) = 2.35 \text{ W/kg}$; $\text{SAR}(10 \text{ g}) = 1.52 \text{ W/kg}$
Maximum value of SAR (measured) = 3.21 W/kg



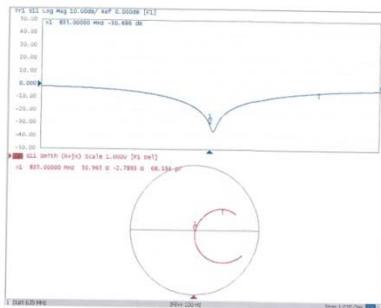
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Impedance Measurement Plot for Head TSL



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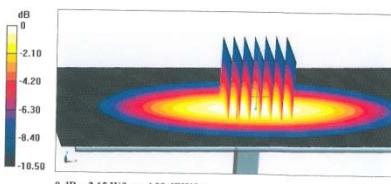


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DASY5 Validation Report for Body TSL
Test Laboratory: CTTL, Beijing, China
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d023
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $\epsilon = 835 \text{ F/m}$; $\sigma = 0.958 \text{ S/m}$; $\tau_e = 55.68$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

- Probe: EX3DV4 - SN7433; ConvF(9.5, 9.5, 9.5); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.17 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.57 W/kg
 $\text{SAR}(1 \text{ g}) = 2.34 \text{ W/kg}$; $\text{SAR}(10 \text{ g}) = 1.53 \text{ W/kg}$
Maximum value of SAR (measured) = 3.15 W/kg



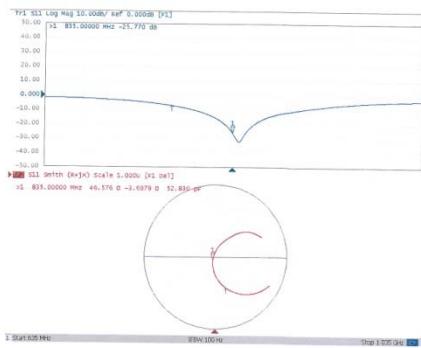
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Impedance Measurement Plot for Body TSL



