FCC SAR Test Report

Report No.	:	**SA190828C21**
Applicant	:	**Getac Technology Corporation.**
Address	:	**5F., Building A, No. 209, Sec.1, Nangang Rd.,Nangang Dist., Taipei City 11568, Taiwan**
Product	:	**Tablet**
FCC ID	:	**QYLEM7455Z**
Brand	:	**Getac**
Model No.	:	**ZX70**
Standards	:	**FCC 47 CFR Part 2 (2.1093), IEEE C95.1:1992, IEEE Std 1528:2013 KDB 865664 D01 v01r04, KDB 865664 D02 v01r02, KDB 248227 D01 v02r02, KDB 447498 D01 v06, KDB 616217 D04 v01r02, KDB 941225 D01 v03r01, KDB 941225 D05 v02r05**
Sample Received Date	:	**Aug. 28, 2019**
Date of Testing	:	**Sep. 23, 2019 ~ Oct. 24, 2019**
Lab Address	:	**No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan**
Test Location	:	**No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City, Taiwan**

CERTIFICATION: The above equipment have been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch–Lin Kou Laboratories**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by TAF or any government agencies.

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FCC Accredited No.: TW0003

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Release Control Record

Report No.	Reason for Change	Date Issued
SA190828C21	Initial release	Nov. 01, 2019

1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest SAR-1g Body (W/kg)
PCB	WCDMA II	1.04
	WCDMA IV	1.09
	WCDMA V	1.19
	LTE 2	1.18
	LTE 4	1.06
	LTE 5	0.93
	LTE 7	1.07
	LTE 12	0.76
	LTE 13	0.86
	LTE 25	1.11
	LTE 26	1.20
	LTE 41	0.83
DTS	2.4G WLAN	0.63
NII	5.3G WLAN	0.14
	5.6G WLAN	0.39
	5.8G WLAN	0.29
DSS	Bluetooth	0.02
DXX	NFC	N/A

Highest Simultaneous Transmission SAR	Highest SAR-1g Body (W/kg)
	1.23

Note:

1. The SAR criteria **(Head & Body: SAR-1g1.6 W/kg, and Extremity: SAR-10g 4.0 W/kg)**for general population/uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

2. Description of Equipment Under Test

EUT Type	Tablet
FCC ID	QYLEM7455Z
Brand Name	Getac
Model Name	ZX70
Tx Frequency Bands (Unit: MHz)	WCDMA Band II : 1852.4 ~ 1907.6 WCDMA Band IV : 1712.4 ~ 1752.6 WCDMA Band V : 826.4 ~ 846.6 LTE Band 2 : 1850.7 ~ 1909.3 (BW: 1.4M, 3M, 5M, 10M, 15M, 20M) LTE Band 4 : 1710.7 ~ 1754.3 (BW: 1.4M, 3M, 5M, 10M, 15M, 20M) LTE Band 5 : 824.7 ~ 848.3 (BW: 1.4M, 3M, 5M, 10M) LTE Band 7 : 2502.5 ~ 2567.5 (BW: 5M, 10M, 15M, 20M) LTE Band 12 : 699.7 ~ 715.3 (BW: 1.4M, 3M, 5M, 10M) LTE Band 13 : 779.5 ~ 784.5 (BW: 5M, 10M) LTE Band 25 : 1850.7 ~ 1914.3 (BW: 1.4M, 3M, 5M, 10M, 15M, 20M) LTE Band 26 : 814.7 ~ 848.3 (BW: 1.4M, 3M, 5M, 10M, 15M) LTE Band 41 : 2498.5 ~ 2687.5 (BW: 5M, 10M, 15M, 20M) WLAN : 2412 ~ 2462, 5180 ~ 5240, 5260 ~ 5320, 5500 ~ 5720, 5745 ~ 5825 Bluetooth : 2402 ~ 2480 NFC : 13.56
Uplink Modulations	WCDMA : QPSK LTE : QPSK, 16QAM 802.11b : DSSS 802.11a/g/n : OFDM Bluetooth : GFSK, π/4-DQPSK, 8-DPSK NFC : ASK
Maximum Tune-up Conducted Power (Unit: dBm)	Please refer to section 4.6.1 of this report
Antenna Type	PIFA Antenna
EUT Stage	Identical Prototype

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.

List of Accessory:

Battery	**Brand Name**	Geatc
	Model Name	BP1S2P4240L
	Power Rating	3.8Vdc, 8480mAh
	Type	Li-ion
LCD Panel	**Brand Name**	Truly
	Model Name	TDO-HD0698K61701
	Signal Line Type	7 meter non-shielded cable without ferrite core
Photo Camera	**Brand Name**	Chicony
	Model Name	CWFFF2520005340LH
	Spec.	2MPs HD Fix focus camera
Video Camera	**Brand Name**	Chicony
	Model Name	CYAF82520005340LH
	Spec.	8MPs auto focus camera
BT/WLAN Module	**Brand Name**	AMPAK
	Model Name	AP6234
RFID Module	**Brand Name**	Jogtek
	Model Name	TRF7970A
WWAN Module	**Brand Name**	Sierra
	Model Name	EM7455

3. SAR Measurement System

3.1 Definition of Specific Absorption Rate (SAR)

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

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

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

SAR is expressed in units of Watts per kilogram (W/kg)
SAR measurement can be related to the electrical field in the tissue by

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

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

3.2 SPEAG DASY6 System

DASY6 system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY6 software defined. The DASY6 software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

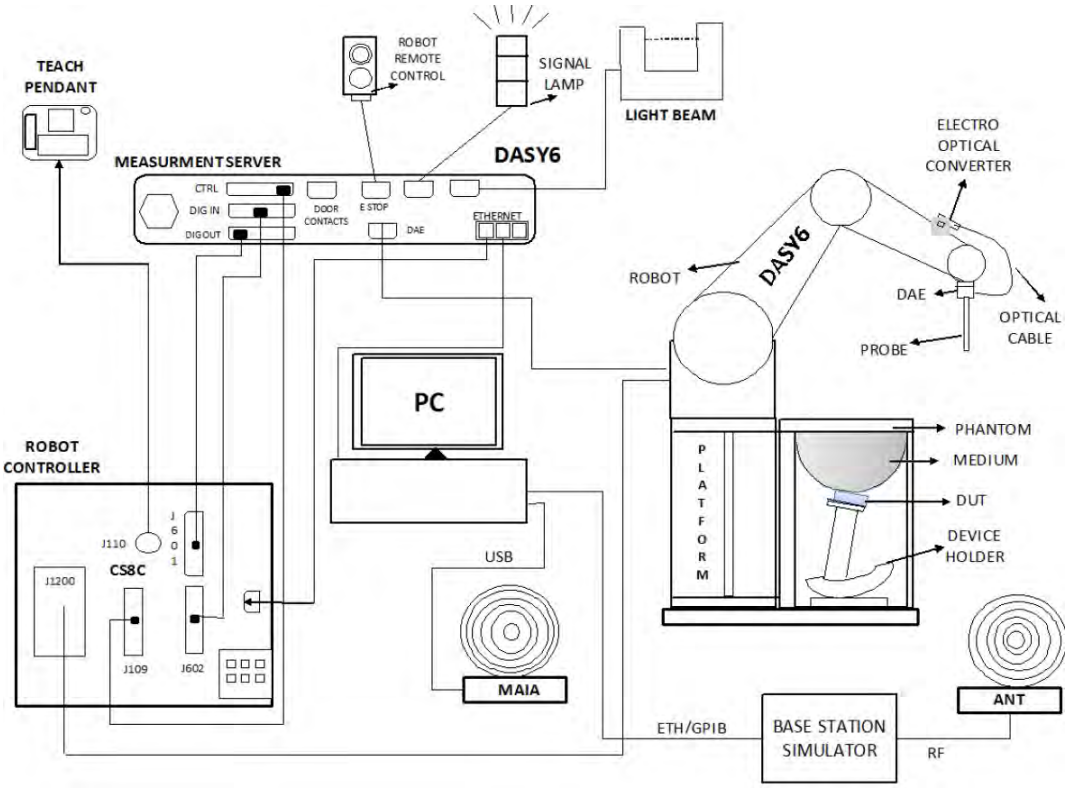


Fig-3.1 SPEAG DASY6 System Setup

3.2.1 Robot

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

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

Fig-3.2 SPEAG DASY6 System

3.2.2 Probes

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

Model	EX3DV4	
Construction	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).	
Frequency	4 MHz to 10 GHz Linearity: ± 0.2 dB	
Directivity	± 0.1 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 µW/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)	
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

3.2.3 Data Acquisition Electronics (DAE)

Model	DAE3, DAE4	
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.	
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)	
Input Offset Voltage	< 5µV (with auto zero)	
Input Bias Current	< 50 fA	
Dimensions	60 x 60 x 68 mm	

3.2.4 Phantoms

Model	Twin SAM	
Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.	
Material	Vinylester, glass fiber reinforced (VE-GF)	
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)	
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet	
Filling Volume	approx. 25 liters	

Model	ELI
Construction	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.
Material	Vinylester, glass fiber reinforced (VE-GF)
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Dimensions	Major axis: 600 mm Minor axis: 400 mm
Filling Volume	approx. 30 liters

3.2.5 Device Holder

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

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

3.2.6 System Validation Dipoles

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

3.2.7 Tissue Simulating Liquids

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

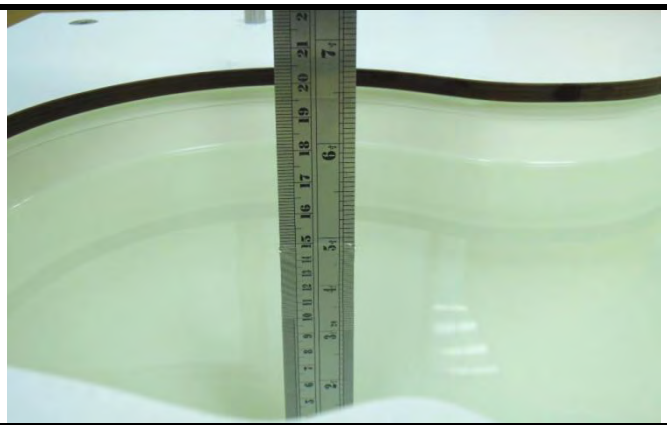
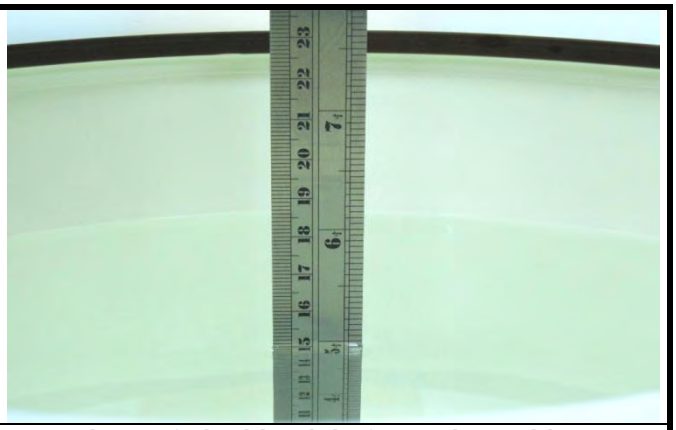
	

Photo of Liquid Height for Head Position	**Photo of Liquid Height for Body Position**

The dielectric properties of the head tissue simulating liquids are defined in IEEE1528,and KDB 865664 D01 Appendix A. For the body tissue simulating liquids, the dielectric properties are defined in KDB 865664 D01 Appendix A. The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using a dielectric assessment kit and a network analyzer.

Table-3.1Targets of Tissue Simulating Liquid

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

The following table gives the recipes for tissue simulating liquids.

Table-3.2Recipes of Tissue Simulating Liquid

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
H750	0.2	-	0.2	1.5	56.0	-	42.1	-
H835	0.2	-	0.2	1.5	57.0	-	41.1	-
H900	0.2	-	0.2	1.4	58.0	-	40.2	-
H1450	-	43.3	-	0.6	-	-	56.1	-
H1640	-	45.8	-	0.5	-	-	53.7	-
H1750	-	47.0	-	0.4	-	-	52.6	-
H1800	-	44.5	-	0.3	-	-	55.2	-
H1900	-	44.5	-	0.2	-	-	55.3	-
H2000	-	44.5	-	0.1	-	-	55.4	-
H2300	-	44.9	-	0.1	-	-	55.0	-
H2450	-	45.0	-	0.1	-	-	54.9	-
H2600	-	45.1	-	0.1	-	-	54.8	-
H3500	-	8.0	-	0.2	-	20.0	71.8	-
H5G	-	-	-	-	-	17.2	65.5	17.3

3.3 SAR System Verification

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

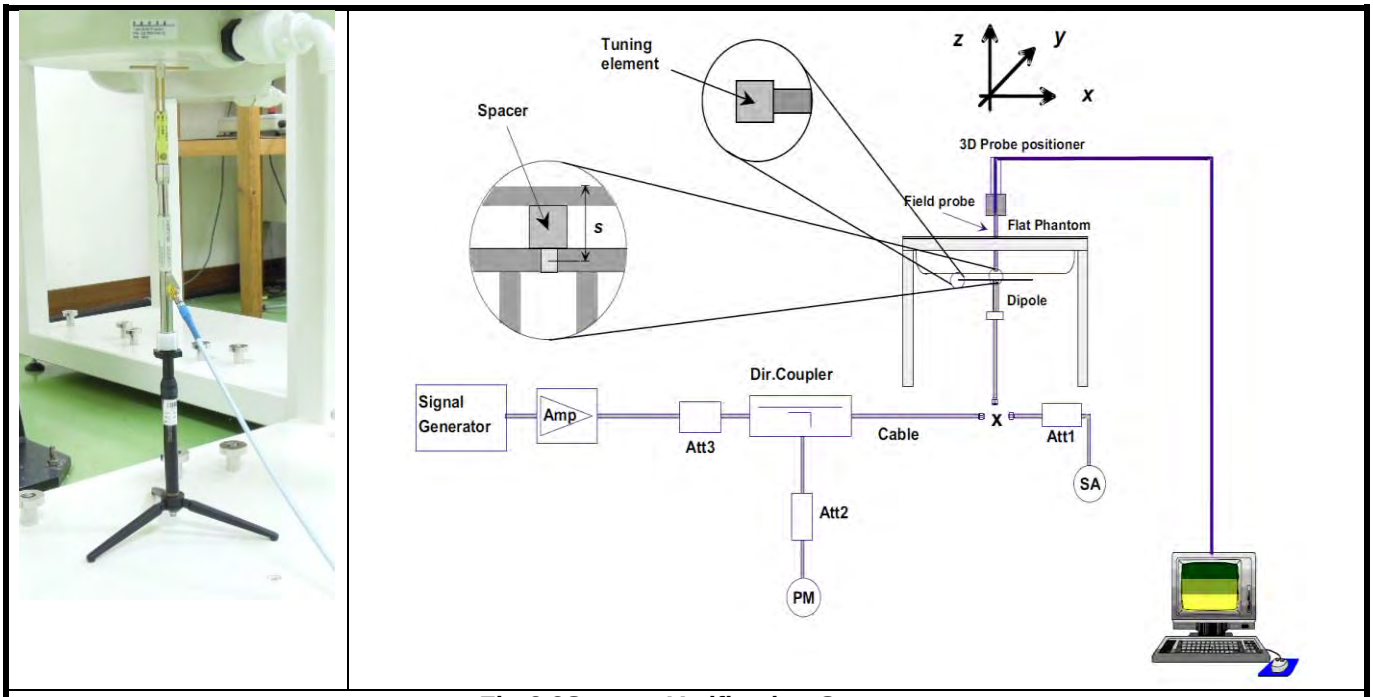


Fig-3.3System Verification Setup

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

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

3.4 SAR Measurement Procedure

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

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

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

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

3.4.1 Area & Zoom Scan Procedure

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

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

Note:

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

3.4.2 Volume Scan Procedure

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

3.4.3 Power Drift Monitoring

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

3.4.4 Spatial Peak SAR Evaluation

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

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

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

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

3.4.5 SAR Averaged Methods

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

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

4. SAR Measurement Evaluation

4.1 EUT Configuration and Setting

<Considerations Related to Proximity Sensor>

The device supports WWAN, WLAN, and Bluetooth capabilities. It is designed with a proximity sensor which can trigger/not trigger power reduction for WCDMA and LTE on Right Side EUT for SAR compliance. Others RF capability (WLAN and Bluetooth) have no power reduction. The power levels for all wireless technologies and the power reduction please refer to section 4.6 of this report.

Proximity Sensor Triggering Distances (KDB 616217 D04 §6.2)

The proximity sensor triggering distance was determined per KDB 616217 for rear face and applicable edge. Summary for power verification per distance was tabulated in the below table.

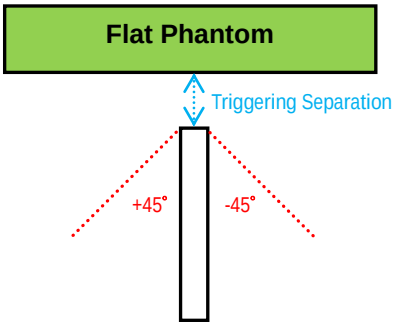
Output Power Verification in dBm for EUT Right Edge											
Distance (mm)	20	21	22	23	24	25	26	27	28	29	30
WCDMA II	17.3	17.5	17.1	17.0	17.4	17.5	23.1	23.2	23.0	23.0	23.3
WCDMA IV	17.1	17.1	17.3	16.9	16.9	17.3	23.4	23.0	23.1	23.5	23.4
WCDMA V	21.8	21.7	21.5	21.9	21.6	21.9	22.6	22.6	22.6	22.7	22.6
LTE 2	17.2	17.5	17.2	17.2	17.2	17.3	22.8	22.7	22.8	23.1	23.1
LTE 4	16.8	16.9	17.2	16.9	16.9	16.8	23.4	23.1	23.4	23.0	23.3
LTE 7	20.2	20.5	20.1	20.0	20.3	20.5	21.6	21.9	21.4	21.5	21.5
LTE 25	17.0	17.1	17.1	16.9	16.9	16.9	23.1	22.8	23.1	22.8	23.3
LTE 26	22.0	22.2	22.2	22.2	22.2	22.4	22.6	23.0	22.5	22.7	22.5

Proximity Sensor Coverage (KDB 616217 D04 §6.3)

Since the proximity sensor is collocated with antenna in one component, the procedure for proximity sensor coverage is not required.

Proximity Sensor Tilt Angle Influences(KDB 616217 D04 §6.4)

The proximity sensor tilt angle influence was determined per KDB 616217 for applicable edge. Summary for proximity sensor tilt angle influence is shown in below.



Orientation	Separation Distance (mm)	Tilt Angle										
		-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
Right Edge	25	On	On	On	On	On	On	On	On	On	On	On

Summary for Proximity Sensor Triggering Test

According to the procedures noticed in KDB 616217 D04, the proximity sensor triggering distance is 25 mm for EUT Right Side. The separation distance of 25 mm determined by the smallest triggering distance on Right Side is used to access the tilt angle influence and the sensor does not release during ±45 degree. Therefore, the smallest separation distance for tilt angle influence is 25 mm for the Right Side. The conservation triggering distances based on the separation distance for the sensor trigger / not triggered as EUT with power reduction at 0 mm, and EUT without power reduction at 16 mm for EUT Right Side were used to test SAR.

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

<Connections between EUT and System Simulator>

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

<Considerations Related to WCDMA for Setup and Testing>

Release 5 HSDPA Data Devices

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

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

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

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with β_{HS} =30/15*β_c, and Δ_{CQI}=24/15 with β_{HS} =24/15*β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{HS}/β_c =24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: 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 signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d= 15/15.

Release 6 HSUPA Data Devices

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS}(1)	β_{ec}	β_{ed}(4)(5)	β_{ed} (SF)	β_{ed} (Codes)	CM(2) (dB)	MPR(2)(6) (dB)	AG(5) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{HS} =30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{HS} =5/15*β_c.
Note 2: CM = 1 for β_c/β_d =12/15, β_{HS}/β_c =24/15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.
Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

DC-HSDPA SAR Guidance

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

<Considerations Related to LTE for Setup and Testing>

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

EUT Supported LTE Band and Channel Bandwidth						
LTE Band	**BW 1.4 MHz**	**BW 3 MHz**	**BW 5 MHz**	**BW 10 MHz**	**BW 15 MHz**	**BW 20 MHz**
2	**V**	**V**	**V**	**V**	**V**	**V**
4	**V**	**V**	**V**	**V**	**V**	**V**
5	**V**	**V**	**V**	**V**		
7			**V**	**V**	**V**	**V**
12	**V**	**V**	**V**	**V**		
13			**V**	**V**		
25	**V**	**V**	**V**	**V**	**V**	**V**
26	**V**	**V**	**V**	**V**	**V**	
41			**V**	**V**	**V**	**V**

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

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

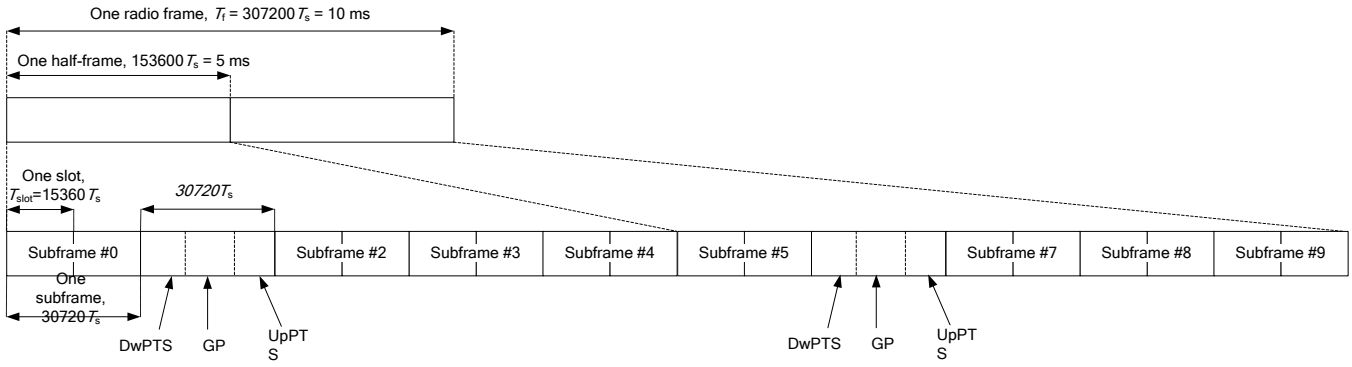
Note: MPR is according to the standard and implemented in the circuit (mandatory).