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D1800V2 Sn:2d084																																																																																																			
 <p>In Collaboration with s p e a g CALIBRATION LABORATORY</p> <p>Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62104633-2079 Fax: +86-10-62104633-2504 E-mail: ctli@chinatl.com http://www.chinatl.cn</p> <p>Client SRTC Certificate No: Z17-97138</p> <p>CALIBRATION CERTIFICATE</p> <p>Object D1800V2 - Sn: 2d084</p> <p>Calibration Procedure(s) FF-Z11-003-01 Calibration Procedures for dipole validation kits</p> <p>Calibration date: September 15, 2017</p> <p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)°C and humidity<70%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date(Calibrated by, Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power Meter NRP2</td> <td>102196</td> <td>02-Mar-17 (CTTL, No.J17X01254)</td> <td>Mar-18</td> </tr> <tr> <td>Power sensor NRP-Z91</td> <td>100595</td> <td>02-Mar-17 (CTTL, No.J17X01254)</td> <td>Mar-18</td> </tr> <tr> <td>Reference Probe EX3DV4</td> <td>SN 7433</td> <td>26-Sep-16(SPEAG No EX3-7433, Sep16)</td> <td>Sep-17</td> </tr> <tr> <td>DAE4</td> <td>SN 1331</td> <td>19-Jan-17(CTTL-SPEAG No.Z17-97015)</td> <td>Jan-18</td> </tr> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Cal Date(Calibrated by, Certificate No.)</th> <th>Scheduled Calibration</th> </tr> <tr> <td>Signal Generator E4438C</td> <td>MY49071430</td> <td>13-Jan-17 (CTTL, No.J17X00286)</td> <td>Jan-18</td> </tr> <tr> <td>Network Analyzer E5071C</td> <td>MY46110673</td> <td>13-Jan-17 (CTTL, No.J17X00285)</td> <td>Jan-18</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Calibrated by:</th> <th>Name</th> <th>Function</th> <th>Signature</th> </tr> </thead> <tbody> <tr> <td>Zhao Jing</td> <td>SAR Test Engineer</td> <td></td> </tr> <tr> <td>Reviewed by:</td> <td>Yu Zongying</td> <td>SAR Test Engineer</td> <td></td> </tr> <tr> <td>Approved by:</td> <td>Qi Dianyuan</td> <td>SAR Project Leader</td> <td></td> </tr> </tbody> </table> <p>Issued: September 18, 2017 This calibration certificate shall not be reproduced except in full without written approval of the laboratory.</p> <p>Certificate No: Z17-97138 Page 1 of 8</p>	Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration	Power Meter NRP2	102196	02-Mar-17 (CTTL, No.J17X01254)	Mar-18	Power sensor NRP-Z91	100595	02-Mar-17 (CTTL, No.J17X01254)	Mar-18	Reference Probe EX3DV4	SN 7433	26-Sep-16(SPEAG No EX3-7433, Sep16)	Sep-17	DAE4	SN 1331	19-Jan-17(CTTL-SPEAG No.Z17-97015)	Jan-18	Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration	Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL, No.J17X00286)	Jan-18	Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18	Calibrated by:	Name	Function	Signature	Zhao Jing	SAR Test Engineer		Reviewed by:	Yu Zongying	SAR Test Engineer		Approved by:	Qi Dianyuan	SAR Project Leader		 <p>In Collaboration with s p e a g CALIBRATION LABORATORY</p> <p>Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62104633-2079 Fax: +86-10-62104633-2504 E-mail: ctli@chinatl.com http://www.chinatl.cn</p> <p>Glossary:</p> <ul style="list-style-type: none"> TSL tissue simulating liquid ConvF sensitivity in TSL / NORMx,y,z N/A not applicable or not measured <p>Calibration is Performed According to the Following Standards:</p> <ul style="list-style-type: none"> 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, "Procedure to measure the Specific Absorption Rate (SAR) For hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005 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 <p>Additional Documentation:</p> <ul style="list-style-type: none"> e) DASY4/5 System Handbook <p>Methods Applied and Interpretation of Parameters:</p> <ul style="list-style-type: none"> • Measurement Conditions: Further details are available from the Validation Report at the end of the certificates. All figures stated in the certificates are valid at the frequency indicated. • Antenna Parameters with TSL: The dipole is mounted with the spacing 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: Crossover delay between the SMA connector and the antenna feed point. • Uncertainty: Uncertainty is derived. • 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. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>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%.</p> </div> <p>Certificate No: Z17-97138 Page 2 of 8</p>																																																			
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TSL	10 mm	with Spacer	Zoom Scan Resolution	dx, dy, dz = 5 mm		Frequency	1800 MHz ± 1 MHz			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	40.4 ± 6 %	1.42 mho/m ± 6 %	Head TSL temperature change during test	<1.0 °C	----	----	SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition		SAR measured	250 mW input power	9.79 mW / g	SAR for nominal Head TSL parameters	normalized to 1W	38.9 mW / g ± 18.8 % (k=2)	SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition		SAR measured	250 mW input power	5.12 mW / g	SAR for nominal Head TSL parameters	normalized to 1W	20.4 mW / g ± 18.7 % (k=2)		Temperature	Permittivity	Conductivity	Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m	Measured Body TSL parameters	(22.0 ± 0.2) °C	53.8 ± 6 %	1.50 mho/m ± 6 %	Body TSL temperature change during test	<1.0 °C	----	----	SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition		SAR measured	250 mW input power	9.94 mW / g	SAR for nominal Body TSL parameters	normalized to 1W	39.7 mW / g ± 18.6 % (k=2)	SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition		SAR measured	250 mW input power	5.18 mW / g	SAR for nominal Body TSL parameters	normalized to 1W	20.8 mW / g ± 18.7 % (k=2)	 <p>In Collaboration with s p e a g CALIBRATION LABORATORY</p> <p>Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62104633-2079 Fax: +86-10-62104633-2504 E-mail: ctli@chinatl.com http://www.chinatl.cn</p> <p>Appendix (Additional assessments outside the scope of CNAS L0570)</p> <p>Antenna Parameters with Head TSL</p> <table border="1"> <thead> <tr> <th>Impedance, transformed to feed point</th> <th>49.3Ω-1.55Ω</th> </tr> </thead> <tbody> <tr> <td>Return Loss</td> <td>-35.4dB</td> </tr> </tbody> </table> <p>Antenna Parameters with Body TSL</p> <table border="1"> <thead> <tr> <th>Impedance, transformed to feed point</th> <th>46.0Ω-1.32Ω</th> </tr> </thead> <tbody> <tr> <td>Return Loss</td> <td>-27.1dB</td> </tr> </tbody> </table> <p>General Antenna Parameters and Design</p> <table border="1"> <thead> <tr> <th>Electrical Delay (one direction)</th> <th>1.318 ns</th> </tr> </thead> </table> <p>After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.</p> <p>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 the addition of end caps, as long as they are 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.</p> <p>Additional EUT Data</p> <table border="1"> <thead> <tr> <th>Manufactured by</th> <th>SPEAG</th> </tr> </thead> </table> <p>Certificate No: Z17-97138 Page 4 of 8</p>	Impedance, transformed to feed point	49.3Ω-1.55Ω	Return Loss	-35.4dB	Impedance, transformed to feed point	46.0Ω-1.32Ω	Return Loss	-27.1dB	Electrical Delay (one direction)	1.318 ns	Manufactured by	SPEAG
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D1800V2 Sn:2d084