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

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

TDD-LTE Setup Configurations

According to KDB 941225 D05, SAR testing for TDD-LTE device must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP TDD-LTE configurations. The TDD-LTE of this device supports frame structure type 2 defined in 3GPP TS 36.211 section 4.2, and the frame structure configuration can be referred to below.



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

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

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

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-Point Periodicity	Subframe Number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

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

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

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

<Considerations Related to WLAN for Setup and Testing>

In general, various vendor specific external test software and chipset based internal test modes are typically used for SAR measurement. These chipset based test mode utilities are generally hardware and manufacturer dependent, and often include substantial flexibility to reconfigure or reprogram a device. A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement. The test frequencies established using test mode must correspond to the actual channel frequencies. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. In addition, a periodic transmission duty factor is required for current generation SAR systems to measure SAR correctly. The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

According to KDB 248227 D01,this device has installed WLAN engineering testing software which can provide continuous transmitting RF signal. During WLAN SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

Initial Test Configuration

An initial test configuration is determined for OFDM transmission modes in 2.4 GHz and 5 GHz bands according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.

Subsequent Test Configuration

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. Additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. When the highest reported SAR for the initial test configuration according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

SAR Test Configuration and Channel Selection

When multiple channel bandwidth configurations in a frequency band have the same specified maximum output power, the initial test configuration is using largest channel bandwidth, lowest order modulation, lowest data rate, and lowest order 802.11 mode (i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n).After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following.

1) The channel closest to mid-band frequency is selected for SAR measurement.

2) For channels with equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

Test Reduction for U-NII-1 (5.2 GHz) and U-NII-2A (5.3 GHz) Bands

For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following.

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition).

2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

<Considerations Related to Bluetooth for Setup and Testing>

This device has installed Bluetooth engineering testing software which can provide continuous transmitting RF signal. During Bluetooth SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

The Bluetooth call box has been used during SAR measurement and the EUT was set to DH5 mode at the maximum output power. Its duty factor was calculated as below and the measured SAR for Bluetooth would be scaled to the 100% transmission duty factor to determine compliance.

Time-domain plot for Bluetooth transmission signal

The duty factor of Bluetooth signal has been calculated as following.

Duty Factor = Pulse Width / Total Period = (4.158-3.71)/(4.34-3.71) = 71.1 %

4.2 EUT Testing Position

4.2.1 Body Exposure Conditions

For full-size tablet, according to KDB 616217 D04, SAR evaluation is required for back surface and edges of the devices. The back surface and edges of the tablet are tested with the tablet touching the phantom. Exposures from antennas through the front surface of the display section of a tablet are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary. When voice mode is supported on a tablet and it is limited to speaker mode or headset operations only, additional SAR testing for this type of voice use is not required.

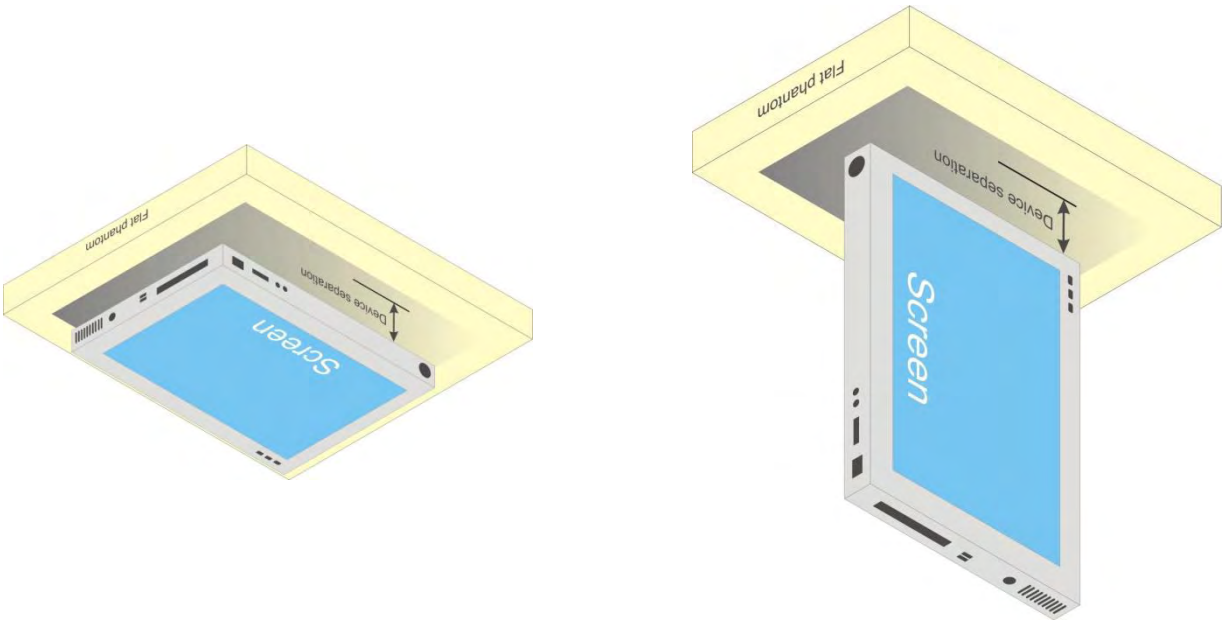


Fig-4.1 Illustration for Tablet Setup

4.2.2 SAR Test Exclusion Evaluations

According to KDB 447498 D01, the SAR test exclusion condition is based on source-based time-averaged maximum conducted output power, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions. The SAR exclusion threshold is determined by the following formula.

1. For the test separation distance <= 50 mm

$$\frac{\textbf{Max. Tune up Power}_{(mW)}}{\textbf{Min. Test Separation Distance}_{(mm)}} \times \sqrt{f_{(GHz)}} \leq \textbf{3.0 for SAR-1g, ≤ 7.5 for SAR-10g}$$

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

2. For the test separation distance > 50 mm, and the frequency at 100 MHz to 1500 MHz

$$\left[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\text{ mm}) \times \left(\frac{f_{(MHz)}}{150}\right)\right]_{(mW)}$$

3. For the test separation distance > 50 mm, and the frequency at > 1500 MHz to 6 GHz

$$[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\text{ mm}) \times 10]_{(mW)}$$

Mode	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Rear Face			Left Side			Right Side			Top Side			Bottom Side		
			Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?
WCDMA II	23.5	224	5	61.88	**Yes**	199	1599 mW	No	3	61.88	**Yes**	23	13.45	**Yes**	29	10.67	**Yes**
WCDMA IV	23.5	224	5	59.31	**Yes**	199	1603 mW	No	3	59.31	**Yes**	23	12.89	**Yes**	29	10.23	**Yes**
WCDMA V	23	200	5	36.8	**Yes**	199	1004 mW	No	3	36.8	**Yes**	23	8	**Yes**	29	6.35	**Yes**
LTE 2	23.5	224	5	61.91	**Yes**	199	1599 mW	No	3	61.91	**Yes**	23	13.46	**Yes**	29	10.67	**Yes**
LTE 4	23.5	224	5	59.35	**Yes**	199	1603 mW	No	3	59.35	**Yes**	23	12.9	**Yes**	29	10.23	**Yes**
LTE 5	23	200	5	36.86	**Yes**	199	1006 mW	No	3	36.86	**Yes**	23	8.01	**Yes**	29	6.35	**Yes**
LTE 7	22	158	5	50.66	**Yes**	199	1584 mW	No	3	50.66	**Yes**	23	11.01	**Yes**	29	8.73	**Yes**
LTE 12	23.5	224	5	37.91	**Yes**	199	888 mW	No	3	37.91	**Yes**	23	8.24	**Yes**	29	6.54	**Yes**
LTE 13	23	200	5	35.49	**Yes**	199	951 mW	No	3	35.49	**Yes**	23	7.71	**Yes**	29	6.12	**Yes**
LTE 25	23.5	224	5	62	**Yes**	199	1598 mW	No	3	62	**Yes**	23	13.48	**Yes**	29	10.69	**Yes**
LTE 26	23	200	5	36.86	**Yes**	199	1006 mW	No	3	36.86	**Yes**	23	8.01	**Yes**	29	6.35	**Yes**
LTE 41	22	158	5	51.83	**Yes**	199	1581 mW	No	3	51.83	**Yes**	23	11.27	**Yes**	29	8.94	**Yes**
WLAN 2.4GHz	13.5	22	5	6.9	**Yes**	9	3.84	**Yes**	200	1596 mW	No	50	0.69	No	63	226 mW	No
WLAN 5GHz	7.5	6	5	2.75	No	9	1.53	No	200	1566 mW	No	50	0.27	No	63	196 mW	No
WLAN 5GHz	7.5	6	5	2.77	No	9	1.54	No	200	1565 mW	No	50	0.28	No	63	195 mW	No
WLAN 5GHz	8.5	7	5	3.35	**Yes**	9	1.86	No	200	1563 mW	No	50	0.33	No	63	193 mW	No
WLAN 5GHz	8	6	5	2.9	No	9	1.61	No	200	1562 mW	No	50	0.29	No	63	192 mW	No
BT	2	2	5	0.63	No	9	0.35	No	200	1595 mW	No	50	0.06	No	63	225 mW	No

Note:

1. When separation distance <= 50 mm and the calculated result shown in above table is <= 3.0 for SAR-1g exposure condition, or <= 7.5 for SAR-10g exposure condition, the SAR testing exclusion is applied.
2. When separation distance > 50 mm and the device output power is less than the calculated result (power threshold, mW) shown in above table, the SAR testing exclusion is applied.

4.3 Tissue Verification

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

Test Date	Frequency (MHz)	Liquid Temp. (℃)	Measured Conductivity (σ)	Measured Permittivity (ε_r)	Target Conductivity (σ)	Target Permittivity (ε_r)	Conductivity Deviation (%)	Permittivity Deviation (%)
Sep. 24, 2019	750	23.3	**0.9**	42.167	0.89	41.9	1.12	0.64
Oct. 22, 2019	750	23.1	**0.9**	42.71	0.89	41.9	1.12	1.93
Sep. 24, 2019	835	23.3	0.915	42.964	0.9	41.5	1.67	3.53
Oct. 02, 2019	835	23.3	0.907	40.942	0.9	41.5	0.78	-1.34
Oct. 03, 2019	835	23.3	0.928	42.053	0.9	41.5	3.11	1.33
Oct. 22, 2019	835	23.1	0.922	41.388	0.9	41.5	2.44	-0.27
Oct. 24, 2019	835	23.3	0.919	42.305	0.9	41.5	2.11	1.94
Sep. 23, 2019	1750	23.3	1.332	39.93	1.37	40.1	-2.77	-0.42
Sep. 24, 2019	1750	23.3	1.319	39.296	1.37	40.1	-3.72	-2.00
Oct. 02, 2019	1750	23.3	1.323	38.973	1.37	40.1	-3.43	-2.81
Oct. 09, 2019	1750	23.3	1.325	39.333	1.37	40.1	-3.28	-1.91
Oct. 23, 2019	1750	23.4	1.343	41.026	1.37	40.1	-1.97	2.31
Sep. 23, 2019	1900	23.3	1.454	39.609	1.4	40	3.86	-0.98
Sep. 24, 2019	1900	23.3	1.446	38.887	1.4	40	3.29	-2.78
Oct. 02, 2019	1900	23.3	1.449	38.48	1.4	40	3.50	-3.80
Oct. 09, 2019	1900	23.3	1.456	38.805	1.4	40	4.00	-2.99
Oct. 23, 2019	1900	23.4	1.459	40.615	1.4	40	4.21	1.54
Oct. 24, 2019	1900	23.3	1.458	39.592	1.4	40	4.14	-1.02
Oct. 01, 2019	2450	23.3	1.87	38.896	1.8	39.2	3.89	-0.78
Oct. 22, 2019	2450	23.1	1.871	39.051	1.8	39.2	3.94	-0.38
Sep. 24, 2019	2600	23.3	1.984	38.033	1.96	39	1.22	-2.48
Oct. 02, 2019	2600	23.3	2.049	37.692	1.96	39	4.54	-3.35
Oct. 22, 2019	2600	23.1	2.047	38.553	1.96	39	4.44	-1.15
Oct. 24, 2019	2600	23.3	2.016	37.255	1.96	39	2.86	-4.47
Oct. 01, 2019	5250	23.3	4.573	34.992	4.71	35.9	-2.91	-2.53
Oct. 22, 2019	5250	23.1	4.795	34.848	4.71	35.9	1.80	-2.93
Oct. 01, 2019	5600	23.3	4.895	34.558	5.07	35.5	-3.45	-2.65
Oct. 22, 2019	5600	23.1	5.122	34.349	5.07	35.5	1.03	-3.24
Oct. 01, 2019	5750	23.3	5.039	34.36	5.22	35.4	-3.47	-2.94
Oct. 22, 2019	5750	23.1	5.265	34.136	5.22	35.4	0.86	-3.57

Note:

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

4.4 System Validation

The SAR measurement system was validated according to procedures in KDB 865664 D01. The validation status in tabulated summary is as below.

Test Date	Probe S/N	Calibration Point	Measured Conductivity (σ)	Measured Permittivity (ε_r)	Validation for CW			Validation for Modulation		
					Sensitivity Range	Probe Linearity	Probe Isotropy	Modulation Type	Duty Factor	PAR
Sep. 24, 2019	7375	750	0.9	42.167	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 22, 2019	7537	750	0.9	42.71	Pass	Pass	Pass	N/A	N/A	N/A
Sep. 24, 2019	7375	835	0.915	42.964	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 02, 2019	7375	835	0.907	40.942	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 03, 2019	7375	835	0.928	42.053	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 22, 2019	7537	835	0.922	41.388	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 24, 2019	7472	835	0.919	42.305	Pass	Pass	Pass	N/A	N/A	N/A
Sep. 23, 2019	7375	1750	1.332	39.93	Pass	Pass	Pass	N/A	N/A	N/A
Sep. 24, 2019	7375	1750	1.319	39.296	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 02, 2019	7375	1750	1.323	38.973	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 09, 2019	7472	1750	1.325	39.333	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 23, 2019	3971	1750	1.343	41.026	Pass	Pass	Pass	N/A	N/A	N/A
Sep. 23, 2019	7375	1900	1.454	39.609	Pass	Pass	Pass	N/A	N/A	N/A
Sep. 24, 2019	7375	1900	1.446	38.887	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 02, 2019	7375	1900	1.449	38.48	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 09, 2019	7472	1900	1.456	38.805	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 23, 2019	3971	1900	1.459	40.615	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 24, 2019	7472	1900	1.458	39.592	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 01, 2019	7375	2450	1.87	38.896	Pass	Pass	Pass	OFDM	N/A	Pass
Oct. 22, 2019	7537	2450	1.871	39.051	Pass	Pass	Pass	OFDM	N/A	Pass
Sep. 24, 2019	7375	2600	1.984	38.033	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 02, 2019	7375	2600	2.049	37.692	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 22, 2019	7537	2600	2.047	38.553	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 24, 2019	7472	2600	2.016	37.255	Pass	Pass	Pass	N/A	N/A	N/A
Oct. 01, 2019	7375	5250	4.573	34.992	Pass	Pass	Pass	OFDM	N/A	Pass
Oct. 22, 2019	7537	5250	4.795	34.848	Pass	Pass	Pass	OFDM	N/A	Pass
Oct. 01, 2019	7375	5600	4.895	34.558	Pass	Pass	Pass	OFDM	N/A	Pass
Oct. 22, 2019	7537	5600	5.122	34.349	Pass	Pass	Pass	OFDM	N/A	Pass
Oct. 01, 2019	7375	5750	5.039	34.36	Pass	Pass	Pass	OFDM	N/A	Pass
Oct. 22, 2019	7537	5750	5.265	34.136	Pass	Pass	Pass	OFDM	N/A	Pass

4.5 System Verification

The measuring result for system verification is tabulated as below.

Test Date	Frequency (MHz)	1W Target SAR-1g (W/kg)	Measured SAR-1g (W/kg)	Normalized to 1W SAR-1g (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
Sep. 24, 2019	750	8.56	2.22	8.88	3.74	1013	7375	1277
Oct. 22, 2019	750	8.56	1.98	7.92	-7.48	1013	7537	1585
Sep. 24, 2019	835	9.61	2.42	9.68	0.73	4d121	7375	1277
Oct. 02, 2019	835	9.61	2.27	9.08	-5.52	4d121	7375	1277
Oct. 03, 2019	835	9.61	2.47	9.88	2.81	4d121	7375	1277
Oct. 22, 2019	835	9.61	2.44	9.76	1.56	4d121	7537	1585
Oct. 24, 2019	835	9.61	2.43	9.72	1.14	4d121	7472	579
Sep. 23, 2019	1750	37.00	8.96	35.84	-3.14	1055	7375	1277
Sep. 24, 2019	1750	37.00	8.82	35.28	-4.65	1055	7375	1277
Oct. 02, 2019	1750	37.00	9.03	36.12	-2.38	1055	7375	1277
Oct. 09, 2019	1750	37.00	8.75	35.00	-5.41	1055	7472	579
Oct. 23, 2019	1750	37.00	9.02	36.08	-2.49	1055	3971	1431
Sep. 23, 2019	1900	40.20	10.3	41.20	2.49	5d036	7375	1277
Sep. 24, 2019	1900	40.20	9.71	38.84	-3.38	5d036	7375	1277
Oct. 02, 2019	1900	40.20	10.3	41.20	2.49	5d036	7375	1277
Oct. 09, 2019	1900	40.20	10	40.00	-0.50	5d036	7472	579
Oct. 23, 2019	1900	40.20	10.7	42.80	6.47	5d036	3971	1431
Oct. 24, 2019	1900	40.20	9.9	39.60	-1.49	5d036	7472	579
Oct. 01, 2019	2450	52.70	12.6	50.40	-4.36	737	7375	1277
Oct. 22, 2019	2450	52.70	12.8	51.20	-2.85	737	7537	1585
Sep. 24, 2019	2600	57.30	2.84	56.80	-0.87	1020	7375	1277
Oct. 02, 2019	2600	57.30	15	60.00	4.71	1020	7375	1277
Oct. 22, 2019	2600	57.30	13.5	54.00	-5.76	1020	7537	1585
Oct. 24, 2019	2600	57.30	14.8	59.20	3.32	1020	7472	579
Oct. 01, 2019	5250	80.70	8.26	82.60	2.35	1019	7375	1277
Oct. 22, 2019	5250	80.70	8.29	82.90	2.73	1019	7537	1585
Oct. 01, 2019	5600	85.80	8.25	82.50	-3.85	1019	7375	1277
Oct. 22, 2019	5600	85.80	8.52	85.20	-0.70	1019	7537	1585
Oct. 01, 2019	5750	81.50	8.42	84.20	3.31	1019	7375	1277
Oct. 22, 2019	5750	81.50	7.67	76.70	-5.89	1019	7537	1585

Note:

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

4.6 Maximum Output Power

4.6.1 Maximum Target Conducted Power

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

Mode	WCDMA Band II (without Power Reduction)	WCDMA Band II (with Power Reduction)	Power Reduction (dB)
RMC 12.2K	23.5	17.5	6
HSDPA / HSUPA / DC-HSDPA	23.5	17.5	6

Mode	WCDMA Band IV (without Power Reduction)	WCDMA Band IV (with Power Reduction)	Power Reduction (dB)
RMC 12.2K	23.5	17.5	6
HSDPA / HSUPA / DC-HSDPA	23.5	17.5	6

Mode	WCDMA Band V (without Power Reduction)	WCDMA Band V (with Power Reduction)	Power Reduction (dB)
RMC 12.2K	23	22	1
HSDPA / HSUPA / DC-HSDPA	23	22	1

Mode	LTE 2 (without Power Reduction)	LTE 2 (with Power Reduction)	Power Reduction (dB)
Maximum Target Power	23.5	18	5.5

Mode	LTE 4 (without Power Reduction)	LTE 4 (with Power Reduction)	Power Reduction (dB)
Maximum Target Power	23.5	17.5	6

Mode	LTE 5
Maximum Target Power	23

Mode	LTE 7 (without Power Reduction)	LTE 7 (with Power Reduction)	Power Reduction (dB)
Maximum Target Power	22	21	1

Mode	LTE 12	LTE 13
Maximum Target Power	23.5	23

Mode	LTE 25 (without Power Reduction)	LTE 25 (with Power Reduction)	Power Reduction (dB)
Maximum Target Power	23.5	17.5	6

Mode	LTE 26 (without Power Reduction)	LTE 26 (with Power Reduction)	Power Reduction (dB)
Maximum Target Power	23	22.5	0.5

Mode	LTE 41
Maximum Target Power	22

<WLAN 2.4G>

Mode	Channel	Frequency (MHz)	Tune-up Power
802.11b	1	2412	13.5
	6	2437	13.5
	11	2462	13.5
802.11g	1	2412	13
	6	2437	13
	11	2462	13
802.11n (HT20)	1	2412	12
	6	2437	12
	11	2462	12

<WLAN 5.2G>

Mode	Channel	Frequency (MHz)	Tune-up Power
802.11a	36	5180	7.5
	40	5200	7.5
	44	5220	7.5
	48	5240	7.5
802.11n (HT20)	36	5180	7
	40	5200	7
	44	5220	7
	48	5240	7
802.11n (HT40)	38	5190	7
	46	5230	7

<WLAN 5.3G>

Mode	Channel	Frequency (MHz)	Tune-up Power
802.11a	52	5260	7.5
	56	5280	7.5
	60	5300	7.5
	64	5320	7.5
802.11n (HT20)	52	5260	7
	56	5280	7
	60	5300	7
	64	5320	7
802.11n (HT40)	54	5270	7
	62	5310	7

<WLAN 5.6G>

Mode	Channel	Frequency (MHz)	Tune-up Power
802.11a	100	5500	8.5
	116	5580	8.5
	120	5600	8.5
	124	5620	8.5
	132	5660	8.5
	140	5700	8.5
	144	5720	8.5
802.11n (HT20)	100	5500	7
	116	5580	7
	120	5600	7
	124	5620	7
	132	5660	7
	140	5700	7
	144	5720	7
802.11n (HT40)	102	5510	7
	110	5550	7
	118	5590	7
	126	5630	7
	134	5670	7
	142	5710	7

<WLAN 5.8G>

Mode	Channel	Frequency (MHz)	Tune-up Power
802.11a	149	5745	8
	153	5765	8
	157	5785	8
	161	5805	8
	165	5825	8
802.11n (HT20)	149	5745	7
	153	5765	7
	157	5785	7
	161	5805	7
	165	5825	7
802.11n (HT40)	151	5755	7
	159	5795	7

<Bluetooth>

Mode	Channel	Frequency (MHz)	Tune-up Power
Bluetooth EDR	0	2402	0.5
	39	2441	0.5
	78	2480	0.5
Bluetooth LE	0	2402	2
	19	2440	2
	39	2480	2

4.6.2 Measured Conducted Power Result

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

Band	WCDMA Band II			WCDMA Band IV			WCDMA Band V			3GPP MPR (dB)
Channel	9262	9400	9538	1312	1413	1513	4132	4182	4233	
Frequency (MHz)	1852.4	1880.0	1907.6	1712.4	1732.6	1752.6	826.4	836.4	846.6	
EUT without Power Reduction (P-Sensor NOT Triggered)										
RMC 12.2K	23.29	23.32	23.37	23.48	23.34	23.47	22.95	22.88	22.93	-
HSDPA Subtest-1	22.31	22.38	22.42	22.29	22.26	22.36	21.80	21.74	21.75	0
HSDPA Subtest-2	22.04	22.39	22.41	22.30	22.27	22.38	21.82	21.76	21.77	0
HSDPA Subtest-3	21.81	21.89	21.92	21.81	21.78	21.87	21.32	21.27	21.28	0.5
HSDPA Subtest-4	21.80	21.86	21.90	21.80	21.43	21.86	21.32	21.26	21.27	0.5
DC-HSDPA Subtest-1	22.29	22.36	22.40	22.22	22.15	22.32	21.75	21.71	21.69	0
DC-HSDPA Subtest-2	21.98	22.35	22.32	22.26	22.18	22.35	21.77	21.73	21.70	0
DC-HSDPA Subtest-3	21.75	21.85	21.87	21.73	21.75	21.79	21.29	21.26	21.13	0.5
DC-HSDPA Subtest-4	21.74	21.81	21.85	21.71	21.36	21.72	21.24	21.23	21.11	0.5
HSUPA Subtest-1	22.01	22.02	22.12	21.97	21.86	22.01	21.54	21.43	21.43	0
HSUPA Subtest-2	21.30	21.35	21.42	21.28	21.23	21.32	20.69	20.75	20.74	2
HSUPA Subtest-3	20.89	20.94	21.01	20.86	20.78	20.91	20.43	20.39	20.36	1
HSUPA Subtest-4	21.20	21.23	21.31	21.18	21.12	21.21	20.70	20.63	20.64	2
HSUPA Subtest-5	22.30	22.40	22.41	22.31	22.20	22.30	21.80	21.81	21.75	0
EUT with Power Reduction (P-Sensor Triggered)										
RMC 12.2K	17.41	17.43	17.45	17.43	17.38	17.42	21.98	21.94	21.96	-
HSDPA Subtest-1	16.24	16.26	16.28	15.88	15.83	15.87	20.90	20.85	20.87	0
HSDPA Subtest-2	16.27	16.28	16.30	15.91	15.86	15.90	20.91	20.86	20.89	0
HSDPA Subtest-3	15.75	15.77	15.78	16.04	15.99	16.05	20.41	20.36	20.33	0.5
HSDPA Subtest-4	15.71	15.72	15.75	15.78	15.72	15.76	20.43	20.36	20.39	0.5
DC-HSDPA Subtest-1	16.19	16.21	16.23	15.81	15.76	15.80	20.85	20.80	20.83	0
DC-HSDPA Subtest-2	16.21	16.23	16.25	15.86	15.79	15.85	20.83	20.81	20.85	0
DC-HSDPA Subtest-3	15.68	15.72	15.75	15.98	15.92	15.96	20.33	20.31	20.34	0.5
DC-HSDPA Subtest-4	15.65	15.67	15.69	15.70	15.65	15.69	20.36	20.31	20.34	0.5
HSUPA Subtest-1	15.89	15.91	15.93	15.90	15.85	15.89	20.59	20.54	20.57	0
HSUPA Subtest-2	15.26	15.28	15.31	15.22	15.18	15.23	19.89	19.83	19.84	2
HSUPA Subtest-3	14.88	14.89	14.91	14.81	14.76	14.80	19.48	19.43	19.46	1
HSUPA Subtest-4	15.17	15.18	15.20	15.41	15.36	15.41	19.81	19.76	19.88	2
HSUPA Subtest-5	16.18	16.20	16.22	16.25	16.20	16.24	20.85	20.80	20.83	0

LTE Band 2

EUT without Power Reduction (P-Sensor NOT Triggered)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18700	18900	19100	
		Frequency (MHz)		1860.0	1880.0	1900.0	
20M	QPSK	1	0	23.10	23.23	23.15	0
		1	50	23.05	23.18	23.10	0
		1	99	22.79	22.92	22.84	0
		50	0	22.11	22.24	22.16	1
		50	25	22.03	22.16	22.08	1
		50	50	22.00	22.13	22.05	1
		100	0	22.08	22.21	22.13	1
	16QAM	1	0	22.33	22.46	22.38	1
		1	50	22.20	22.33	22.25	1
		1	99	22.09	22.22	22.14	1
		50	0	21.14	21.27	21.19	2
		50	25	21.04	21.17	21.09	2
		50	50	21.01	21.14	21.06	2
		100	0	21.10	21.23	21.15	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18675	18900	19125	
		Frequency (MHz)		1857.5	1880.0	1902.5	
15M	QPSK	1	0	23.05	23.15	23.10	0
		1	37	22.99	23.14	23.06	0
		1	74	22.79	22.88	22.79	0
		36	0	22.06	22.15	22.14	1
		36	19	22.00	22.16	22.00	1
		36	39	21.98	22.07	21.95	1
		75	0	22.04	22.15	22.10	1
	16QAM	1	0	22.25	22.36	22.38	1
		1	37	22.18	22.25	22.24	1
		1	74	22.00	22.22	22.06	1
		36	0	21.13	21.26	21.16	2
		36	19	20.97	21.13	21.04	2
		36	39	20.97	21.14	20.97	2
		75	0	21.09	21.14	21.09	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18650	18900	19150	
		Frequency (MHz)		1855.0	1880.0	1905.0	
10M	QPSK	1	0	23.04	23.10	23.09	0
		1	24	22.91	23.08	22.96	0
		1	49	22.65	22.87	22.74	0
		25	0	21.92	22.11	21.97	1
		25	12	21.87	22.04	21.97	1
		25	25	21.89	21.98	21.86	1
		50	0	21.99	22.07	22.03	1
	16QAM	1	0	22.17	22.35	22.26	1
		1	24	22.01	22.13	22.20	1
		1	49	22.02	22.06	22.11	1
		25	0	21.02	21.23	21.02	2
		25	12	20.99	21.06	21.00	2
		25	25	20.85	20.90	20.83	2
		50	0	20.99	21.04	21.03	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18625	18900	19175	
		Frequency (MHz)		1852.5	1880.0	1907.5	
5M	QPSK	1	0	22.98	23.14	22.93	0
		1	12	22.90	23.08	22.80	0
		1	24	22.68	22.88	22.66	0
		12	0	22.08	22.18	22.04	1
		12	6	21.88	22.00	21.89	1
		12	13	21.99	21.98	21.89	1
		25	0	21.93	22.14	21.97	1
	16QAM	1	0	22.19	22.42	22.25	1
		1	12	22.13	22.15	22.10	1
		1	24	22.06	22.17	22.08	1
		12	0	21.02	21.17	21.04	2
		12	6	20.90	20.98	20.98	2
		12	13	20.96	21.02	20.87	2
		25	0	20.95	21.06	21.01	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18615	18900	19185	
		Frequency (MHz)		1851.5	1880.0	1908.5	
3M	QPSK	1	0	22.98	23.06	22.99	0
		1	7	22.88	22.99	23.03	0
		1	14	22.70	22.79	22.72	0
		8	0	22.07	22.06	22.07	1
		8	3	21.81	22.02	22.03	1
		8	7	21.89	22.03	21.96	1
		15	0	21.91	22.06	22.05	1
	16QAM	1	0	22.12	22.28	22.33	1
		1	7	22.01	22.13	22.05	1
		1	14	21.95	22.20	22.03	1
		8	0	20.95	21.04	21.18	2
		8	3	20.85	21.00	20.89	2
		8	7	20.87	21.01	20.91	2
		15	0	20.93	21.21	20.92	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18607	18900	19193	
		Frequency (MHz)		1850.7	1880.0	1909.3	
1.4M	QPSK	1	0	23.06	23.02	23.02	0
		1	2	23.00	23.09	23.02	0
		1	5	22.70	22.80	22.65	0
		3	0	23.05	23.05	23.02	0
		3	1	22.94	23.06	22.96	0
		3	3	22.86	23.09	22.98	0
		6	0	21.90	22.11	22.13	1
	16QAM	1	0	22.30	22.28	22.28	1
		1	2	22.01	22.26	22.11	1
		1	5	22.00	22.03	21.98	1
		3	0	22.03	22.14	22.11	1
		3	1	21.95	22.01	22.02	1
		3	3	21.88	21.99	21.93	1
		6	0	20.93	21.11	21.10	2

LTE Band 2															
EUT with Power Reduction (P-Sensor Triggered)															
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18700	18900	19100				Channel		18675	18900	19125	
		Frequency (MHz)		1860.0	1880.0	1900.0				Frequency (MHz)		1857.5	1880.0	1902.5	
20M	QPSK	1	0	17.62	17.68	17.65	0	15M	QPSK	1	0	17.52	17.66	17.63	0
		1	50	17.40	17.46	17.06	0			1	37	17.39	17.46	16.99	0
		1	99	17.00	17.06	16.66	0			1	74	16.93	17.04	16.65	0
		50	0	17.37	17.43	17.05	0			36	0	17.27	17.43	16.96	0
		50	25	17.37	17.43	17.00	0			36	19	17.28	17.41	16.99	0
		50	50	17.26	17.32	17.04	0			36	39	17.16	17.24	17.03	0
		100	0	17.41	17.47	17.07	0			75	0	17.35	17.40	17.04	0
	16QAM	1	0	17.59	17.67	17.25	0		16QAM	1	0	17.54	17.56	17.22	0
		1	50	17.66	17.65	17.32	0			1	37	17.65	17.63	17.24	0
		1	99	17.33	17.39	16.99	0			1	74	17.29	17.30	16.91	0
		50	0	17.39	17.45	17.05	0			36	0	17.33	17.35	17.05	0
		50	25	17.44	17.50	17.10	0			36	19	17.42	17.49	17.00	0
		50	50	17.32	17.38	16.98	0			36	39	17.23	17.33	16.88	0
		100	0	17.41	17.47	17.07	0			75	0	17.40	17.41	16.99	0
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18650	18900	19150				Channel		18625	18900	19175	
		Frequency (MHz)		1855.0	1880.0	1905.0				Frequency (MHz)		1852.5	1880.0	1907.5	
10M	QPSK	1	0	17.46	17.50	17.54	0	5M	QPSK	1	0	17.43	17.48	17.50	0
		1	24	17.37	17.40	16.91	0			1	12	17.27	17.32	16.90	0
		1	49	16.92	16.91	16.54	0			1	24	16.96	16.95	16.40	0
		25	0	17.30	17.36	16.84	0			12	0	17.21	17.31	17.01	0
		25	12	17.30	17.19	16.90	0			12	6	17.13	17.24	16.89	0
		25	25	17.10	17.18	16.92	0			12	13	17.23	17.09	16.92	0
		50	0	17.23	17.41	16.93	0			25	0	17.18	17.26	16.83	0
	16QAM	1	0	17.51	17.49	17.23	0		16QAM	1	0	17.46	17.47	17.06	0
		1	24	17.45	17.43	17.15	0			1	12	17.56	17.51	17.24	0
		1	49	17.20	17.26	16.86	0			1	24	17.15	17.32	16.80	0
		25	0	17.28	17.25	16.86	0			12	0	17.16	17.25	16.98	0
		25	12	17.34	17.38	17.00	0			12	6	17.32	17.31	16.95	0
		25	25	17.16	17.20	16.87	0			12	13	17.25	17.32	16.87	0
		50	0	17.27	17.29	16.98	0			25	0	17.20	17.40	16.93	0
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18615	18900	19185				Channel		18607	18900	19193	
		Frequency (MHz)		1851.5	1880.0	1908.5				Frequency (MHz)		1850.7	1880.0	1909.3	
3M	QPSK	1	0	17.45	17.55	17.53	0	1.4M	QPSK	1	0	17.57	17.66	17.56	0
		1	7	17.17	17.35	17.04	0			1	2	17.40	17.44	17.06	0
		1	14	16.84	17.00	16.55	0			1	5	16.93	16.96	16.65	0
		8	0	17.25	17.19	16.98	0			3	0	17.30	17.34	17.04	0
		8	3	17.29	17.23	16.93	0			3	1	17.28	17.37	17.00	0
		8	7	17.22	17.30	16.96	0			3	3	17.19	17.31	17.00	0
		15	0	17.32	17.42	16.92	0			6	0	17.36	17.38	16.99	0
	16QAM	1	0	17.56	17.60	17.10	0		16QAM	1	0	17.50	17.58	17.17	0
		1	7	17.53	17.48	17.19	0			1	2	17.57	17.57	17.32	0
		1	14	17.21	17.32	16.94	0			1	5	17.24	17.39	16.95	0
		8	0	17.36	17.30	16.97	0			3	0	17.38	17.36	16.97	0
		8	3	17.24	17.47	17.03	0			3	1	17.42	17.40	17.06	0
		8	7	17.24	17.26	16.77	0			3	3	17.22	17.36	16.93	0
		15	0	17.23	17.36	16.91	0			6	0	17.36	17.41	17.00	0

LTE Band 4																
EUT without Power Reduction (P-Sensor NOT Triggered)																
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20050	20175	20300				Channel		20025	20175	20325	
		Frequency (MHz)		1720.0	1732.5	1745.0				Frequency (MHz)		1717.5	1732.5	1747.5	
20M	QPSK	1	0	23.34	23.37	23.22	0	15M	QPSK	1	0	23.30	23.29	23.18	0
		1	50	23.15	23.18	23.03	0			1	37	23.05	23.16	22.96	0
		1	99	22.84	22.87	22.72	0			1	74	22.77	22.87	22.66	0
		50	0	22.17	22.20	22.05	1			36	0	22.12	22.11	22.01	1
		50	25	22.15	22.18	22.03	1			36	19	22.10	22.16	21.95	1
		50	50	22.07	22.10	21.95	1			36	39	22.03	22.07	21.91	1
		100	0	22.10	22.13	21.98	1			75	0	22.02	22.09	21.91	1
	16QAM	1	0	22.43	22.46	22.31	1		16QAM	1	0	22.35	22.41	22.23	1
		1	50	22.38	22.41	22.26	1			1	37	22.35	22.32	22.24	1
		1	99	22.07	22.10	21.95	1			1	74	22.03	22.03	21.88	1
		50	0	21.18	21.21	21.06	2			36	0	21.12	21.16	20.98	2
		50	25	21.16	21.19	21.04	2			36	19	21.15	21.19	21.02	2
		50	50	21.03	21.06	20.91	2			36	39	20.93	21.06	20.81	2
		100	0	21.04	21.07	20.92	2			75	0	20.96	20.99	20.85	2
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20000	20175	20350				Channel		19975	20175	20375	
		Frequency (MHz)		1715.0	1732.5	1750.0				Frequency (MHz)		1712.5	1732.5	1752.5	
10M	QPSK	1	0	23.16	23.23	23.02	0	5M	QPSK	1	0	23.31	23.23	22.99	0
		1	24	22.92	23.11	22.92	0			1	12	22.98	23.12	22.85	0
		1	49	22.70	22.72	22.63	0			1	24	22.64	22.69	22.67	0
		25	0	21.98	22.08	21.84	1			12	0	22.12	22.08	21.77	1
		25	12	22.00	22.13	21.83	1			12	6	22.03	22.02	21.90	1
		25	25	21.97	21.88	21.95	1			12	13	21.93	21.99	21.76	1
		50	0	21.91	21.98	21.84	1			25	0	21.96	21.95	21.82	1
	16QAM	1	0	22.24	22.30	22.10	1		16QAM	1	0	22.25	22.28	22.15	1
		1	24	22.29	22.26	22.17	1			1	12	22.29	22.34	22.02	1
		1	49	22.00	22.00	21.90	1			1	24	21.93	21.90	21.76	1
		25	0	21.03	21.02	20.96	2			12	0	21.10	21.14	20.93	2
		25	12	21.09	21.00	20.92	2			12	6	21.02	21.06	20.90	2
		25	25	20.97	20.99	20.83	2			12	13	20.85	20.90	20.76	2
		50	0	20.90	20.90	20.91	2			25	0	21.03	20.87	20.82	2
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		19965	20175	20385				Channel		19957	20175	20393	
		Frequency (MHz)		1711.5	1732.5	1753.5				Frequency (MHz)		1710.7	1732.5	1754.3	
3M	QPSK	1	0	23.22	23.35	23.18	0	1.4M	QPSK	1	0	23.21	23.14	23.17	0
		1	7	23.12	22.98	22.89	0			1	2	22.97	22.99	22.81	0
		1	14	22.72	22.80	22.65	0			1	5	22.68	22.66	22.58	0
		8	0	22.06	22.08	21.95	1			3	0	23.07	23.07	22.92	0
		8	3	22.04	22.01	21.87	1			3	1	22.98	22.96	22.96	0
		8	7	21.91	21.95	21.87	1			3	3	22.92	22.97	22.80	0
		15	0	21.89	22.07	21.84	1			6	0	22.10	22.04	21.84	1
	16QAM	1	0	22.38	22.24	22.13	1		16QAM	1	0	22.36	22.25	22.18	1
		1	7	22.25	22.24	22.16	1			1	2	22.14	22.39	22.09	1
		1	14	21.83	21.94	21.87	1			1	5	21.89	21.97	21.88	1
		8	0	21.07	21.09	20.88	2			3	0	22.06	22.14	21.93	1
		8	3	20.95	21.08	20.99	2			3	1	22.03	22.06	21.85	1
		8	7	20.81	20.85	20.76	2			3	3	22.03	21.98	21.78	1
		15	0	20.84	20.94	20.81	2			6	0	20.93	20.95	20.90	2

LTE Band 4																
EUT with Power Reduction (P-Sensor Triggered)																
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20050	20175	20300				Channel		20025	20175	20325	
		Frequency (MHz)		1720.0	1732.5	1745.0				Frequency (MHz)		1717.5	1732.5	1747.5	
20M	QPSK	1	0	17.14	17.16	17.09	0	15M	QPSK	1	0	17.10	17.15	17.02	0
		1	50	16.85	16.89	16.85	0			1	37	16.88	16.83	16.82	0
		1	99	16.49	16.52	16.51	0			1	74	16.51	16.52	16.52	0
		50	0	16.96	16.99	16.93	0			36	0	16.92	16.92	16.97	0
		50	25	16.97	16.99	16.92	0			36	19	16.91	16.98	16.90	0
		50	50	16.81	16.85	16.77	0			36	39	16.81	16.79	16.84	0
		100	0	16.83	16.85	16.78	0			75	0	16.84	16.75	16.83	0
	16QAM	1	0	17.09	17.11	17.05	0		16QAM	1	0	17.02	17.04	17.10	0
		1	50	17.09	17.11	17.05	0			1	37	17.03	17.01	17.09	0
		1	99	16.82	16.84	16.78	0			1	74	16.79	16.82	16.79	0
		50	0	17.02	17.04	16.98	0			36	0	16.96	17.03	17.00	0
		50	25	17.01	17.03	16.97	0			36	19	16.97	16.98	17.01	0
		50	50	16.82	16.84	16.78	0			36	39	16.80	16.75	16.84	0
		100	0	16.97	16.99	16.93	0			75	0	16.92	16.98	16.92	0
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20000	20175	20350				Channel		19975	20175	20375	
		Frequency (MHz)		1715.0	1732.5	1750.0				Frequency (MHz)		1712.5	1732.5	1752.5	
10M	QPSK	1	0	17.09	17.00	16.97	0	5M	QPSK	1	0	17.00	17.05	16.92	0
		1	24	16.79	16.73	16.79	0			1	12	16.68	16.69	16.63	0
		1	49	16.46	16.40	16.45	0			1	24	16.45	16.38	16.42	0
		25	0	16.94	16.81	16.80	0			12	0	16.94	16.84	16.75	0
		25	12	16.83	16.83	16.82	0			12	6	16.83	16.97	16.88	0
		25	25	16.72	16.76	16.79	0			12	13	16.64	16.77	16.67	0
		50	0	16.71	16.72	16.71	0			25	0	16.78	16.83	16.70	0
	16QAM	1	0	16.92	16.99	16.95	0		16QAM	1	0	17.00	16.97	17.00	0
		1	24	16.93	17.03	16.97	0			1	12	16.98	16.99	17.02	0
		1	49	16.61	16.68	16.77	0			1	24	16.63	16.76	16.74	0
		25	0	16.88	16.98	16.85	0			12	0	16.97	17.02	16.89	0
		25	12	16.88	16.91	16.93	0			12	6	16.89	16.95	16.95	0
		25	25	16.70	16.74	16.69	0			12	13	16.73	16.76	16.81	0
		50	0	16.92	16.91	16.79	0			25	0	16.84	16.98	16.75	0
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		19965	20175	20385				Channel		19957	20175	20393	
		Frequency (MHz)		1711.5	1732.5	1753.5				Frequency (MHz)		1710.7	1732.5	1754.3	
3M	QPSK	1	0	17.06	17.03	16.95	0	1.4M	QPSK	1	0	17.12	17.09	17.01	0
		1	7	16.66	16.77	16.67	0			1	2	16.80	16.84	16.80	0
		1	14	16.42	16.37	16.38	0			1	5	16.50	16.49	16.52	0
		8	0	16.79	16.88	16.76	0			3	0	16.92	16.91	16.97	0
		8	3	16.99	16.91	16.82	0			3	1	16.92	16.90	16.89	0
		8	7	16.83	16.73	16.72	0			3	3	16.75	16.85	16.79	0
		15	0	16.71	16.79	16.74	0			6	0	16.85	16.80	16.79	0
	16QAM	1	0	17.08	17.05	17.01	0		16QAM	1	0	17.11	17.09	17.01	0
		1	7	16.96	16.97	16.99	0			1	2	17.02	17.07	17.08	0
		1	14	16.83	16.68	16.73	0			1	5	16.75	16.76	16.74	0
		8	0	16.99	16.93	16.90	0			3	0	16.99	16.97	16.97	0
		8	3	17.00	16.97	17.00	0			3	1	17.00	17.02	17.03	0
		8	7	16.65	16.76	16.70	0			3	3	16.76	16.81	16.84	0
		15	0	16.92	16.88	16.90	0			6	0	16.93	16.97	16.96	0