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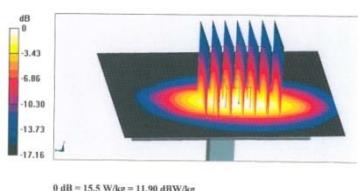
DASYS Validation Report for Head TSL
Test Laboratory: CTTI, Beijing, China
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d084

Communication System: UID 0, CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1800$ MHz; $\sigma = 1.423$ S/m; $\epsilon_r = 40.37$; $\rho = 1000$ kg/m³
Phantom section: Left Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASYS Configuration:

- Probe: EX3DVA - SN7433; ConvP(7.97, 7.97, 7.97); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASYS2, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)Cube 0: Measurement grid:
 dx<5mm, dy<5mm, dz<5mm
 Reference Value = 93.90 V/m; Power Drift = 0.01 dB
 Peak SAR (extrapolated) = 18.7 W/kg
 SAR(1 g) = 9.79 W/kg; SAR(10 g) = 5.12 W/kg
 Maximum value of SAR (measured) = 15.5 W/kg



0 dB = 15.5 W/kg = 11.90 dBW/kg

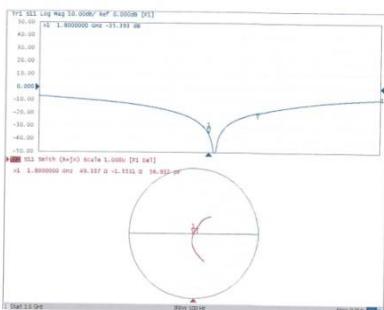
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Impedance Measurement Plot for Head TSL



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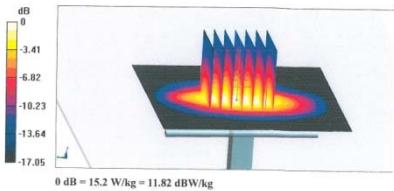
DASYS Validation Report for Body TSL
Test Laboratory: CTTI, Beijing, China
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d1084

Communication System: UID 0, CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1800$ MHz; $\sigma = 1.503$ S/m; $\epsilon_r = 53.79$; $\rho = 1000$ kg/m³
Phantom section: Center Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASYS Configuration:

- Probe: EX3DVA - SN7433; ConvP(7.75, 7.75, 7.75); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASYS2, Version 52.10 (0); SEMCAD X Version 14.6.10 (7413)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)Cube 0: Measurement grid:
 dx<5mm, dy<5mm, dz<5mm
 Reference Value = 97.57 V/m; Power Drift = -0.02 dB
 Peak SAR (extrapolated) = 18.0 W/kg
 SAR(1 g) = 9.84 W/kg; SAR(10 g) = 5.18 W/kg
 Maximum value of SAR (measured) = 15.2 W/kg



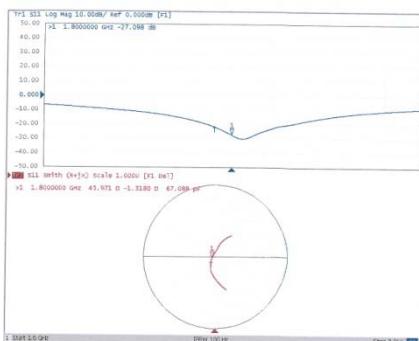
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Impedance Measurement Plot for Body TSL