LTE Band 5																
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20450	20525	20600				Channel		20425	20525	20625	
		Frequency (MHz)		829.0	836.5	844.0				Frequency (MHz)		826.5	836.5	846.5	
10M	QPSK	1	0	22.86	22.85	22.88	0	5M	QPSK	1	0	22.81	22.85	22.79	0
		1	24	22.84	22.83	22.86	0			1	12	22.81	22.76	22.79	0
		1	49	22.79	22.78	22.81	0			1	24	22.73	22.71	22.81	0
		25	0	21.87	21.86	21.89	1			12	0	21.81	21.78	21.81	1
		25	12	21.75	21.74	21.77	1			12	6	21.69	21.65	21.77	1
		25	25	21.72	21.71	21.74	1			12	13	21.62	21.70	21.74	1
		50	0	21.77	21.76	21.79	1			25	0	21.76	21.70	21.74	1
	16QAM	1	0	21.96	21.95	21.98	1		16QAM	1	0	21.92	21.88	21.96	1
		1	24	21.97	21.96	21.99	1			1	12	21.88	21.94	21.95	1
		1	49	21.95	21.94	21.97	1			1	24	21.95	21.94	21.88	1
		25	0	20.90	20.89	20.92	2			12	0	20.88	20.85	20.88	2
		25	12	20.84	20.83	20.86	2			12	6	20.82	20.79	20.83	2
		25	25	20.78	20.77	20.80	2			12	13	20.70	20.69	20.80	2
		50	0	20.81	20.80	20.83	2			25	0	20.73	20.72	20.74	2
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20415	20525	20635				Channel		20407	20525	20643	
		Frequency (MHz)		825.5	836.5	847.5				Frequency (MHz)		824.7	836.5	848.3	
3M	QPSK	1	0	22.71	22.83	22.70	0	1.4M	QPSK	1	0	22.70	22.71	22.65	0
		1	7	22.74	22.65	22.75	0			1	2	22.71	22.62	22.68	0
		1	14	22.76	22.69	22.65	0			1	5	22.66	22.61	22.65	0
		8	0	21.69	21.73	21.89	1			3	0	22.77	22.68	22.77	0
		8	3	21.62	21.51	21.68	1			3	1	22.52	22.64	22.73	0
		8	7	21.61	21.64	21.67	1			3	3	22.62	22.59	22.60	0
		15	0	21.70	21.63	21.63	1			6	0	21.68	21.68	21.72	1
	16QAM	1	0	21.80	21.76	21.92	1		16QAM	1	0	21.89	21.77	21.88	1
		1	7	21.79	21.90	21.87	1			1	2	21.90	21.75	21.88	1
		1	14	21.77	21.91	21.77	1			1	5	21.82	21.83	21.80	1
		8	0	20.79	20.69	20.78	2			3	0	21.77	21.71	21.78	1
		8	3	20.63	20.75	20.73	2			3	1	21.76	21.68	21.70	1
		8	7	20.71	20.63	20.72	2			3	3	21.65	21.75	21.74	1
		15	0	20.63	20.72	20.73	2			6	0	20.68	20.65	20.75	2

LTE Band 7															
EUT without Power Reduction (P-Sensor NOT Triggered)															
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20850	21100	21350				Channel		20825	21100	21375	
		Frequency (MHz)		2510.0	2535.0	2560.0				Frequency (MHz)		2507.5	2535.0	2562.5	
20M	QPSK	1	0	21.87	21.93	21.89	0	15M	QPSK	1	0	21.83	21.92	21.86	0
		1	50	21.85	21.91	21.87	0			1	37	21.79	21.85	21.83	0
		1	99	21.79	21.85	21.81	0			1	74	21.69	21.78	21.78	0
		50	0	20.87	20.93	20.89	1			36	0	20.84	20.91	20.84	1
		50	25	20.85	20.91	20.87	1			36	19	20.83	20.85	20.77	1
		50	50	20.81	20.87	20.83	1			36	39	20.74	20.86	20.75	1
		100	0	20.86	20.92	20.88	1			75	0	20.83	20.86	20.88	1
	16QAM	1	0	20.90	20.96	20.92	1		16QAM	1	0	20.88	20.94	20.91	1
		1	50	20.87	20.93	20.89	1			1	37	20.83	20.90	20.82	1
		1	99	20.85	20.91	20.87	1			1	74	20.76	20.91	20.81	1
		50	0	19.86	19.92	19.88	2			36	0	19.83	19.89	19.78	2
		50	25	19.83	19.89	19.85	2			36	19	19.79	19.80	19.85	2
		50	50	19.79	19.85	19.81	2			36	39	19.73	19.76	19.78	2
		100	0	19.85	19.91	19.87	2			75	0	19.84	19.91	19.85	2
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20800	21100	21400				Channel		20775	21100	21425	
		Frequency (MHz)		2505.0	2535.0	2565.0				Frequency (MHz)		2502.5	2535.0	2567.5	
10M	QPSK	1	0	21.69	21.81	21.73	0	5M	QPSK	1	0	21.73	21.81	21.70	0
		1	24	21.68	21.72	21.82	0			1	12	21.77	21.84	21.74	0
		1	49	21.57	21.64	21.61	0			1	24	21.73	21.85	21.64	0
		25	0	20.84	20.76	20.70	1			12	0	20.73	20.80	20.67	1
		25	12	20.69	20.74	20.68	1			12	6	20.75	20.86	20.70	1
		25	25	20.62	20.69	20.69	1			12	13	20.65	20.74	20.52	1
		50	0	20.81	20.80	20.74	1			25	0	20.83	20.78	20.77	1
	16QAM	1	0	20.87	20.88	20.78	1		16QAM	1	0	20.90	20.85	20.77	1
		1	24	20.79	20.69	20.87	1			1	12	20.67	20.77	20.77	1
		1	49	20.69	20.80	20.77	1			1	24	20.63	20.76	20.72	1
		25	0	19.67	19.75	19.70	2			12	0	19.65	19.79	19.69	2
		25	12	19.70	19.78	19.83	2			12	6	19.82	19.82	19.80	2
		25	25	19.57	19.66	19.66	2			12	13	19.63	19.79	19.64	2
		50	0	19.79	19.75	19.76	2			25	0	19.67	19.83	19.64	2

LTE Band 7																
EUT with Power Reduction (P-Sensor Triggered)																
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20850	21100	21350				Channel		20825	21100	21375	
		Frequency (MHz)		2510.0	2535.0	2560.0				Frequency (MHz)		2507.5	2535.0	2562.5	
20M	QPSK	1	0	20.35	20.46	20.43	0	15M	QPSK	1	0	20.29	20.45	20.42	0
		1	50	20.24	20.35	20.32	0			1	37	20.18	20.32	20.26	0
		1	99	19.83	19.94	19.91	0			1	74	19.80	19.91	19.88	0
		50	0	20.25	20.36	20.33	0			36	0	20.16	20.28	20.23	0
		50	25	20.24	20.35	20.32	0			36	19	20.19	20.30	20.22	0
		50	50	20.06	20.17	20.14	0			36	39	20.05	20.07	20.13	0
		100	0	20.20	20.31	20.28	0			75	0	20.10	20.24	20.18	0
	16QAM	1	0	20.31	20.42	20.39	0		16QAM	1	0	20.27	20.41	20.31	0
		1	50	20.30	20.41	20.38	0			1	37	20.30	20.33	20.34	0
		1	99	20.18	20.29	20.26	0			1	74	20.16	20.28	20.17	0
		50	0	19.18	19.29	19.26	0			36	0	19.18	19.19	19.24	0
		50	25	19.29	19.40	19.37	0			36	19	19.23	19.36	19.35	0
		50	50	19.09	19.20	19.17	0			36	39	19.07	19.11	19.12	0
		100	0	19.20	19.31	19.28	0			75	0	19.14	19.27	19.25	0
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20800	21100	21400				Channel		20775	21100	21425	
		Frequency (MHz)		2505.0	2535.0	2565.0				Frequency (MHz)		2502.5	2535.0	2567.5	
10M	QPSK	1	0	20.31	20.32	20.31	0	5M	QPSK	1	0	20.13	20.28	20.16	0
		1	24	20.08	20.24	20.17	0			1	12	20.11	20.21	20.13	0
		1	49	19.66	19.79	19.87	0			1	24	19.70	19.80	19.79	0
		25	0	20.05	20.31	20.21	0			12	0	20.10	20.25	20.09	0
		25	12	20.12	20.21	20.08	0			12	6	20.09	20.25	20.25	0
		25	25	19.95	20.03	19.96	0			12	13	19.85	19.98	19.93	0
		50	0	20.10	20.07	20.14	0			25	0	20.18	20.11	19.99	0
	16QAM	1	0	20.19	20.32	20.36	0		16QAM	1	0	20.16	20.31	20.27	0
		1	24	20.07	20.37	20.19	0			1	12	20.18	20.27	20.26	0
		1	49	20.03	20.10	20.09	0			1	24	20.07	20.13	20.14	0
		25	0	19.01	19.23	19.06	0			12	0	19.05	19.20	19.13	0
		25	12	19.21	19.31	19.30	0			12	6	19.21	19.38	19.29	0
		25	25	19.08	19.14	19.11	0			12	13	19.01	19.05	19.02	0
		50	0	19.02	19.25	19.23	0			25	0	19.10	19.09	19.14	0

LTE Band 12

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23060	23095	23130				Channel		23035	23095	23155	
		Frequency (MHz)		704.0	707.5	711.0				Frequency (MHz)		701.5	707.5	713.5	
10M	QPSK	1	0	23.35	23.37	23.27	0	5M	QPSK	1	0	23.34	23.27	23.17	0
		1	24	23.32	23.34	23.24	0			1	12	23.28	23.34	23.16	0
		1	49	23.29	23.31	23.21	0			1	24	23.23	23.26	23.16	0
		25	0	22.37	22.39	22.29	1			12	0	22.32	22.34	22.24	1
		25	12	22.34	22.36	22.26	1			12	6	22.31	22.28	22.22	1
		25	25	22.26	22.28	22.18	1			12	13	22.17	22.24	22.11	1
		50	0	22.31	22.33	22.23	1			25	0	22.25	22.26	22.17	1
	16QAM	1	0	22.39	22.41	22.31	1		16QAM	1	0	22.30	22.35	22.21	1
		1	24	22.37	22.39	22.29	1			1	12	22.28	22.30	22.29	1
		1	49	22.33	22.35	22.25	1			1	24	22.26	22.34	22.25	1
		25	0	21.35	21.37	21.27	2			12	0	21.29	21.34	21.27	2
		25	12	21.31	21.33	21.23	2			12	6	21.28	21.33	21.19	2
		25	25	21.29	21.31	21.21	2			12	13	21.27	21.22	21.15	2
		50	0	21.30	21.32	21.22	2			25	0	21.22	21.22	21.20	2
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23025	23095	23165				Channel		23017	23095	23173	
		Frequency (MHz)		700.5	707.5	714.5				Frequency (MHz)		699.7	707.5	715.3	
3M	QPSK	1	0	23.30	23.17	23.11	0	1.4M	QPSK	1	0	23.20	23.18	23.23	0
		1	7	23.26	23.31	23.03	0			1	2	23.17	23.22	23.09	0
		1	14	23.17	23.15	23.13	0			1	5	23.18	23.20	23.11	0
		8	0	22.14	22.28	22.16	1			3	0	23.27	23.18	23.10	0
		8	3	22.23	22.16	22.11	1			3	1	23.25	23.20	23.01	0
		8	7	22.15	22.24	21.98	1			3	3	23.14	23.19	23.12	0
		15	0	22.06	22.20	22.12	1			6	0	22.22	22.15	22.19	1
	16QAM	1	0	22.21	22.39	22.15	1		16QAM	1	0	22.17	22.29	22.19	1
		1	7	22.34	22.28	22.14	1			1	2	22.17	22.35	22.22	1
		1	14	22.24	22.24	22.13	1			1	5	22.20	22.20	22.11	1
		8	0	21.21	21.24	21.09	2			3	0	22.11	22.35	22.08	1
		8	3	21.16	21.28	21.12	2			3	1	22.21	22.17	22.08	1
		8	7	21.26	21.22	21.04	2			3	3	22.20	22.23	22.09	1
		15	0	21.17	21.22	21.06	2			6	0	21.21	21.17	21.15	2

LTE Band 13

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		-	23230	-				Channel		23205	23230	23225	
		Frequency (MHz)		-	782.0	-				Frequency (MHz)		779.5	782.0	784.5	
10M	QPSK	1	0	-	22.98	-	0	5M	QPSK	1	0	-	22.90	-	0
		1	24	-	22.96	-	0			1	12	-	22.86	-	0
		1	49	-	22.95	-	0			1	24	-	22.93	-	0
		25	0	-	21.96	-	1			12	0	-	21.87	-	1
		25	12	-	21.94	-	1			12	6	-	21.92	-	1
		25	25	-	21.92	-	1			12	13	-	21.84	-	1
		50	0	-	21.93	-	1			25	0	-	21.88	-	1
	16QAM	1	0	-	21.98	-	1		16QAM	1	0	-	21.89	-	1
		1	24	-	21.96	-	1			1	12	-	21.92	-	1
		1	49	-	21.94	-	1			1	24	-	21.94	-	1
		25	0	-	20.94	-	2			12	0	-	20.88	-	2
		25	12	-	20.91	-	2			12	6	-	20.89	-	2
		25	25	-	20.89	-	2			12	13	-	20.86	-	2
		50	0	-	20.93	-	2			25	0	-	20.87	-	2

LTE Band 25

EUT without Power Reduction (P-Sensor NOT Triggered)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26140	26365	26590				Channel		26115	26365	26615	
		Frequency (MHz)		1860.0	1882.5	1905.0				Frequency (MHz)		1857.5	1882.5	1907.5	
20M	QPSK	1	0	23.20	23.25	23.26	0	15M	QPSK	1	0	23.11	23.18	23.18	0
		1	50	23.17	23.22	23.23	0			1	37	23.13	23.22	23.15	0
		1	99	22.95	23.00	23.01	0			1	74	22.95	22.99	22.94	0
		50	0	22.17	22.22	22.23	1			36	0	22.12	22.13	22.23	1
		50	25	22.10	22.15	22.16	1			36	19	22.06	22.09	22.10	1
		50	50	22.11	22.16	22.17	1			36	39	22.06	22.14	22.14	1
		100	0	22.13	22.18	22.19	1			75	0	22.08	22.09	22.14	1
	16QAM	1	0	22.43	22.48	22.49	1		16QAM	1	0	22.39	22.38	22.41	1
		1	50	22.39	22.44	22.45	1			1	37	22.39	22.39	22.40	1
		1	99	22.15	22.20	22.21	1			1	74	22.09	22.14	22.19	1
		50	0	21.18	21.23	21.24	2			36	0	21.15	21.21	21.17	2
		50	25	21.10	21.15	21.16	2			36	19	21.09	21.13	21.16	2
		50	50	21.12	21.17	21.18	2			36	39	21.10	21.14	21.18	2
		100	0	21.17	21.22	21.23	2			75	0	21.16	21.16	21.16	2
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26090	26365	26640				Channel		26065	26365	26665	
		Frequency (MHz)		2855.0	1882.5	1910.0				Frequency (MHz)		1852.5	1882.5	1912.5	
10M	QPSK	1	0	23.04	23.13	23.17	0	5M	QPSK	1	0	23.12	23.04	23.03	0
		1	24	23.11	23.08	23.18	0			1	12	23.04	23.06	23.05	0
		1	49	22.78	22.81	22.83	0			1	24	22.82	22.83	22.85	0
		25	0	21.97	22.22	22.10	1			12	0	22.04	22.05	22.06	1
		25	12	22.06	22.01	22.10	1			12	6	21.96	22.02	22.05	1
		25	25	21.94	22.06	21.96	1			12	13	21.93	22.08	21.94	1
		50	0	22.02	22.09	22.05	1			25	0	22.02	22.09	21.91	1
	16QAM	1	0	22.42	22.36	22.39	1		16QAM	1	0	22.20	22.45	22.36	1
		1	24	22.31	22.39	22.41	1			1	12	22.24	22.33	22.30	1
		1	49	22.14	22.04	22.20	1			1	24	22.09	22.05	22.17	1
		25	0	21.10	21.05	21.10	2			12	0	21.03	21.22	21.16	2
		25	12	20.96	21.07	21.11	2			12	6	21.03	21.01	21.08	2
		25	25	20.96	21.09	21.05	2			12	13	21.02	21.11	21.05	2
		50	0	21.03	21.21	21.18	2			25	0	21.01	21.00	21.03	2
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26055	26365	26675				Channel		26047	26365	26683	
		Frequency (MHz)		1851.5	1882.5	1913.5				Frequency (MHz)		1850.7	1882.5	1914.3	
3M	QPSK	1	0	22.98	23.17	23.14	0	1.4M	QPSK	1	0	23.14	23.09	23.17	0
		1	7	23.13	23.03	23.03	0			1	2	23.07	23.10	23.05	0
		1	14	22.87	22.85	22.82	0			1	5	22.73	22.81	22.90	0
		8	0	22.01	22.14	22.03	1			3	0	23.06	23.11	23.17	0
		8	3	21.96	21.99	22.03	1			3	1	23.03	23.04	23.03	0
		8	7	22.06	22.08	22.07	1			3	3	23.09	23.10	23.08	0
		15	0	21.97	22.16	22.17	1			6	0	21.94	22.05	22.05	1
	16QAM	1	0	22.36	22.32	22.40	1		16QAM	1	0	22.30	22.29	22.34	1
		1	7	22.33	22.36	22.29	1			1	2	22.36	22.29	22.31	1
		1	14	22.07	22.07	22.11	1			1	5	22.08	22.10	21.99	1
		8	0	21.04	21.12	21.09	2			3	0	22.07	22.08	22.16	1
		8	3	20.93	21.11	21.03	2			3	1	22.01	21.98	22.10	1
		8	7	21.02	21.01	21.08	2			3	3	21.96	22.07	22.09	1
		15	0	21.15	21.00	21.15	2			6	0	21.00	21.13	21.11	2

LTE Band 25															
EUT with Power Reduction (P-Sensor Triggered)															
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26140	26365	26590				Channel		26115	26365	26615	
		Frequency (MHz)		1860.0	1882.5	1905.0				Frequency (MHz)		1857.5	1882.5	1907.5	
20M	QPSK	1	0	17.12	17.25	17.26	0	15M	QPSK	1	0	17.11	17.18	17.16	0
		1	50	16.76	17.06	17.11	0			1	37	16.69	17.02	17.07	0
		1	99	16.09	16.39	16.44	0			1	74	16.08	16.37	16.38	0
		50	0	16.70	17.00	17.05	0			36	0	16.64	16.90	16.95	0
		50	25	16.74	17.04	17.09	0			36	19	16.65	17.02	17.05	0
		50	50	16.62	16.92	16.97	0			36	39	16.52	16.82	16.89	0
		100	0	16.75	17.05	17.10	0			75	0	16.73	16.99	17.01	0
	16QAM	1	0	17.18	17.24	17.23	0		16QAM	1	0	17.18	17.14	17.18	0
		1	50	17.19	17.23	17.22	0			1	37	17.18	17.16	17.14	0
		1	99	16.70	17.00	17.05	0			1	74	16.70	16.91	17.01	0
		50	0	16.71	17.01	17.06	0			36	0	16.62	16.98	16.98	0
		50	25	16.78	17.08	17.13	0			36	19	16.72	17.06	17.13	0
		50	50	16.65	16.95	17.00	0			36	39	16.55	16.91	16.91	0
		100	0	16.72	17.02	17.07	0			75	0	16.64	16.99	17.02	0
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26090	26365	26640				Channel		26065	26365	26665	
		Frequency (MHz)		2855.0	1882.5	1910.0				Frequency (MHz)		1852.5	1882.5	1912.5	
10M	QPSK	1	0	17.05	17.01	17.16	0	5M	QPSK	1	0	17.09	17.10	17.15	0
		1	24	16.54	17.03	17.05	0			1	12	16.63	16.99	16.87	0
		1	49	15.93	16.34	16.40	0			1	24	15.97	16.30	16.19	0
		25	0	16.57	16.82	17.00	0			12	0	16.65	16.94	16.83	0
		25	12	16.69	16.96	17.01	0			12	6	16.55	16.99	16.80	0
		25	25	16.49	16.79	16.79	0			12	13	16.48	16.77	16.81	0
		50	0	16.62	17.00	16.99	0			25	0	16.67	17.00	16.82	0
	16QAM	1	0	17.06	17.02	17.06	0		16QAM	1	0	17.13	17.14	17.11	0
		1	24	17.00	17.05	17.03	0			1	12	17.11	17.10	17.16	0
		1	49	16.62	16.89	17.00	0			1	24	16.60	16.83	17.00	0
		25	0	16.67	16.83	16.95	0			12	0	16.51	16.92	16.96	0
		25	12	16.62	16.91	16.94	0			12	6	16.62	17.03	16.99	0
		25	25	16.40	16.83	16.84	0			12	13	16.62	16.83	16.85	0
		50	0	16.63	16.78	16.84	0			25	0	16.70	16.93	16.96	0
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26055	26365	26675				Channel		26047	26365	26683	
		Frequency (MHz)		1851.5	1882.5	1913.5				Frequency (MHz)		1850.7	1882.5	1914.3	
3M	QPSK	1	0	17.05	17.11	17.08	0	1.4M	QPSK	1	0	17.04	17.24	17.16	0
		1	7	16.67	16.93	16.92	0			1	2	16.67	16.98	17.08	0
		1	14	15.99	16.29	16.30	0			1	5	16.09	16.32	16.44	0
		8	0	16.58	16.86	16.90	0			3	0	16.68	16.93	16.98	0
		8	3	16.60	16.92	16.98	0			3	1	16.74	16.95	17.05	0
		8	7	16.49	16.80	16.80	0			3	3	16.58	16.92	16.95	0
		15	0	16.54	16.91	16.97	0			6	0	16.67	16.97	17.07	0
	16QAM	1	0	17.11	17.18	17.08	0		16QAM	1	0	17.08	17.21	17.15	0
		1	7	17.09	17.16	17.04	0			1	2	17.14	17.21	17.20	0
		1	14	16.50	16.87	16.90	0			1	5	16.70	16.94	16.95	0
		8	0	16.55	16.91	16.95	0			3	0	16.64	17.00	17.00	0
		8	3	16.66	16.87	17.06	0			3	1	16.77	17.04	17.12	0
		8	7	16.45	16.83	16.91	0			3	3	16.59	16.94	16.98	0
		15	0	16.54	16.82	16.87	0			6	0	16.65	16.99	16.97	0

LTE Band 26

EUT without Power Reduction (P-Sensor NOT Triggered)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26765	26865	26965	
		Frequency (MHz)		821.5	831.5	841.5	
15M	QPSK	1	0	22.96	22.92	22.89	0
		1	37	22.93	22.89	22.86	0
		1	74	22.86	22.82	22.79	0
		36	0	21.93	21.89	21.86	1
		36	19	21.89	21.85	21.82	1
		36	39	21.86	21.82	21.79	1
		75	0	21.95	21.91	21.88	1
	16QAM	1	0	21.99	21.95	21.92	1
		1	37	21.97	21.93	21.90	1
		1	74	21.92	21.88	21.85	1
		36	0	20.96	20.92	20.89	2
		36	19	20.93	20.89	20.86	2
		36	39	20.89	20.85	20.82	2
		75	0	20.92	20.88	20.85	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26740	26865	26990	
		Frequency (MHz)		819.0	831.5	844.0	
10M	QPSK	1	0	22.90	22.89	22.83	0
		1	24	22.89	22.89	22.82	0
		1	49	22.79	22.80	22.76	0
		25	0	21.87	21.85	21.86	1
		25	12	21.80	21.81	21.72	1
		25	25	21.80	21.73	21.70	1
		50	0	21.91	21.88	21.79	1
	16QAM	1	0	21.99	21.87	21.92	1
		1	24	21.94	21.87	21.86	1
		1	49	21.91	21.86	21.78	1
		25	0	20.93	20.86	20.79	2
		25	12	20.83	20.81	20.76	2
		25	25	20.81	20.78	20.80	2
		50	0	20.89	20.86	20.85	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26715	26865	27015	
		Frequency (MHz)		816.5	831.5	846.5	
5M	QPSK	1	0	22.81	22.81	22.75	0
		1	12	22.81	22.77	22.76	0
		1	24	22.66	22.71	22.55	0
		12	0	21.83	21.79	21.65	1
		12	6	21.72	21.75	21.64	1
		12	13	21.71	21.65	21.63	1
		25	0	21.75	21.78	21.70	1
	16QAM	1	0	21.75	21.88	21.79	1
		1	12	21.82	21.78	21.75	1
		1	24	21.82	21.83	21.80	1
		12	0	20.89	20.71	20.87	2
		12	6	20.79	20.80	20.81	2
		12	13	20.75	20.73	20.69	2
		25	0	20.78	20.78	20.76	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26705	26865	27025	
		Frequency (MHz)		815.5	831.5	847.5	
3M	QPSK	1	0	22.75	22.89	22.59	0
		1	7	22.89	22.70	22.55	0
		1	14	22.69	22.76	22.58	0
		8	0	21.83	21.72	21.79	1
		8	3	21.76	21.73	21.50	1
		8	7	21.72	21.71	21.50	1
		15	0	21.76	21.71	21.70	1
	16QAM	1	0	21.79	21.80	21.80	1
		1	7	21.86	21.75	21.68	1
		1	14	21.77	21.82	21.62	1
		8	0	20.75	20.89	20.73	2
		8	3	20.78	20.77	20.75	2
		8	7	20.78	20.69	20.80	2
		15	0	20.89	20.82	20.74	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26697	26865	27033	
		Frequency (MHz)		814.7	831.5	848.3	
1.4M	QPSK	1	0	22.85	22.89	22.82	0
		1	2	22.80	22.76	22.68	0
		1	5	22.73	22.64	22.71	0
		3	0	21.82	21.88	21.73	0
		3	1	21.77	21.78	21.67	0
		3	3	21.65	21.69	21.75	0
		6	0	21.87	21.72	21.68	1
	16QAM	1	0	21.84	21.74	21.85	1
		1	2	21.89	21.77	21.72	1
		1	5	21.83	21.85	21.66	1
		3	0	20.86	20.76	20.76	1
		3	1	20.70	20.74	20.78	1
		3	3	20.69	20.74	20.75	1
		6	0	20.69	20.75	20.75	2

LTE Band 26

EUT with Power Reduction (P-Sensor Triggered)

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26765	26865	26965	
		Frequency (MHz)		821.5	831.5	841.5	
15M	QPSK	1	0	22.42	22.39	22.32	0
		1	37	22.30	22.37	22.29	0
		1	74	22.15	22.10	22.02	0
		36	0	21.89	21.84	21.76	0
		36	19	22.01	21.96	21.88	0
		36	39	21.81	21.76	21.68	0
		75	0	21.93	21.88	21.80	0
	16QAM	1	0	22.14	22.09	22.01	0
		1	37	22.22	22.17	22.09	0
		1	74	22.40	22.35	22.27	0
		36	0	20.86	20.81	20.73	0
		36	19	20.94	20.89	20.81	0
		36	39	20.78	20.73	20.65	0
		75	0	20.90	20.85	20.77	0

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26740	26865	26990	
		Frequency (MHz)		819.0	831.5	844.0	
10M	QPSK	1	0	22.40	22.21	22.25	0
		1	24	22.16	22.30	22.20	0
		1	49	21.97	21.98	21.85	0
		25	0	21.80	21.65	21.61	0
		25	12	21.94	21.83	21.68	0
		25	25	21.70	21.67	21.63	0
		50	0	21.79	21.65	21.58	0
	16QAM	1	0	22.02	21.93	21.90	0
		1	24	22.04	22.06	22.00	0
		1	49	22.36	22.15	22.07	0
		25	0	20.71	20.76	20.52	0
		25	12	20.85	20.80	20.71	0
		25	25	20.64	20.61	20.54	0
		50	0	20.82	20.68	20.73	0

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26715	26865	27015	
		Frequency (MHz)		816.5	831.5	846.5	
5M	QPSK	1	0	22.40	22.15	22.28	0
		1	12	22.16	22.20	22.09	0
		1	24	22.09	21.88	21.85	0
		12	0	21.71	21.74	21.39	0
		12	6	21.77	21.78	21.75	0
		12	13	21.72	21.66	21.57	0
		25	0	21.79	21.67	21.56	0
	16QAM	1	0	22.02	22.00	21.92	0
		1	12	22.18	22.09	22.00	0
		1	24	22.30	22.27	22.12	0
		12	0	20.74	20.76	20.57	0
		12	6	20.79	20.86	20.62	0
		12	13	20.69	20.56	20.55	0
		25	0	20.75	20.81	20.55	0

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26705	26865	27025	
		Frequency (MHz)		815.5	831.5	847.5	
3M	QPSK	1	0	22.23	22.29	22.25	0
		1	7	22.23	22.17	22.24	0
		1	14	22.05	21.92	21.79	0
		8	0	21.73	21.77	21.71	0
		8	3	21.80	21.92	21.76	0
		8	7	21.78	21.59	21.54	0
		15	0	21.75	21.71	21.64	0
	16QAM	1	0	21.92	21.94	21.95	0
		1	7	22.01	22.00	22.00	0
		1	14	22.16	22.18	22.04	0
		8	0	20.62	20.65	20.66	0
		8	3	20.78	20.80	20.69	0
		8	7	20.55	20.70	20.55	0
		15	0	20.71	20.74	20.71	0

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		26697	26865	27033	
		Frequency (MHz)		814.7	831.5	848.3	
1.4M	QPSK	1	0	22.39	22.30	22.28	0
		1	2	22.22	22.28	22.26	0
		1	5	22.13	22.07	22.02	0
		3	0	21.79	21.80	21.75	0
		3	1	21.93	21.87	21.82	0
		3	3	21.73	21.68	21.63	0
		6	0	21.83	21.79	21.72	0
	16QAM	1	0	22.06	22.06	22.01	0
		1	2	22.21	22.10	22.05	0
		1	5	22.34	22.27	22.17	0
		3	0	20.84	20.75	20.69	0
		3	1	20.86	20.80	20.77	0
		3	3	20.75	20.64	20.63	0
		6	0	20.86	20.78	20.70	0

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BW	MCS Index	RB Size	RB Offset	Low	Mid	Mid	Mid	High	3GPP MPR (dB)
		Channel		39750	40185	40620	41055	41490	
		Frequency (MHz)		2506.0	2549.5	2593.0	2636.5	2680.0	
20M	QPSK	1	0	21.75	21.72	21.78	21.71	21.73	0
		1	50	21.71	21.68	21.74	21.67	21.69	0
		1	99	21.68	21.65	21.71	21.64	21.66	0
		50	0	20.73	20.70	20.76	20.69	20.71	1
		50	25	20.70	20.67	20.73	20.66	20.68	1
		50	50	20.68	20.65	20.71	20.64	20.66	1
		100	0	20.71	20.68	20.74	20.67	20.69	1
	16QAM	1	0	20.73	20.70	20.76	20.69	20.71	1
		1	50	20.71	20.68	20.74	20.67	20.69	1
		1	99	20.68	20.65	20.71	20.64	20.66	1
		50	0	19.75	19.72	19.78	19.71	19.73	2
		50	25	19.72	19.69	19.75	19.68	19.70	2
		50	50	19.68	19.65	19.71	19.64	19.66	2
		100	0	19.71	19.68	19.74	19.67	19.69	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	Mid	Mid	High	3GPP MPR (dB)
		Channel		39725	40173	40620	41068	41515	
		Frequency (MHz)		2503.5	2548.3	2593.0	2637.8	2682.5	
15M	QPSK	1	0	21.66	21.65	21.75	21.70	21.66	0
		1	37	21.62	21.64	21.69	21.57	21.68	0
		1	74	21.65	21.55	21.70	21.64	21.57	0
		36	0	20.63	20.62	20.70	20.59	20.68	1
		36	19	20.63	20.66	20.65	20.56	20.59	1
		36	39	20.66	20.65	20.67	20.59	20.57	1
		75	0	20.65	20.68	20.67	20.62	20.59	1
	16QAM	1	0	20.75	20.67	20.75	20.61	20.72	1
		1	37	20.68	20.61	20.69	20.64	20.63	1
		1	74	20.61	20.62	20.70	20.59	20.64	1
		36	0	19.69	19.70	19.72	19.64	19.62	2
		36	19	19.65	19.65	19.66	19.60	19.63	2
		36	39	19.63	19.58	19.62	19.59	19.64	2
		75	0	19.66	19.65	19.69	19.59	19.68	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	Mid	Mid	High	3GPP MPR (dB)
		Channel		39700	40160	40620	41080	41540	
		Frequency (MHz)		2501.0	2547.0	2593.0	2639.0	2685.0	
10M	QPSK	1	0	21.65	21.55	21.67	21.68	21.71	0
		1	24	21.62	21.50	21.60	21.62	21.64	0
		1	49	21.54	21.64	21.66	21.52	21.58	0
		25	0	20.60	20.65	20.58	20.59	20.60	1
		25	12	20.67	20.57	20.72	20.65	20.60	1
		25	25	20.53	20.53	20.56	20.62	20.57	1
		50	0	20.56	20.54	20.65	20.66	20.57	1
	16QAM	1	0	20.70	20.59	20.62	20.60	20.62	1
		1	24	20.68	20.57	20.61	20.63	20.64	1
		1	49	20.56	20.57	20.60	20.49	20.62	1
		25	0	19.57	19.68	19.59	19.61	19.67	2
		25	12	19.61	19.60	19.69	19.61	19.57	2
		25	25	19.51	19.55	19.62	19.55	19.52	2
		50	0	19.58	19.56	19.71	19.64	19.50	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	Mid	Mid	High	3GPP MPR (dB)
		Channel		39675	40148	40620	41093	41565	
		Frequency (MHz)		2498.5	2545.8	2593.0	2640.3	2687.5	
5M	QPSK	1	0	21.61	21.54	21.76	21.68	21.58	0
		1	12	21.62	21.59	21.67	21.58	21.60	0
		1	24	21.53	21.56	21.60	21.56	21.52	0
		12	0	20.64	20.58	20.67	20.52	20.60	1
		12	6	20.59	20.58	20.70	20.51	20.57	1
		12	13	20.60	20.64	20.57	20.52	20.50	1
		25	0	20.67	20.58	20.74	20.54	20.69	1
	16QAM	1	0	20.59	20.61	20.73	20.64	20.68	1
		1	12	20.64	20.60	20.65	20.59	20.60	1
		1	24	20.54	20.48	20.63	20.61	20.54	1
		12	0	19.59	19.65	19.63	19.61	19.57	2
		12	6	19.57	19.57	19.60	19.58	19.57	2
		12	13	19.56	19.60	19.60	19.51	19.54	2
		25	0	19.64	19.60	19.70	19.55	19.66	2

<WLAN 2.4G>

Mode	Channel	Frequency (MHz)	Average Power
802.11b	1	2412	11.92
	6	2437	12.44
	11	2462	**12.88**

<WLAN 5.3G>

Mode	Channel	Frequency (MHz)	Average Power
802.11a	52	5260	7.07
	56	5280	7.11
	60	5300	7.21
	64	5320	**7.38**

<WLAN 5.6G>

Mode	Channel	Frequency (MHz)	Average Power
802.11a	100	5500	8.16
	116	5580	7.95
	120	5600	7.88
	124	5620	7.92
	132	5660	7.49
	140	5700	7.08
	144	5720	7.03

<WLAN 5.8G>

Mode	Channel	Frequency (MHz)	Average Power
802.11a	149	5745	7.45
	153	5765	**7.52**
	157	5785	7.49
	161	5805	7.51
	165	5825	7.47

<Bluetooth>

Mode	Channel	Frequency (MHz)	Average Power
Bluetooth EDR	0	2402	-0.26
	39	2441	-0.22
	78	2480	-0.46
Bluetooth LE	0	2402	**1.93**
	19	2440	1.31
	39	2480	1.39

4.7 SAR Testing Results

4.7.1 SAR Test Reduction Considerations

<KDB 447498 D01, General RF Exposure Guidance>

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

(1) ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz

(2) ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz

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

When SAR is not measured at the maximum power level allowed for production units, the measured SAR will be scaled to the maximum tune-up tolerance limit to determine compliance. The scaling factor for the tune-up power is defined as maximum tune-up limit (mW) / measured conducted power (mW). The reported SAR would be calculated by measured SAR x tune-up power scaling factor.

The SAR has been measured with highest transmission duty factor supported by the test mode tools for WLAN and/or Bluetooth. When the transmission duty factor could not achieve 100%, the reported SAR will be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up power. The scaling factor for the duty factor is defined as 100% / transmission duty cycle (%). The reported SAR would be calculated by measured SAR x tune-up power scaling factor x duty cycle scaling factor.

<KDB 941225 D01, 3G SAR Measurement Procedures>

The mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ 1/4 dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

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

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

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

(2) QPSK with 100% RB allocation

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

(3) Higher order modulations

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

(4) Other channel bandwidth

SAR is required when the highest maximum output power of the smaller channel bandwidth is >1/2 dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

<KDB 248227 D01, SAR Guidance for Wi-Fi Transmitters>

(1) For handsets operating next to ear, hotspot mode or mini-tablet configurations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When the reported SAR of initial test position is <= 0.4 W/kg, SAR testing for remaining test positions is not required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is <= 0.8 W/kg or all test positions are measured.

(2) For WLAN 2.4 GHz, the highest measured maximum output power channel for DSSS was selected for SAR measurement. When the reported SAR is <= 0.8 W/kg, no further SAR testing is required. Otherwise, SAR is evaluated at the next highest measured output power channel. When any reported SAR is >1.2 W/kg, SAR is required for the third channel. For OFDM modes (802.11g/n),SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and it is <= 1.2 W/kg.

(3) For WLAN 5GHz, the initial test configuration was selected according to the transmission mode with the highest maximum output power. When the reported SAR of initial test configuration is > 0.8 W/kg, SAR is required for the subsequent highest measured output power channel until the reported SAR result is <=1.2 W/kg or all required channels are measured. For other transmission modes, SAR is not required when the highest reported SAR for initial test configuration is adjusted by the ratio of subsequent test configuration to initial test configuration specified maximum output power and it is <= 1.2 W/kg.

4.7.2 SAR Results for Body Exposure Condition

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	Power Reduction	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	WCDMA II	RMC12.2K	Rear Face	0	9538	W/O	23.5	23.37	1.03	0.02	0.236	0.24
	WCDMA II	RMC12.2K	Right Side	16	9538	W/O	23.5	23.37	1.03	-0.1	0.587	0.60
	WCDMA II	RMC12.2K	Right Side	0	9538	W/	17.5	17.45	1.01	0.12	0.607	0.61
	WCDMA II	RMC12.2K	Top Side	0	9538	W/O	23.5	23.37	1.03	0.11	0.048	0.05
	WCDMA II	RMC12.2K	Bottom Side	0	9538	W/O	23.5	23.37	1.03	0.09	0.012	0.01
01	WCDMA II	RMC12.2K	Right Side	0	9262	W/	17.5	17.41	1.02	-0.08	1.02	**1.04**
	WCDMA II	RMC12.2K	Right Side	0	9400	W/	17.5	17.43	1.02	0.13	0.855	0.87
	WCDMA II	RMC12.2K	Right Side	0	9262	W/	17.5	17.41	1.02	0.15	0.996	1.02
	WCDMA IV	RMC12.2K	Rear Face	0	1312	W/O	23.5	23.48	1.00	0.08	0.385	0.39
02	WCDMA IV	RMC12.2K	Right Side	16	1312	W/O	23.5	23.48	1.00	0.03	1.09	**1.09**
	WCDMA IV	RMC12.2K	Right Side	0	1312	W/	17.5	17.43	1.02	-0.11	0.995	1.01
	WCDMA IV	RMC12.2K	Top Side	0	1312	W/O	23.5	23.48	1.00	0.17	0.021	0.02
	WCDMA IV	RMC12.2K	Bottom Side	0	1312	W/O	23.5	23.48	1.00	-0.08	0.03	0.03
	WCDMA IV	RMC12.2K	Right Side	16	1413	W/O	23.5	23.34	1.04	0.09	1.03	1.07
	WCDMA IV	RMC12.2K	Right Side	16	1513	W/O	23.5	23.47	1.01	-0.12	1.07	1.08
	WCDMA IV	RMC12.2K	Right Side	0	1413	W/	17.5	17.38	1.03	0.11	0.804	0.83
	WCDMA IV	RMC12.2K	Right Side	0	1513	W/	17.5	17.42	1.02	0.16	0.848	0.86
	WCDMA IV	RMC12.2K	Right Side	16	1312	W/O	23.5	23.48	1.00	0.05	1.08	1.08
	WCDMA V	RMC12.2K	Rear Face	0	4132	W/O	23.0	22.95	1.01	0.05	0.364	0.37
	WCDMA V	RMC12.2K	Left Side	0	4132	W/O	23.0	22.95	1.01	0	< 0.001	0.00
	WCDMA V	RMC12.2K	Right Side	16	4132	W/O	23.0	22.95	1.01	-0.01	0.216	0.22
	WCDMA V	RMC12.2K	Right Side	0	4132	W/	22.0	21.98	1.00	-0.01	1.04	1.04
	WCDMA V	RMC12.2K	Top Side	0	4132	W/O	23.0	22.95	1.01	-0.18	0.053	0.05
	WCDMA V	RMC12.2K	Bottom Side	0	4132	W/O	23.0	22.95	1.01	0.16	0.190	0.19
	WCDMA V	RMC12.2K	Right Side	0	4182	W/	22.0	21.94	1.01	-0.01	1.12	1.13
03	WCDMA V	RMC12.2K	Right Side	0	4233	W/	22.0	21.96	1.01	0.06	1.18	**1.19**
	WCDMA V	RMC12.2K	Right Side	0	4233	W/	22.0	21.96	1.01	0.01	1.12	1.13

Note : The "< 0.001" means there is no SAR value or the SAR is too low to be measured.

Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Ch.	RB#	RB Offset	Power Reduction	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	LTE 2	QPSK20M	Rear Face	0	18900	1	0	W/O	23.5	23.23	1.06	0.08	0.298	0.32
	LTE 2	QPSK20M	Right Side	16	18900	1	0	W/O	23.5	23.23	1.06	0.02	0.737	0.78
	LTE 2	QPSK20M	Right Side	0	18900	1	0	W/	18.0	17.68	1.08	-0.04	1.02	1.1
	LTE 2	QPSK20M	Top Side	0	18900	1	0	W/O	23.5	23.23	1.06	0.19	0.030	0.03
	LTE 2	QPSK20M	Bottom Side	0	18900	1	0	W/O	23.5	23.23	1.06	-0.17	0.056	0.06
	LTE 2	QPSK20M	Rear Face	0	18900	50	0	W/O	22.5	22.24	1.06	-0.05	0.253	0.27
	LTE 2	QPSK20M	Right Side	16	18900	50	0	W/O	22.5	22.24	1.06	0.07	0.567	0.60
	LTE 2	QPSK20M	Right Side	0	18900	50	0	W/	18.0	17.43	1.14	-0.06	0.945	1.08
	LTE 2	QPSK20M	Top Side	0	18900	50	0	W/O	22.5	22.24	1.06	0.1	0.026	0.03
	LTE 2	QPSK20M	Bottom Side	0	18900	50	0	W/O	22.5	22.24	1.06	0.07	0.054	0.06
04	LTE 2	QPSK20M	Right Side	0	18700	1	0	W/	18.0	17.62	1.09	-0.11	1.08	**1.18**
	LTE 2	QPSK20M	Right Side	0	19100	1	99	W/	18.0	17.66	1.08	0.1	0.818	0.88
	LTE 2	QPSK20M	Right Side	0	18700	50	0	W/	18.0	17.37	1.16	-0.06	0.889	1.03
	LTE 2	QPSK20M	Right Side	0	19100	50	0	W/	18.0	17.05	1.24	-0.11	0.644	0.80
	LTE 2	QPSK20M	Right Side	0	18900	100	0	W/	18.0	17.47	1.13	-0.11	0.234	0.26
	LTE 2	QPSK20M	Right Side	0	18700	1	0	W/	18.0	17.62	1.09	0.12	1.06	1.16
	LTE 4	QPSK20M	Rear Face	0	20175	1	0	W/O	23.5	23.37	1.03	0.03	0.348	0.36
	LTE 4	QPSK20M	Right Side	16	20175	1	0	W/O	23.5	23.37	1.03	-0.12	0.801	0.83
	LTE 4	QPSK20M	Right Side	0	20175	1	0	W/	17.5	17.16	1.08	0.04	0.887	0.96
	LTE 4	QPSK20M	Top Side	0	20175	1	0	W/O	23.5	23.37	1.03	0.1	0.023	0.02
	LTE 4	QPSK20M	Bottom Side	0	20175	1	0	W/O	23.5	23.37	1.03	-0.05	0.032	0.03
	LTE 4	QPSK20M	Rear Face	0	20175	50	0	W/O	22.5	22.20	1.07	-0.19	0.279	0.30
	LTE 4	QPSK20M	Right Side	16	20175	50	0	W/O	22.5	22.20	1.07	0.03	0.652	0.70
	LTE 4	QPSK20M	Right Side	0	20175	50	0	W/	17.5	16.99	1.12	0.1	0.690	0.77
	LTE 4	QPSK20M	Top Side	0	20175	50	0	W/O	22.5	22.20	1.07	-0.01	0.023	0.02
	LTE 4	QPSK20M	Bottom Side	0	20175	50	0	W/O	22.5	22.20	1.07	-0.04	0.027	0.03
	LTE 4	QPSK20M	Right Side	16	20050	1	0	W/O	23.5	23.34	1.04	0.07	0.834	0.87
	LTE 4	QPSK20M	Right Side	16	20300	1	0	W/O	23.5	23.22	1.07	-0.13	0.783	0.84
	LTE 4	QPSK20M	Right Side	16	20175	100	0	W/O	22.5	22.13	1.09	-0.15	0.671	0.73
05	LTE 4	QPSK20M	Right Side	0	20050	1	0	W/	17.5	17.14	1.09	-0.09	0.975	**1.06**
	LTE 4	QPSK20M	Right Side	0	20300	1	0	W/	17.5	17.09	1.10	-0.1	0.806	0.89
	LTE 4	QPSK20M	Right Side	0	20175	100	0	W/	17.5	16.85	1.16	-0.12	0.710	0.82
	LTE 4	QPSK20M	Right Side	0	20050	1	0	W/	17.5	17.14	1.09	0.03	0.956	1.04
	LTE 5	QPSK10M	Rear Face	0	20600	1	0	W/O	23.0	22.88	1.03	-0.14	0.340	0.35
	LTE 5	QPSK10M	Left Side	0	20600	1	0	W/O	23.0	22.88	1.03	0	< 0.001	0.00
06	LTE 5	QPSK10M	Right Side	0	20600	1	0	W/O	23.0	22.88	1.03	-0.07	0.904	**0.93**
	LTE 5	QPSK10M	Top Side	0	20600	1	0	W/O	23.0	22.88	1.03	-0.13	0.037	0.04
	LTE 5	QPSK10M	Bottom Side	0	20600	1	0	W/O	23.0	22.88	1.03	-0.01	0.166	0.17
	LTE 5	QPSK10M	Rear Face	0	20600	25	0	W/O	22.0	21.89	1.03	0.04	0.273	0.28
	LTE 5	QPSK10M	Left Side	0	20600	25	0	W/O	22.0	21.89	1.03	0	< 0.001	0.00
	LTE 5	QPSK10M	Right Side	0	20600	25	0	W/O	22.0	21.89	1.03	0.09	0.716	0.74
	LTE 5	QPSK10M	Top Side	0	20600	25	0	W/O	22.0	21.89	1.03	-0.03	0.031	0.03
	LTE 5	QPSK10M	Bottom Side	0	20600	25	0	W/O	22.0	21.89	1.03	-0.18	0.135	0.14
	LTE 5	QPSK10M	Right Side	0	20450	1	0	W/O	23.0	22.86	1.03	0.01	0.844	0.87
	LTE 5	QPSK10M	Right Side	0	20525	1	0	W/O	23.0	22.85	1.04	-0.06	0.859	0.89
	LTE 5	QPSK10M	Right Side	0	20600	50	0	W/O	22.0	21.79	1.05	-0.1	0.739	0.78
	LTE 5	QPSK10M	Right Side	0	20600	1	0	W/O	23.0	22.88	1.03	0.04	0.895	0.92

Note : The "< 0.001" means there is no SAR value or the SAR is too low to be measured.

Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Ch.	RB#	RB Offset	Power Reduction	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	LTE 7	QPSK20M	Rear Face	0	21100	1	0	W/O	22.0	21.93	1.02	0.18	0.255	0.26
	LTE 7	QPSK20M	Right Side	16	21100	1	0	W/O	22.0	21.93	1.02	0.01	0.170	0.17
	LTE 7	QPSK20M	Right Side	0	21100	1	0	W/	21.0	20.46	1.13	0.17	0.905	1.02
	LTE 7	QPSK20M	Top Side	0	21100	1	0	W/O	22.0	21.93	1.02	0.18	0.085	0.09
	LTE 7	QPSK20M	Bottom Side	0	21100	1	0	W/O	22.0	21.93	1.02	0.08	0.036	0.04
	LTE 7	QPSK20M	Rear Face	0	21100	50	0	W/O	21.0	20.93	1.02	-0.01	0.211	0.22
	LTE 7	QPSK20M	Right Side	16	21100	50	0	W/O	21.0	20.93	1.02	0.06	0.152	0.16
	LTE 7	QPSK20M	Right Side	0	21100	50	0	W/	21.0	20.36	1.16	-0.06	0.746	0.87
	LTE 7	QPSK20M	Top Side	0	21100	50	0	W/O	21.0	20.93	1.02	-0.08	0.072	0.07
	LTE 7	QPSK20M	Bottom Side	0	21100	50	0	W/O	21.0	20.93	1.02	0.15	0.032	0.03
	LTE 7	QPSK20M	Right Side	0	20850	1	0	W/	21.0	20.35	1.16	-0.1	0.816	0.95
07	LTE 7	QPSK20M	Right Side	0	21350	1	0	W/	21.0	20.43	1.14	-0.09	0.937	**1.07**
	LTE 7	QPSK20M	Right Side	0	20850	50	0	W/	21.0	20.25	1.19	0.14	0.677	0.81
	LTE 7	QPSK20M	Right Side	0	21350	50	0	W/	21.0	20.33	1.17	-0.09	0.755	0.88
	LTE 7	QPSK20M	Right Side	0	21100	100	0	W/	21.0	20.31	1.17	-0.13	0.769	0.90
	LTE 7	QPSK20M	Right Side	0	21350	1	0	W/	21.0	20.33	1.17	0.02	0.916	1.07
	LTE 12	QPSK10M	Rear Face	0	23095	1	0	W/O	23.5	23.37	1.03	0.18	0.730	0.75
	LTE 12	QPSK10M	Left Side	0	23095	1	0	W/O	23.5	23.37	1.03	-0.15	0.058	0.06
08	LTE 12	QPSK10M	Right Side	0	23095	1	0	W/O	23.5	23.37	1.03	-0.06	0.742	**0.76**
	LTE 12	QPSK10M	Top Side	0	23095	1	0	W/O	23.5	23.37	1.03	0.11	0.087	0.09
	LTE 12	QPSK10M	Bottom Side	0	23095	1	0	W/O	23.5	23.37	1.03	-0.16	0.366	0.38
	LTE 12	QPSK10M	Rear Face	0	23095	25	0	W/O	22.5	22.39	1.03	-0.15	0.541	0.56
	LTE 12	QPSK10M	Left Side	0	23095	25	0	W/O	22.5	22.39	1.03	-0.15	0.067	0.07
	LTE 12	QPSK10M	Right Side	0	23095	25	0	W/O	22.5	22.39	1.03	0.05	0.508	0.52
	LTE 12	QPSK10M	Top Side	0	23095	25	0	W/O	22.5	22.39	1.03	-0.02	0.583	0.60
	LTE 12	QPSK10M	Bottom Side	0	23095	25	0	W/O	22.5	22.39	1.03	0.09	0.295	0.30
	LTE 12	QPSK10M	Right Side	0	23060	1	0	W/O	23.5	23.35	1.04	0.17	0.653	0.68
	LTE 12	QPSK10M	Right Side	0	23130	1	0	W/O	23.5	23.27	1.05	-0.17	0.576	0.60
	LTE 13	QPSK10M	Rear Face	0	23230	1	0	W/O	23.0	22.98	1.00	0.12	0.519	0.52
	LTE 13	QPSK10M	Left Side	0	23230	1	0	W/O	23.0	22.98	1.00	0.14	< 0.001	0.00
09	LTE 13	QPSK10M	Right Side	0	23230	1	0	W/O	23.0	22.98	1.00	-0.05	0.859	**0.86**
	LTE 13	QPSK10M	Top Side	0	23230	1	0	W/O	23.0	22.98	1.00	-0.04	0.094	0.09
	LTE 13	QPSK10M	Bottom Side	0	23230	1	0	W/O	23.0	22.98	1.00	-0.14	0.321	0.32
	LTE 13	QPSK10M	Rear Face	0	23230	25	0	W/O	22.0	21.96	1.01	0.03	0.398	0.40
	LTE 13	QPSK10M	Left Side	0	23230	25	0	W/O	22.0	21.96	1.01	0.06	< 0.001	0.00
	LTE 13	QPSK10M	Right Side	0	23230	25	0	W/O	22.0	21.96	1.01	0.03	0.720	0.73
	LTE 13	QPSK10M	Top Side	0	23230	25	0	W/O	22.0	21.96	1.01	-0.13	0.075	0.08
	LTE 13	QPSK10M	Bottom Side	0	23230	25	0	W/O	22.0	21.96	1.01	-0.04	0.254	0.26
	LTE 13	QPSK10M	Right Side	0	23230	50	0	W/O	22.0	21.93	1.02	0.01	0.384	0.39
	LTE 13	QPSK10M	Right Side	0	23230	1	0	W/O	23.0	22.98	1.00	-0.13	0.834	0.83
	LTE 25	QPSK20M	Rear Face	0	26590	1	0	W/O	23.5	23.26	1.06	0.08	0.275	0.29
	LTE 25	QPSK20M	Right Side	16	26590	1	0	W/O	23.5	23.26	1.06	-0.07	0.643	0.68
	LTE 25	QPSK20M	Right Side	0	26590	1	0	W/	17.5	17.26	1.06	-0.02	0.750	0.80
	LTE 25	QPSK20M	Top Side	0	26590	1	0	W/O	23.5	23.26	1.06	-0.01	0.041	0.04
	LTE 25	QPSK20M	Bottom Side	0	26590	1	0	W/O	23.5	23.26	1.06	0.02	0.053	0.06
	LTE 25	QPSK20M	Rear Face	0	26590	50	0	W/O	22.5	22.23	1.06	-0.09	0.221	0.23
	LTE 25	QPSK20M	Right Side	16	26590	50	0	W/O	22.5	22.23	1.06	0.05	0.510	0.54
	LTE 25	QPSK20M	Right Side	0	26590	50	25	W/	17.5	17.09	1.10	-0.09	0.583	0.64
	LTE 25	QPSK20M	Top Side	0	26590	50	0	W/O	22.5	22.23	1.06	-0.04	0.037	0.04
	LTE 25	QPSK20M	Bottom Side	0	26590	50	0	W/O	22.5	22.23	1.06	-0.18	0.041	0.04
10	LTE 25	QPSK20M	Right Side	0	26140	1	0	W/	17.5	17.12	1.09	-0.05	1.02	**1.11**
	LTE 25	QPSK20M	Right Side	0	26365	1	0	W/	17.5	17.25	1.06	-0.04	0.936	0.99
	LTE 25	QPSK20M	Right Side	0	26590	100	0	W/	17.5	17.10	1.10	-0.04	0.220	0.24
	LTE 25	QPSK20M	Right Side	0	26140	1	0	W/	17.5	17.12	1.09	0.02	0.996	1.09

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Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Ch.	RB#	RB Offset	Power Reduction	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	LTE 26	QPSK15M	Rear Face	0	26765	1	0	W/O	23.0	22.96	1.01	-0.06	0.413	0.42
	LTE 26	QPSK15M	Right Side	16	26765	1	0	W/O	23.0	22.96	1.01	-0.08	0.202	0.20
	LTE 26	QPSK15M	Right Side	0	26765	1	0	W/	22.5	22.42	1.02	0.05	1.08	1.10
	LTE 26	QPSK15M	Top Side	0	26765	1	0	W/O	23.0	22.96	1.01	-0.17	0.057	0.06
	LTE 26	QPSK15M	Bottom Side	0	26765	1	0	W/O	23.0	22.96	1.01	-0.11	0.191	0.19
	LTE 26	QPSK15M	Rear Face	0	26765	36	0	W/O	22.0	21.93	1.02	0.18	0.338	0.34
	LTE 26	QPSK15M	Right Side	16	26765	36	0	W/O	22.0	21.93	1.02	-0.15	0.168	0.17
	LTE 26	QPSK15M	Right Side	0	26765	36	19	W/	22.5	22.01	1.12	-0.05	0.898	1.01
	LTE 26	QPSK15M	Top Side	0	26765	36	0	W/O	22.0	21.93	1.02	-0.04	0.049	0.05
	LTE 26	QPSK15M	Bottom Side	0	26765	36	0	W/O	22.0	21.93	1.02	-0.19	0.170	0.17
	LTE 26	QPSK15M	Right Side	0	26865	1	0	W/	22.5	22.39	1.03	0.06	1.11	1.14
11	LTE 26	QPSK15M	Right Side	0	26965	1	0	W/	22.5	22.32	1.04	0.03	1.15	**1.20**
	LTE 26	QPSK15M	Right Side	0	26865	36	19	W/	22.5	21.96	1.13	-0.09	0.873	0.99
	LTE 26	QPSK15M	Right Side	0	26965	36	19	W/	22.5	21.88	1.15	0.07	0.935	1.08
	LTE 26	QPSK15M	Right Side	0	26765	75	0	W/	22.5	21.93	1.14	0	0.914	1.04
	LTE 26	QPSK15M	Right Side	0	26965	1	0	W/	22.5	22.32	1.04	0.09	1.08	1.12
	LTE 41	QPSK20M	Rear Face	0	40620	1	0	W/O	22.0	21.78	1.05	-0.08	0.222	0.23
	LTE 41	QPSK20M	Left Side	0	40620	1	0	W/O	22.0	21.78	1.05	0	< 0.001	0.00
	LTE 41	QPSK20M	Right Side	0	40620	1	0	W/O	22.0	21.78	1.05	0.05	0.682	0.72
	LTE 41	QPSK20M	Top Side	0	40620	1	0	W/O	22.0	21.78	1.05	0.01	0.068	0.07
	LTE 41	QPSK20M	Bottom Side	0	40620	1	0	W/O	22.0	21.78	1.05	-0.02	0.055	0.06
	LTE 41	QPSK20M	Rear Face	0	40620	50	0	W/O	21.0	20.76	1.06	0.09	0.167	0.18
	LTE 41	QPSK20M	Left Side	0	40620	50	0	W/O	21.0	20.76	1.06	0	< 0.001	0.00
	LTE 41	QPSK20M	Right Side	0	40620	50	0	W/O	21.0	20.76	1.06	0.01	0.534	0.57
	LTE 41	QPSK20M	Top Side	0	40620	50	0	W/O	21.0	20.76	1.06	0.02	0.052	0.06
	LTE 41	QPSK20M	Bottom Side	0	40620	50	0	W/O	21.0	20.76	1.06	0.13	0.042	0.04
	LTE 41	QPSK20M	Right Side	0	39750	1	0	W/O	22.0	21.75	1.06	0.03	0.659	0.70
12	LTE 41	QPSK20M	Right Side	0	40185	1	0	W/O	22.0	21.72	1.07	0.04	0.778	**0.83**
	LTE 41	QPSK20M	Right Side	0	41055	1	0	W/O	22.0	21.71	1.07	-0.17	0.769	0.82
	LTE 41	QPSK20M	Right Side	0	41490	1	0	W/O	22.0	21.73	1.06	-0.17	0.606	0.64
	LTE 41	QPSK20M	Right Side	0	40620	100	0	W/O	21.0	20.74	1.06	0.03	0.528	0.56

Note : The "< 0.001" means there is no SAR value or the SAR is too low to be measured.

Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Ch.	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	WLAN2.4G	802.11b	Rear Face	0	11	98.60	1.01	13.5	12.88	1.15	-0.14	0.236	0.27
13	WLAN2.4G	802.11b	Left Side	0	11	98.60	1.01	13.5	12.88	1.15	-0.04	0.539	**0.63**
	WLAN2.4G	802.11b	Right Side	0	11	98.60	1.01	13.5	12.88	1.15	0.00	< 0.001	0.00
	WLAN2.4G	802.11b	Left Side	0	1	98.60	1.01	13.5	11.92	1.44	0.04	0.428	0.62
	WLAN2.4G	802.11b	Left Side	0	6	98.60	1.01	13.5	12.44	1.28	0.18	0.477	0.62
	WLAN5.3G	802.11a	Rear Face	0	64	93.80	1.07	7.5	7.38	1.03	0.06	0.044	0.05
14	WLAN5.3G	802.11a	Left Side	0	64	93.80	1.07	7.5	7.38	1.03	-0.09	0.125	**0.14**
	WLAN5.3G	802.11a	Right Side	0	64	93.80	1.07	7.5	7.38	1.03	-0.13	0.027	0.03
	WLAN5.3G	802.11a	Left Side	0	52	93.80	1.07	7.5	7.07	1.10	0.05	0.092	0.11
	WLAN5.3G	802.11a	Left Side	0	56	93.80	1.07	7.5	7.11	1.09	-0.02	0.100	0.12
	WLAN5.3G	802.11a	Left Side	0	60	93.80	1.07	7.5	7.21	1.07	0.09	0.101	0.12
	WLAN5.6G	802.11a	Rear Face	0	100	93.80	1.07	8.5	8.16	1.08	0.1	0.081	0.09
	WLAN5.6G	802.11a	Left Side	0	100	93.80	1.07	8.5	8.16	1.08	-0.17	0.215	0.25
	WLAN5.6G	802.11a	Right Side	0	100	93.80	1.07	8.5	8.16	1.08	-0.11	0.028	0.03
	WLAN5.6G	802.11a	Left Side	0	116	93.80	1.07	8.5	7.95	1.14	-0.08	0.197	0.24
	WLAN5.6G	802.11a	Left Side	0	120	93.80	1.07	8.5	7.88	1.15	-0.04	0.223	0.27
	WLAN5.6G	802.11a	Left Side	0	124	93.80	1.07	8.5	7.92	1.14	0.01	0.237	0.29
15	WLAN5.6G	802.11a	Left Side	0	132	93.80	1.07	8.5	7.49	1.26	-0.05	0.286	**0.39**
	WLAN5.6G	802.11a	Left Side	0	140	93.80	1.07	8.5	7.08	1.39	0.11	0.202	0.30
	WLAN5.6G	802.11a	Left Side	0	144	93.80	1.07	8.5	7.03	1.40	0.16	0.194	0.29
	WLAN5.8G	802.11a	Rear Face	0	153	93.80	1.07	8.0	7.52	1.12	-0.12	0.148	0.18
	WLAN5.8G	802.11a	Left Side	0	153	93.80	1.07	8.0	7.52	1.12	-0.13	0.223	0.27
	WLAN5.8G	802.11a	Right Side	0	153	93.80	1.07	8.0	7.52	1.12	-0.04	0.032	0.04
	WLAN5.8G	802.11a	Left Side	0	149	93.80	1.07	8.0	7.45	1.14	0.18	0.128	0.16
16	WLAN5.8G	802.11a	Left Side	0	157	93.80	1.07	8.0	7.49	1.12	-0.03	0.239	**0.29**
	WLAN5.8G	802.11a	Left Side	0	161	93.80	1.07	8.0	7.51	1.12	0.08	0.208	0.25
	WLAN5.8G	802.11a	Left Side	0	165	93.80	1.07	8.0	7.47	1.13	0.02	0.222	0.27
	BT	LE	Rear Face	0	0	71.10	1.41	2.0	1.93	1.02	0.19	0.0052	0.01
17	BT	LE	Left Side	0	0	71.10	1.41	2.0	1.93	1.02	0.03	0.012	**0.02**
	BT	LE	Right Side	0	0	71.10	1.41	2.0	1.93	1.02	-0.14	< 0.001	0.00
	BT	LE	Top Side	0	0	71.10	1.41	2.0	1.93	1.02	-0.18	0.00503	0.01
	BT	LE	Bottom Side	0	0	71.10	1.41	2.0	1.93	1.02	0.07	< 0.001	0.00
	BT	LE	Left Side	0	19	71.10	1.41	2.0	1.31	1.17	0.18	< 0.001	0.00
	BT	LE	Left Side	0	39	71.10	1.41	2.0	1.39	1.15	0.14	0.0051	0.01

Note : The "< 0.001" means there is no SAR value or the SAR is too low to be measured.

4.7.3 SAR Measurement Variability

According to KDB 865664 D01, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10, the highest SAR configuration for either head or body tissue-equivalent medium maybe used to perform the repeated measurement. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is >= 0.80 W/kg, repeat that measurement once.
3. If the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20, or when the original or repeated measurement is >= 1.45 W/kg, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20, and the original, first or second repeated measurement is >= 1.5 W/kg, perform a third repeated measurement.

Band	Test Position	Ch.	Original Measured SAR-1g (W/kg)	1st Repeated SAR-1g (W/kg)	L/S Ratio	2nd Repeated SAR-1g (W/kg)	L/S Ratio	3rd Repeated SAR-1g (W/kg)	L/S Ratio
WCDMA II	Right Side	9262	1.02	0.996	1.02	N/A	N/A	N/A	N/A
WCDMA IV	Right Side	1312	1.09	1.08	1.01	N/A	N/A	N/A	N/A
WCDMA V	Right Side	4233	1.18	1.12	1.05	N/A	N/A	N/A	N/A
LTE 2	Right Side	18700	1.08	1.06	1.02	N/A	N/A	N/A	N/A
LTE 4	Right Side	20050	0.975	0.956	1.02	N/A	N/A	N/A	N/A
LTE 5	Right Side	20600	0.904	0.895	1.01	N/A	N/A	N/A	N/A
LTE 7	Right Side	21350	0.937	0.916	1.02	N/A	N/A	N/A	N/A
LTE 13	Right Side	23230	0.859	0.834	1.03	N/A	N/A	N/A	N/A
LTE 25	Right Side	26140	1.02	0.996	1.02	N/A	N/A	N/A	N/A
LTE 26	Right Side	26965	1.15	1.08	1.06	N/A	N/A	N/A	N/A

4.7.4 Simultaneous Multi-band Transmission Evaluation

<Possibilities of Simultaneous Transmission>

The simultaneous transmission possibilities for this device are listed as below.