Certificate No: Z17-97138

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D2000V2 Sn:1009



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E-mail: srtc@stateamt.cn http://www.stateamt.cn

Certificate No: Z18-97021

CALIBRATION CERTIFICATE

Object D2000V2 - SN: 1009

Calibration Procedure(s) FF-Z11-003-01

Calibration Procedures for dipole validation kits

Calibration date: February 1, 2018

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 NRVD	102198	02-Mar-17 (CTTL, No.J17X01254)	Mar-18
Power sensor NRV-Z5	100586	02-Mar-17 (CTTL, No.J17X01254)	Mar-18
Reference Probe EX3DV4	SN 7464	12-Sep-17(SPEAG No.EX3-464_Sep17)	Sep-18
DAE4	SN 1525	02-Oct-17(SPEAG No.DAE4-1525_Oct17)	Oct-18
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4439C	MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
Network Analyzer E5071C	MY46110673	24-Jan-18 (CTTL, No.J18X00561)	Jan-19

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

Issued: February 4, 2018

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Certificate No: Z18-97021

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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 1526-2013, "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) KDB655664, 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 connected to a standard SMA connector. 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 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	DASY02	52.10.0.1446
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	2000 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 %	1.42 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	—	—

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL Condition

SAR measured	250 mW input power	10.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	40.3 mW / g ± 18.8 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL Condition

SAR measured	250 mW input power	5.18 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	20.5 mW / g ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	1.56 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	—	—

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL Condition

SAR measured	250 mW input power	10.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	40.3 mW / g ± 18.8 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL Condition

SAR measured	250 mW input power	5.18 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.4 mW / g ± 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	49.80- 2.08jΩ
Return Loss	-33.6dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.30- 1.63jΩ
Return Loss	-27.0dB

General Antenna Parameters and Design

Electrical Delay (one director)	1.047 ns
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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 with the human head. This is explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall design 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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D2000V2 Sn:1009

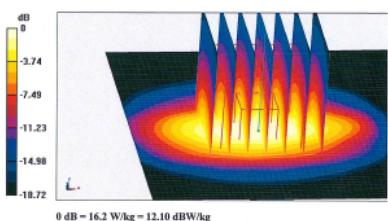


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Date: 02/01/2018
Test Laboratory: TTII, Beijing, China
DUT: Dipole 2000 MHz; Type: D2000V2; Serial: D2000V2 - SN: 1009
Communication System: UID 0, CW; Frequency: 2000 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2000$ MHz; $\epsilon_r = 1.416$ Siem; $\alpha_r = 38.89$; $\rho = 1000$ kg/m³
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2009)
DASY5 Configuration:

- Probe: EXDV4 - SN7464; ConvFi(8.39, 8.39, 8.39); Calibrated: 9/12/2017,
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4_Sn125; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD_000_P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.1 (7417)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)Cube 0: Measurement grid:
dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.98 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 19.7 W/kg
SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.17 W/kg
Maximum value of SAR (measured) = 16.2 W/kg



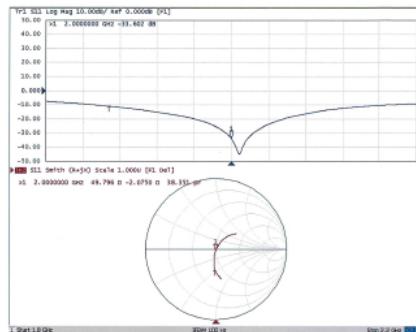
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Impedance Measurement Plot for Head TSL



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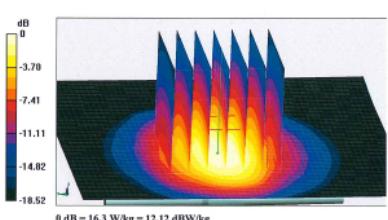


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E-mail: tti@chinastl.com http://www.chinastl.cn