Simultaneous TX Combination	Capable Transmit Configurations	Body Exposure Condition
1	WWAN + WLAN 2.4G	Yes
2	WWAN + WLAN 5G	Yes
3	WWAN + BT	Yes
4	WLAN 2.4G + BT	Yes
5	WLAN 5G + BT	Yes
6	WWAN + WLAN 2.4G + BT	Yes
7	WWAN + WLAN 5G + BT	Yes

Note :

1. The WLAN 2.4G and WLAN 5G cannot transmit simultaneously.

<Estimated SAR Calculation>

According to KDB 447498 D01, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR was estimated according to following formula to result in substantially conservative SAR values of <= 0.4 W/kg to determine simultaneous transmission SAR test exclusion.

$$\text{Estimated SAR} = \frac{\text{Max. Tune up Power}_{(\text{mW})}}{\text{Min. Test Separation Distance}_{(\text{mm})}} \times \frac{\sqrt{f_{(\text{GHz})}}}{7.5}$$

If the minimum test separation distance is < 5 mm, a distance of 5 mm is used for estimated SAR calculation. When the test separation distance is > 50 mm, the 0.4 W/kg is used for SAR-1g.

Mode / Band	Frequency (GHz)	Max. Tune-up Power (dBm)	Test Position	Separation Distance (mm)	Estimated SAR (W/kg)
WCDMA II	1.9076	23.5	Body	0	0.40
WCDMA IV	1.7526	23.5	Body	0	0.40
WCDMA V	0.8466	23	Body	0	0.40
LTE 2	1.91	23.5	Body	0	0.40
LTE 4	1.755	23.5	Body	0	0.40
LTE 5	0.849	23	Body	0	0.40
LTE 7	2.57	22	Body	0	0.40
LTE 12	0.716	23.5	Body	0	0.40
LTE 13	0.787	23	Body	0	0.40
LTE 25	1.915	23.5	Body	0	0.40
LTE 26	0.849	23	Body	0	0.40
LTE 41	2.69	22	Body	0	0.40
WLAN (DTS)	2.462	13.5	Body	0	0.40
WLAN (NII)	5.24	7.5	Body	0	0.37
WLAN (NII)	5.32	7.5	Body	0	0.37
WLAN (NII)	5.72	8.5	Body	0	0.40
WLAN (NII)	5.825	8	Body	5	0.39

Note:

1. The separation distance is determined from the outer housing of the EUT to the user.
2. When standalone SAR testing is not required, an estimated SAR can be applied to determine simultaneous transmission SAR test exclusion.

<SAR Summation Analysis>

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR_{1g} of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit(SAR_{1g} 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR_{1g} is greater than the SAR limit (SAR_{1g} 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

Band	Position	1g SAR W/kg				Summimg result 1g SAR W/kg	
		1	2	3	4		
		Max WWAN	Max WLAN 2.4GHz	Max WLAN 5GHz	Max BT	1+2+4	1+3+4
WCDMA II	Rear Face	0.24	0.27	0.18	0.01	0.52	0.43
	Left Side	0.40	0.63	0.39	0.02	1.05	0.81
	Right Side	1.04	0.00	0.04	0.00	1.04	1.08
	Top Side	0.05	0.40	0.40	0.01	0.46	0.46
	Bottom Side	0.01	0.40	0.40	0.00	0.41	0.41
WCDMA IV	Rear Face	0.39	0.27	0.18	0.01	0.67	0.58
	Left Side	0.40	0.63	0.39	0.02	1.05	0.81
	Right Side	1.09	0.00	0.04	0.00	1.09	1.13
	Top Side	0.02	0.40	0.40	0.01	0.43	0.43
	Bottom Side	0.03	0.40	0.40	0.00	0.43	0.43
WCDMA V	Rear Face	0.37	0.27	0.18	0.01	0.65	0.56
	Left Side	0.00	0.63	0.39	0.02	0.65	0.41
	Right Side	1.19	0.00	0.04	0.00	1.19	1.23
	Top Side	0.05	0.40	0.40	0.01	0.46	0.46
	Bottom Side	0.19	0.40	0.40	0.00	0.59	0.59
LTE 2	Rear Face	0.32	0.27	0.18	0.01	0.60	0.51
	Left Side	0.40	0.63	0.39	0.02	1.05	0.81
	Right Side	1.18	0.00	0.04	0.00	1.18	1.22
	Top Side	0.03	0.40	0.40	0.01	0.44	0.44
	Bottom Side	0.06	0.40	0.40	0.00	0.46	0.46
LTE 4	Rear Face	0.36	0.27	0.18	0.01	0.64	0.55
	Left Side	0.40	0.63	0.39	0.02	1.05	0.81
	Right Side	1.06	0.00	0.04	0.00	1.06	1.10
	Top Side	0.02	0.40	0.40	0.01	0.43	0.43
	Bottom Side	0.03	0.40	0.40	0.00	0.43	0.43

Band	Position	1g SAR W/kg				Summimg result 1g SAR W/kg	
		1	2	3	4		
		Max WWAN	Max WLAN 2.4GHz	Max WLAN 5GHz	Max BT	1+2+4	1+3+4
LTE 5	Rear Face	0.35	0.27	0.18	0.01	0.63	0.54
	Left Side	0.00	0.63	0.39	0.02	0.65	0.41
	Right Side	0.93	0.00	0.04	0.00	0.93	0.97
	Top Side	0.04	0.40	0.40	0.01	0.45	0.45
	Bottom Side	0.17	0.40	0.40	0.00	0.57	0.57
LTE 7	Rear Face	0.26	0.27	0.18	0.01	0.54	0.45
	Left Side	0.40	0.63	0.39	0.02	1.05	0.81
	Right Side	1.07	0.00	0.04	0.00	1.07	1.11
	Top Side	0.09	0.40	0.40	0.01	0.50	0.50
	Bottom Side	0.04	0.40	0.40	0.00	0.44	0.44
LTE 12	Rear Face	0.75	0.27	0.18	0.01	1.03	0.94
	Left Side	0.07	0.63	0.39	0.02	0.72	0.48
	Right Side	0.76	0.00	0.04	0.00	0.76	0.80
	Top Side	0.60	0.40	0.40	0.01	1.01	1.01
	Bottom Side	0.38	0.40	0.40	0.00	0.78	0.78
LTE 13	Rear Face	0.52	0.27	0.18	0.01	0.80	0.71
	Left Side	0.00	0.63	0.39	0.02	0.65	0.41
	Right Side	0.86	0.00	0.04	0.00	0.86	0.90
	Top Side	0.09	0.40	0.40	0.01	0.50	0.50
	Bottom Side	0.32	0.40	0.40	0.00	0.72	0.72
LTE 25	Rear Face	0.29	0.27	0.18	0.01	0.57	0.48
	Left Side	0.40	0.63	0.39	0.02	1.05	0.81
	Right Side	1.11	0.00	0.04	0.00	1.11	1.15
	Top Side	0.04	0.40	0.40	0.01	0.45	0.45
	Bottom Side	0.06	0.40	0.40	0.00	0.46	0.46
LTE 26	Rear Face	0.42	0.27	0.18	0.01	0.70	0.61
	Left Side	0.40	0.63	0.39	0.02	1.05	0.81
	Right Side	1.20	0.00	0.04	0.00	1.20	**1.24**
	Top Side	0.06	0.40	0.40	0.01	0.47	0.47
	Bottom Side	0.19	0.40	0.40	0.00	0.59	0.59

Band	Position	1g SAR W/kg				Summimg result 1g SAR W/kg	
		1	2	3	4		
		Max WWAN	Max WLAN 2.4GHz	Max WLAN 5GHz	Max BT	1+2+4	1+3+4
LTE 41	Rear Face	0.23	0.27	0.18	0.01	0.51	0.42
	Left Side	0.00	0.63	0.39	0.02	0.65	0.41
	Right Side	0.83	0.00	0.04	0.00	0.83	0.87
	Top Side	0.07	0.40	0.40	0.01	0.48	0.48
	Bottom Side	0.57	0.40	0.40	0.00	0.97	0.97

Test Engineer：Isaac Liao, and Matt Cheng

5. Calibration of Test Equipment

Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Dipole	SPEAG	D750V3	1013	Aug. 23, 2019	1 Year
System Validation Dipole	SPEAG	D835V2	4d121	Aug. 23, 2019	1 Year
System Validation Dipole	SPEAG	D1750V2	1055	Aug. 23, 2019	1 Year
System Validation Dipole	SPEAG	D1900V2	5d036	Jan. 25, 2019	1 Year
System Validation Dipole	SPEAG	D2450V2	737	Aug. 26, 2019	1 Year
System Validation Dipole	SPEAG	D2600V2	1020	Aug. 26, 2019	1 Year
System Validation Dipole	SPEAG	D5GHzV2	1019	Mar. 21, 2019	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	3971	Mar. 29, 2019	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7375	Dec. 13, 2018	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7472	Aug. 30, 2019	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7537	Jun. 18, 2019	1 Year
Data Acquisition Electronics	SPEAG	DAE3	579	Aug. 27, 2019	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1431	Mar. 25, 2019	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1277	Jan. 24, 2019	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1585	Jun. 07, 2019	1 Year
Radio Communication Analyzer	Anritsu	MT8821C	6201381727	Jun. 14, 2019	1 Year
Universal Radio Communication Tester	R&S	CMW500	164864	Apr. 08, 2019	1 Year
Spectrum Analyzer	R&S	FSL6	102006	Mar. 26, 2019	1 Year
ENA Series Network Analyzer	Agilent	E5071C	MY46214281	Jun. 17, 2019	1 Year
MXG Analong Signal Generator	Agilent	N5181A	MY50143868	Jun. 27, 2019	1 Year
Power Meter	Anritsu	ML2495A	1218009	Jun. 28, 2019	1 Year
Power Sensor	Anritsu	MA2411B	1207252	Jun. 28, 2019	1 Year
Thermometer	YFE	YF-160A	130504591	Mar. 22, 2019	1 Year

6. Measurement Uncertainty.

According to KDB 865664 D01, SAR measurement uncertainty analysis is required in SAR reports only when the highest measured SAR in a frequency band is ≥ 1.5 W/kg for 1-g SAR, and ≥ 3.75 W/kg for 10-g SAR. The procedures described in IEEE Std 1528-2013should be applied. The expanded SAR measurement uncertainty must be ≤ 30%,for a confidence interval of k = 2. When the highest measured SAR within a frequency band is < 1.5 W/kg for 1-g and < 3.75 W/kg for 10-g, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. Hence, the measurement uncertainty analysis is not required in this SAR report because the test result met the condition.

7. Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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The road map of all our labs can be found in our web site also.

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Appendix A. SAR Plots of System Verification

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

Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/22

System Check_H750_191022

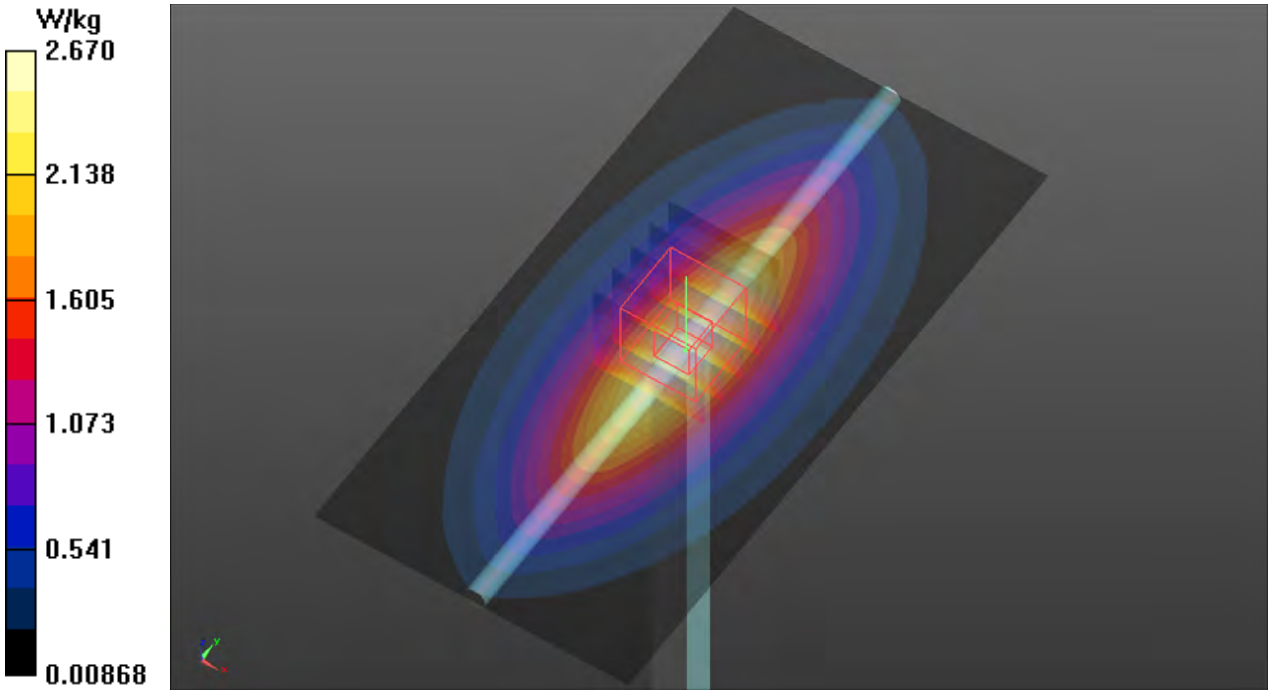
DUT: Dipole 750 MHz; Type: D750V3; SN: 1013

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: H06T09N1_1022 Medium parameters used: f = 750 MHz; σ = 0.9 S/m; ε_r = 42.71; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃ ； Liquid Temperature：23.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7537; ConvF(10.77, 10.77, 10.77); Calibrated: 2019/06/18
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1585; Calibrated: 2019/06/07
- Phantom: ELI Phantom_1245; Type: QDOVA002AA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Pin=250mW/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.67 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 57.01 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 3.00 W/kg
SAR(1 g) = 1.98 W/kg; SAR(10 g) = 1.3 W/kg
Maximum value of SAR (measured) = 2.67 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/02

System Check_H835_191002

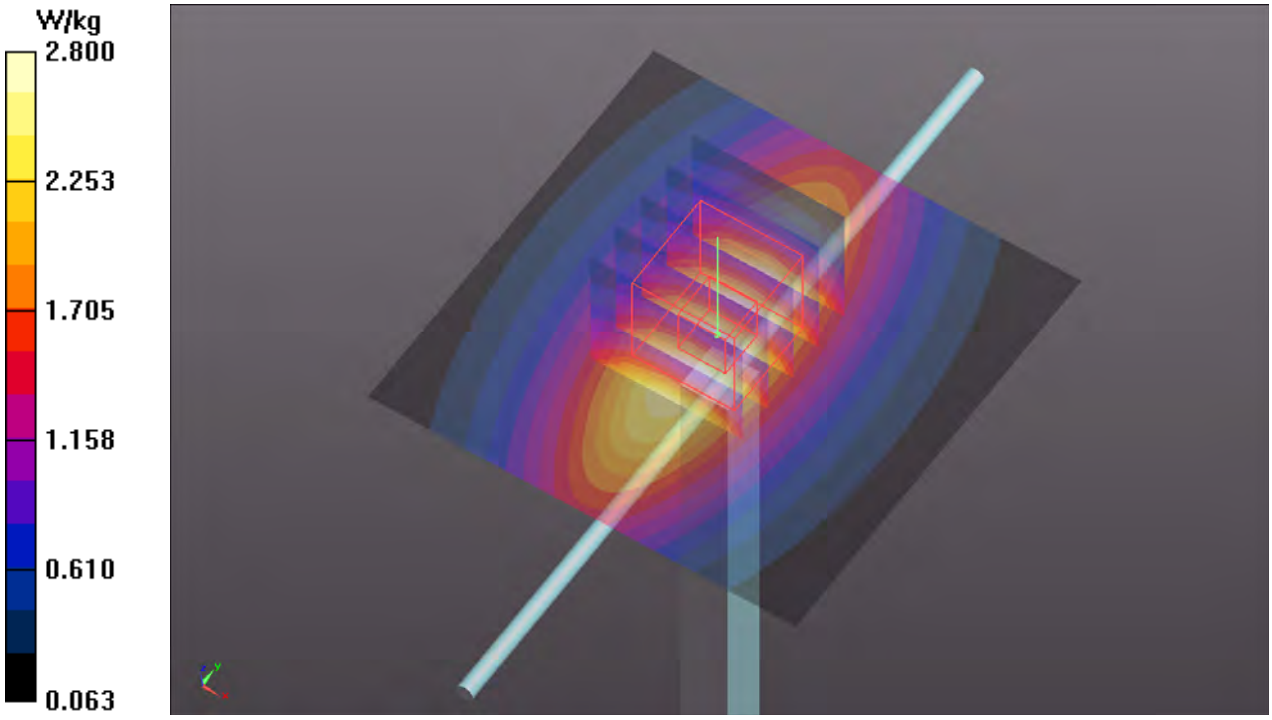
DUT: Dipole 835 MHz; Type: D835V2; SN: 4d121

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: H07T10N2_1002 Medium parameters used: f = 835 MHz; σ = 0.907 S/m; ε_r = 40.942; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(10.13, 10.13, 10.13); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.80 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.72 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.32 W/kg
SAR(1 g) = 2.27 W/kg; SAR(10 g) = 1.5 W/kg
Maximum value of SAR (measured) = 2.99 W/kg



System Check_H1750_191009

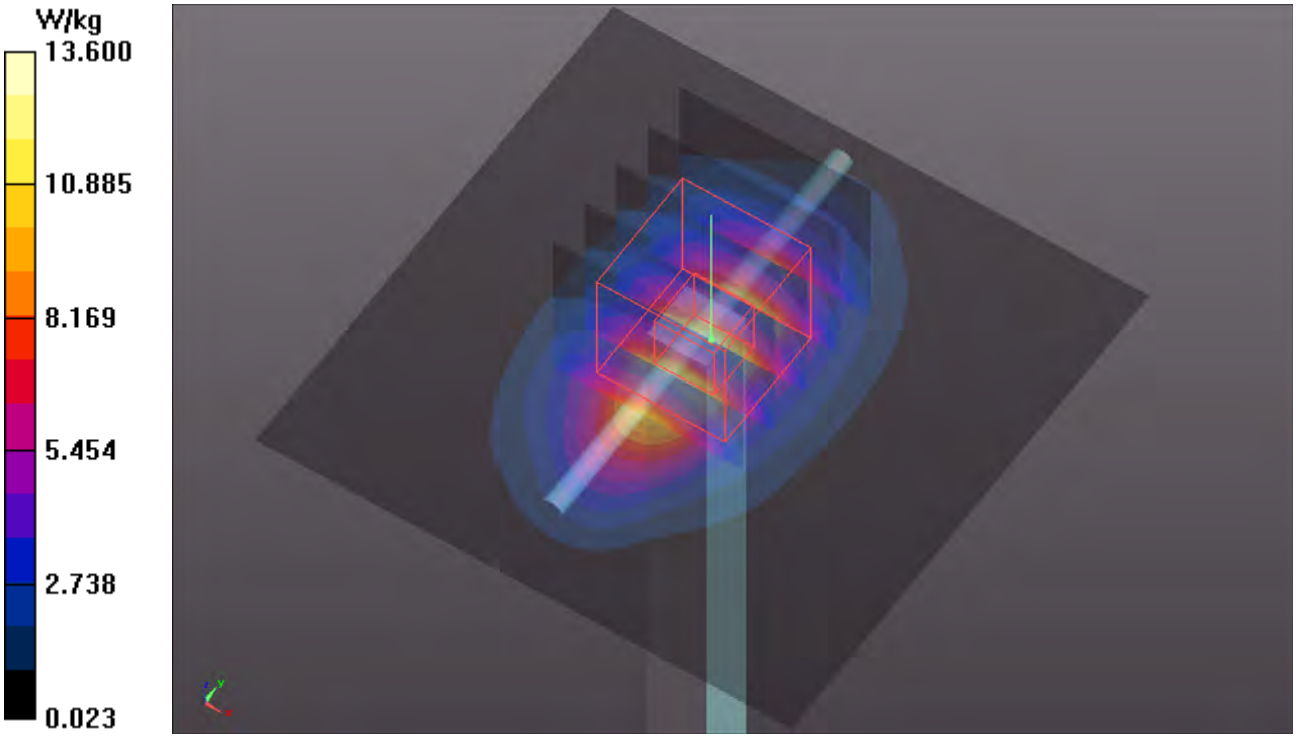
DUT: Dipole 1750 MHz; Type: D1750V2; SN: 1055

Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: H16T20N1_1009 Medium parameters used: f = 1750 MHz; σ = 1.325 S/m; ε_r = 39.333; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7472; ConvF(8.68, 8.68, 8.68); Calibrated: 2019/08/30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2019/08/27
- Phantom: ELI Phantom_1043; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 13.6 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 102.6 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 16.1 W/kg
SAR(1 g) = 8.75 W/kg; SAR(10 g) = 4.66 W/kg
Maximum value of SAR (measured) = 13.4 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/23

System Check_H1900_191023

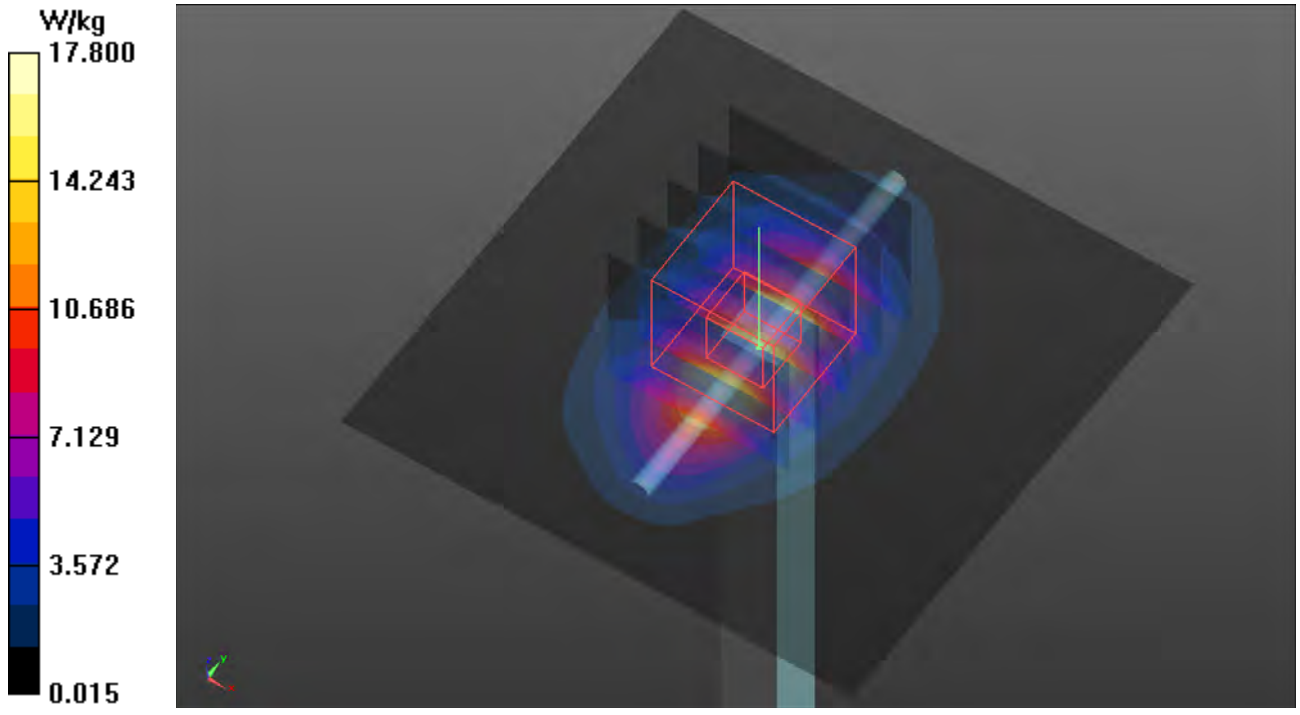
DUT: Dipole 1900 MHz; Type: D1900V2; SN: 5d036