Date: 02/01/2018
Test Laboratory: TTII, Beijing, China
DUT: Dipole 2000 MHz; Type: D2000V2; Serial: D2000V2 - SN: 1009
Communication System: UID 0, CW; Frequency: 2000 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2000$ MHz; $\epsilon_r = 1.564$ Siem; $\alpha_r = 51.83$; $\rho = 1000$ kg/m³
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: EXDV4 - SN7464; ConvFi(8.24, 8.24, 8.24); Calibrated: 9/12/2017,
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4_Sn125; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD_000_P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.1 (7417)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)Cube 0: Measurement grid:
dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.84 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 19.7 W/kg
SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.18 W/kg
Maximum value of SAR (measured) = 16.3 W/kg



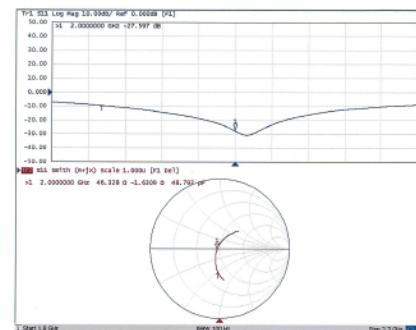
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Impedance Measurement Plot for Body TSL



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D2450V2 Sn:738																																																																																																				
<div style="text-align: center;">   <p>In Collaboration with TTL CALIBRATION LABORATORY Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504 E-mail: ctfl@chinattl.com http://www.chinattl.cn</p> <p>CNAS 国家认可 国际互认 校准 CALIBRATION CNAS L0570</p> <p>Certificate No: Z17-97140</p> </div> <p>Client SRTC</p> <p>CALIBRATION CERTIFICATE</p> <p>Object D2450V2 - SN: 738</p> <p>Calibration Procedure(s) FF-Z11-003-01 Calibration Procedures for dipole validation kits</p> <p>Calibration date: September 18, 2017</p> <p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)°C and humidity<70%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date(Calibrated by, Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power Meter NRV/D</td> <td>102195</td> <td>02-Mar-17 (CTTL, No.J17X01254)</td> <td>Mar-18</td> </tr> <tr> <td>Power sensor NRV/Z5</td> <td>100596</td> <td>02-Mar-17 (CTTL, No.J17X01254)</td> <td>Mar-18</td> </tr> <tr> <td>Reference Probe EX3DV4</td> <td>SN 7433</td> <td>26-Sep-16(SPEAG No EX3-7433_Sep16)</td> <td>Sep-17</td> </tr> <tr> <td>DAE4</td> <td>SN 1331</td> <td>19-Jan-17(CTTL-SPEAG No.Z17-97015)</td> <td>Jan-18</td> </tr> <tr> <td>Secondary Standards</td> <td>ID #</td> <td>Cal Date(Calibrated by, Certificate No.)</td> <td>Scheduled Calibration</td> </tr> <tr> <td>Signal Generator E4438C</td> <td>MY49071430</td> <td>13-Jan-17 (CTTL, No.J17X00286)</td> <td>Jan-18</td> </tr> <tr> <td>Network Analyzer E5071C</td> <td>MY46110673</td> <td>13-Jan-17 (CTTL, No.J17X00285)</td> <td>Jan-18</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Calibrated by:</td> <td>Name: Zhao Jing</td> <td>Function: SAR Test Engineer</td> <td>Signature: </td> </tr> <tr> <td>Reviewed by:</td> <td>Yu Zongying</td> <td>SAR Test Engineer</td> <td></td> </tr> <tr> <td>Approved by:</td> <td>Qi Dianyuan</td> <td>SAR Project Leader</td> <td></td> </tr> </table> <p>Issued: September 21, 2017</p> <p>This calibration certificate shall not be reproduced except in full without written approval of the laboratory.</p> <p>Certificate No: Z17-97140 Page 1 of 8</p>	Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration	Power Meter NRV/D	102195	02-Mar-17 (CTTL, No.J17X01254)	Mar-18	Power sensor NRV/Z5	100596	02-Mar-17 (CTTL, No.J17X01254)	Mar-18	Reference Probe EX3DV4	SN 7433	26-Sep-16(SPEAG No EX3-7433_Sep16)	Sep-17	DAE4	SN 1331	19-Jan-17(CTTL-SPEAG No.Z17-97015)	Jan-18	Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration	Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL, No.J17X00286)	Jan-18	Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18	Calibrated by:	Name: Zhao Jing	Function: SAR Test Engineer	Signature: 	Reviewed by:	Yu Zongying	SAR Test Engineer		Approved by:	Qi Dianyuan	SAR Project Leader		<div style="text-align: center;">  <p>In Collaboration with TTL CALIBRATION LABORATORY Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504 E-mail: ctfl@chinattl.com http://www.chinattl.cn</p> <p>Glossary: TSL tissue simulating liquid ConvF sensitivity in TSL / NORMX,y,z N/A not applicable or not measured</p> <p>Calibration is Performed According to the Following Standards:</p> <ul style="list-style-type: none"> 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 62209-3, "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)", SAR Measurement Requirements for 100 MHz to 6 GHz", KDB885064, SAR Measurement Requirements for 100 MHz to 6 GHz <p>Additional Documentation: e) DASY4/5 System Handbook</p> <p>Methods Applied and Interpretation of Parameters:</p> <ul style="list-style-type: none"> • 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 spacing 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: Time delay between the SMA connector and the antenna feed point. 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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, smaller caps are added to the dipole arms in order to improve matching when loaded with a dummy load. The position of these caps is given 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.</p> <p>Additional EUT Data</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Manufactured by</td> <td>SPEAG</td> </tr> </table> <p>Certificate No: Z17-97140 Page 4 of 8</p> </div>	Impedance, transformed to feed point	51.30+5.92jΩ	Return Loss	-24.5dB	Impedance, transformed to feed point	47.60+6.39jΩ	Return Loss	-23.1dB	Electrical Delay (one direction)	1.268 ns	Manufactured by	SPEAG
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DASYS Validation Report for Head TSL

Date: 09.18.2017

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 738

Communication System: UUD 0, CW, Frequency: 2450 MHz, Duty Cycle: 1:1

Medium parameters used: $\epsilon' = 2450$ MHz, $\sigma = 1.788$ S/m, $\epsilon_r = 38.67$, $\rho = 1000$ kg/m³

Phantom section: Left Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASYS Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.45, 7.45, 7.45); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASYS2, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

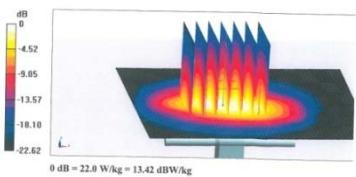
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 102.1 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 27.8 W/kg

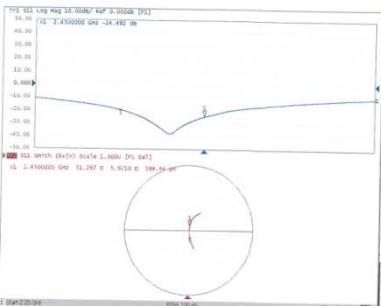
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.1 W/kg

Maximum value of SAR (measured) = 22.0 W/kg



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Impedance Measurement Plot for Head TSL



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DASYS Validation Report for Body TSL

Date: 09.18.2017

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 738

Communication System: UUD 0, CW, Frequency: 2450 MHz, Duty Cycle: 1:1

Medium parameters used: $\epsilon' = 2450$ MHz, $\sigma = 1.983$ S/m, $\epsilon_r = 52.51$, $\rho = 1000$ kg/m³

Phantom section: Center Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASYS Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.46, 7.46, 7.46); Calibrated: 9/26/2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 1/19/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASYS2, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

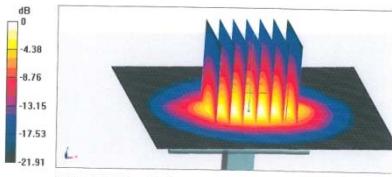
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.41 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 27.8 W/kg

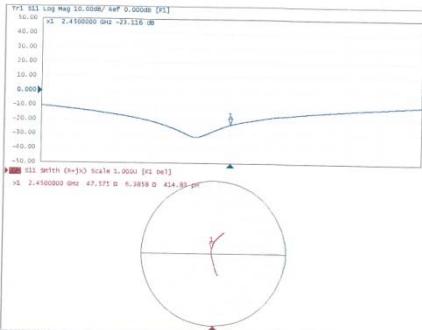
SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.1 W/kg

Maximum value of SAR (measured) = 22.3 W/kg



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Impedance Measurement Plot for Body TSL



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-----End of the test report-----