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: H16T20N1_1023 Medium parameters used: f = 1900 MHz; σ = 1.459 S/m; ε_r = 40.615; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃ ； Liquid Temperature：23.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3971; ConvF(8.47, 8.47, 8.47); Calibrated: 2019/03/29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1431; Calibrated: 2019/03/25
- Phantom: ELI Phantom_2105; Type: QD OVA 004 Ax; Serial: 2105
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 17.8 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 102.2 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 20.4 W/kg
SAR(1 g) = 10.7 W/kg; SAR(10 g) = 5.56 W/kg
Maximum value of SAR (measured) = 16.8 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/01

System Check_H2450_191001

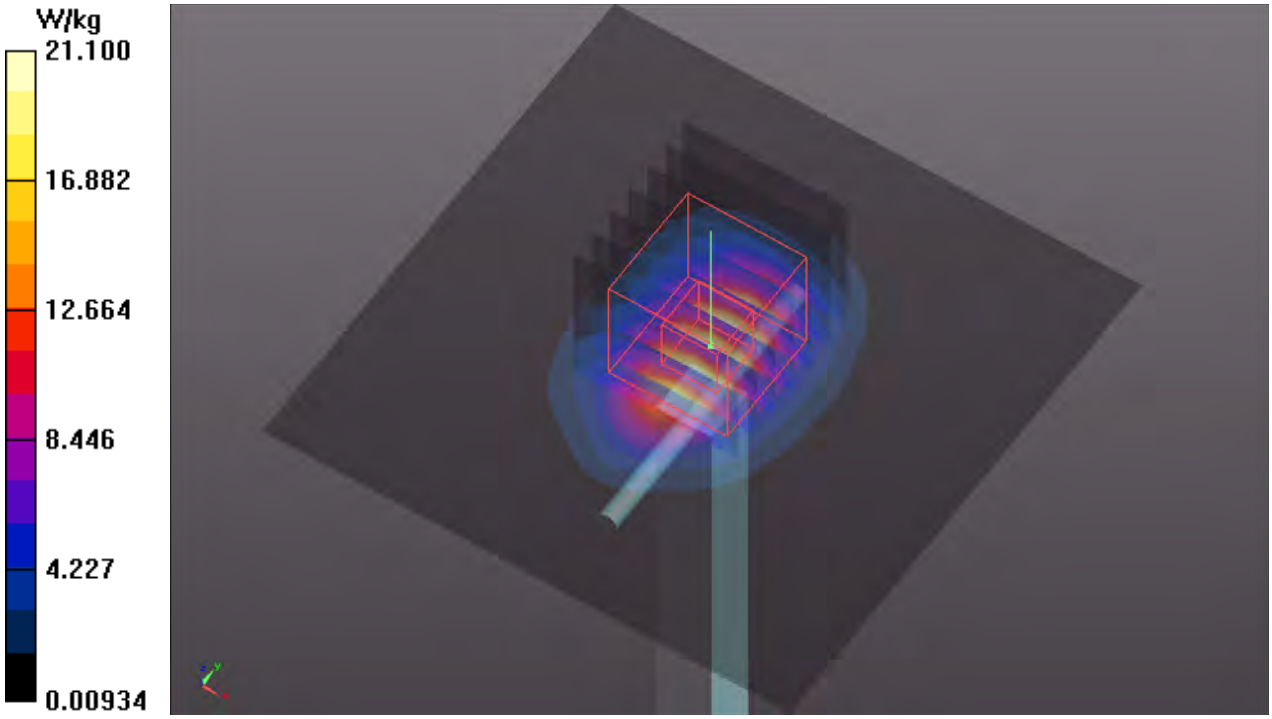
DUT: Dipole 2450 MHz; Type: D2450V2; SN: 737

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: H19T27N1_1001 Medium parameters used: f = 2450 MHz; σ = 1.87 S/m; ε_r = 38.896; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(7.64, 7.64, 7.64); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 21.1 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.5 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 26.4 W/kg
SAR(1 g) = 12.6 W/kg; SAR(10 g) = 5.81 W/kg
Maximum value of SAR (measured) = 21.3 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/22

System Check_H2600_191022

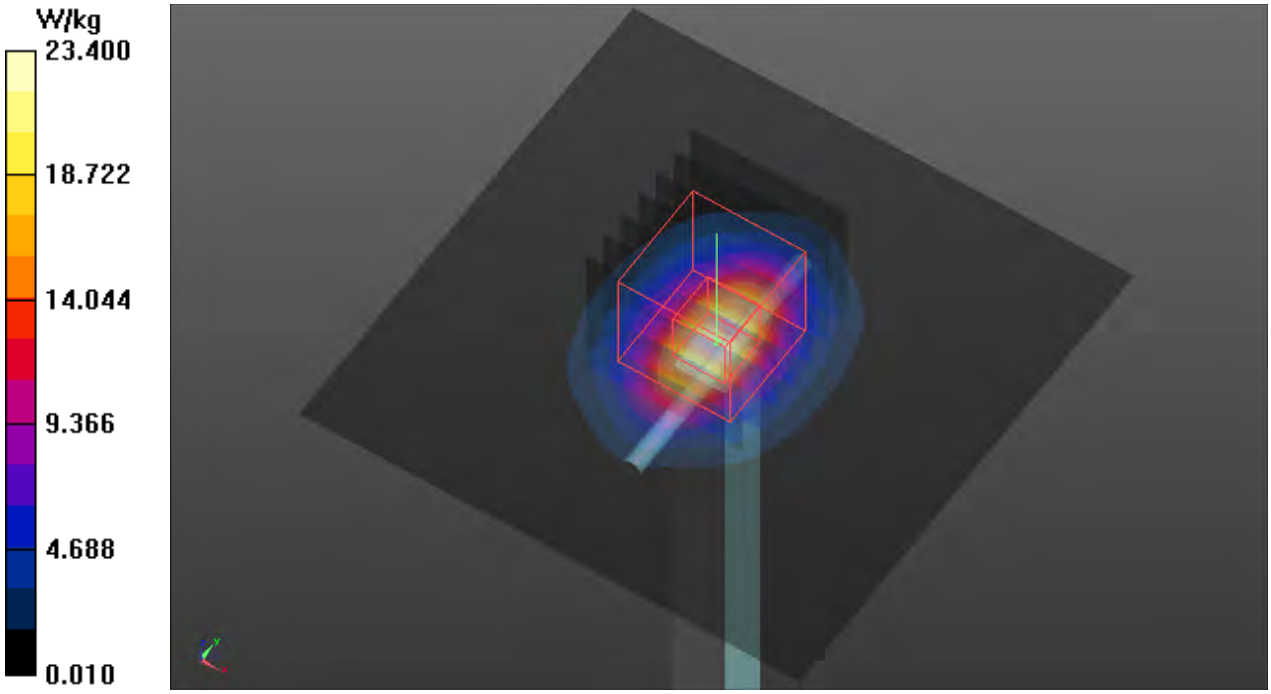
DUT: Dipole 2600 MHz; Type: D2600V2; SN: 1020

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: H19T27N3_1022 Medium parameters used: f = 2600 MHz; σ = 2.047 S/m; ε_r = 38.553; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃ ； Liquid Temperature：23.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7537; ConvF(7.19, 7.19, 7.19); Calibrated: 2019/06/18
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1585; Calibrated: 2019/06/07
- Phantom: ELI Phantom_1245; Type: QDOVA002AA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 23.4 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.4 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 29.2 W/kg
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.08 W/kg
Maximum value of SAR (measured) = 23.3 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/22

System Check_H5250_191022

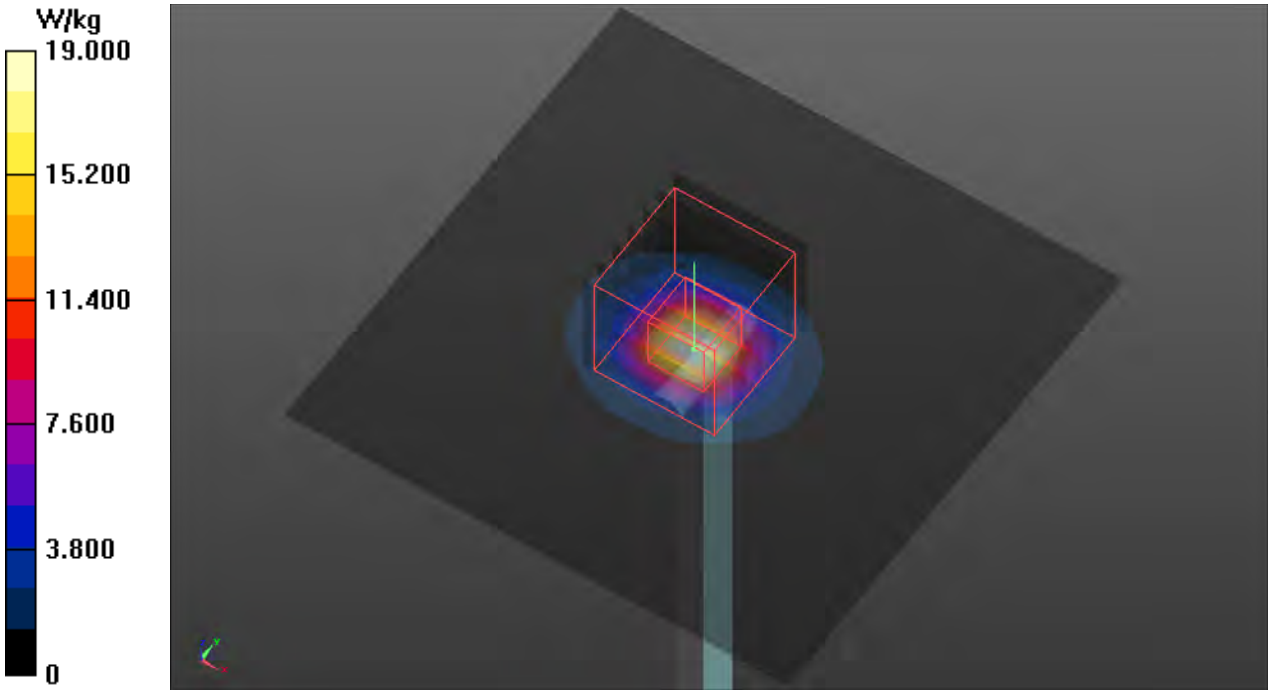
DUT: Dipole 5 GHz; Type: D5GHzV2; SN: 1019

Communication System: CW; Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: H34T60N1_1022 Medium parameters used: f = 5250 MHz; σ = 4.795 S/m; ε_r = 34.848; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃ ； Liquid Temperature：23.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7537; ConvF(5.36, 5.36, 5.36); Calibrated: 2019/06/18
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1585; Calibrated: 2019/06/07
- Phantom: ELI Phantom_1245; Type: QDOVA002AA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.0 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 71.59 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 35.7 W/kg
SAR(1 g) = 8.29 W/kg; SAR(10 g) = 2.38 W/kg
Maximum value of SAR (measured) = 21.1 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/01

System Check_H5600_191001

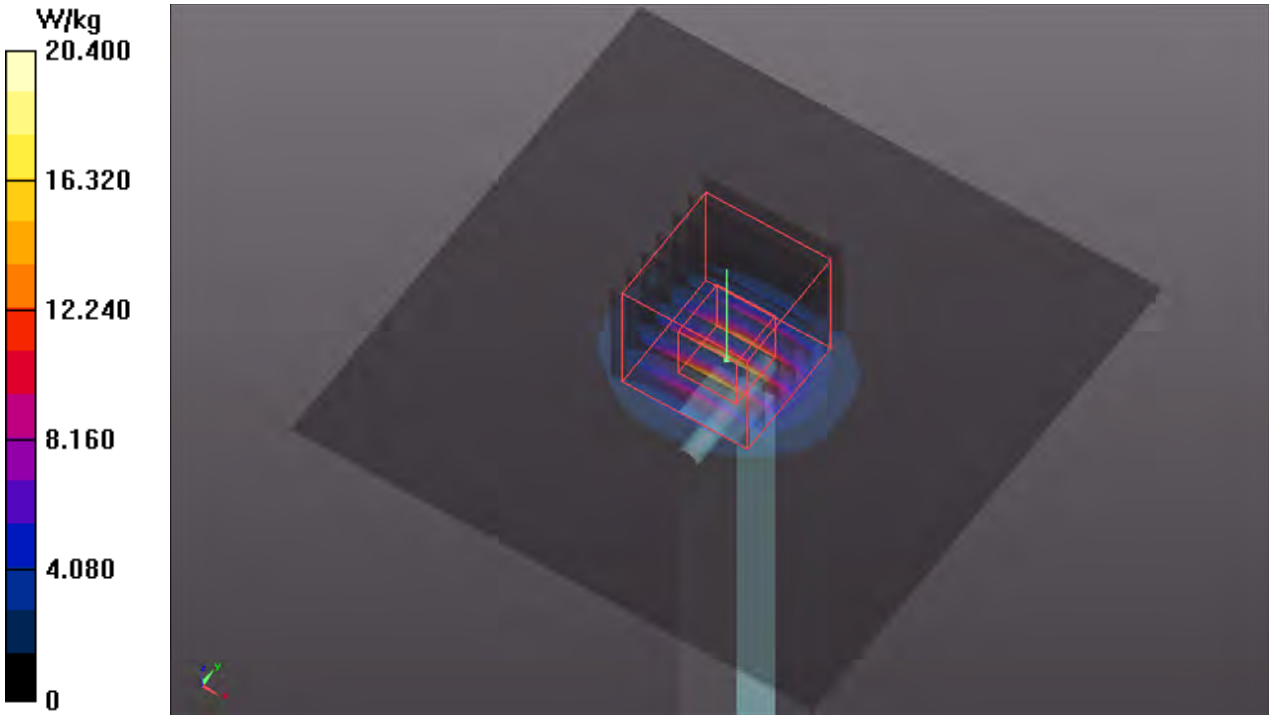
DUT: Dipole 5 GHz; Type: D5GHzV2; SN: 1019

Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: H34T60N1_1001 Medium parameters used: f = 5600 MHz; σ = 4.895 S/m; ε_r = 34.558; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(4.69, 4.69, 4.69); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 20.4 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 73.75 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 37.6 W/kg
SAR(1 g) = 8.25 W/kg; SAR(10 g) = 2.35 W/kg
Maximum value of SAR (measured) = 21.5 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/22

System Check_H5750_191022

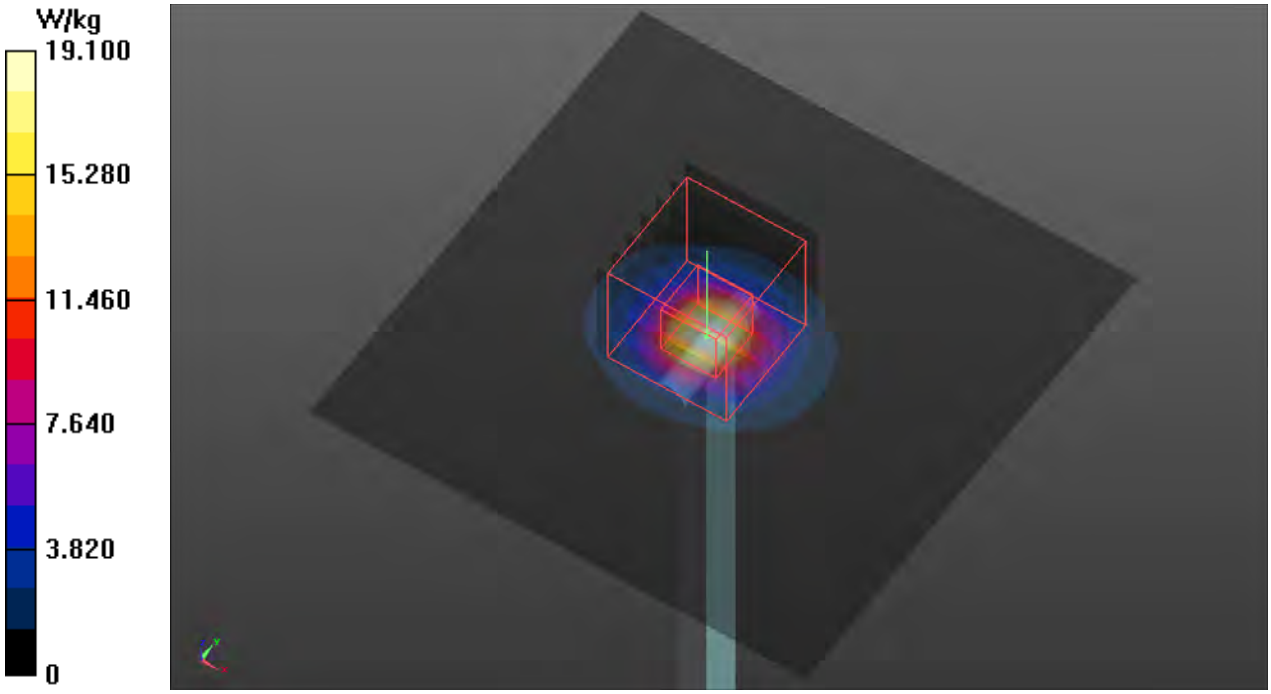
DUT: Dipole 5 GHz; Type: D5GHzV2; SN: 1019

Communication System: CW; Frequency: 5750 MHz;Duty Cycle: 1:1
Medium: H34T60N1_1022 Medium parameters used: f = 5750 MHz; σ = 5.265 S/m; ε_r = 34.136; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃ ； Liquid Temperature：23.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7537; ConvF(4.99, 4.99, 4.99); Calibrated: 2019/06/18
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1585; Calibrated: 2019/06/07
- Phantom: ELI Phantom_1245; Type: QDOVA002AA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.1 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 56.42 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 35.4 W/kg
SAR(1 g) = 7.67 W/kg; SAR(10 g) = 2.2 W/kg
Maximum value of SAR (measured) = 20.1 W/kg



Appendix B. SAR Plots of SAR Measurement

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

Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/23

P01 WCDMA II_RMC12.2K_Right Side_0mm_Ch9262

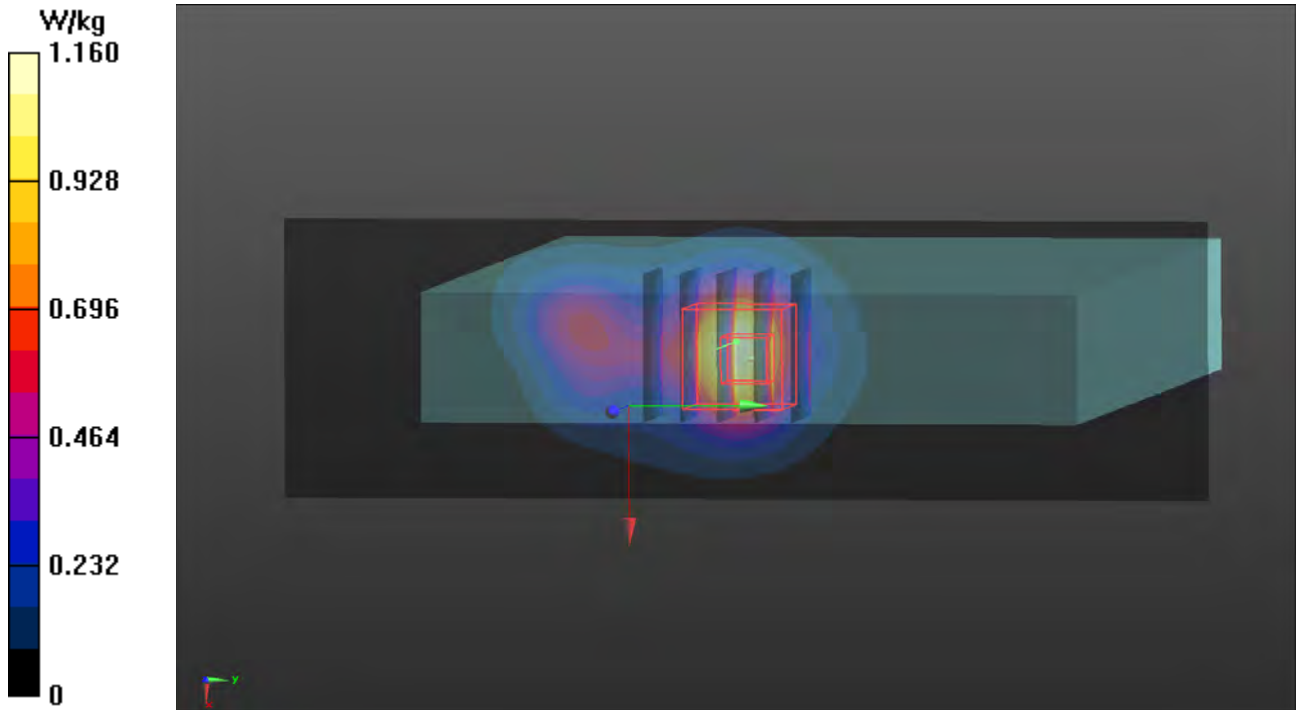
DUT: 190808C21

Communication System: WCDMA; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: H16T20N1_1023 Medium parameters used: f = 1852.4 MHz; σ = 1.424 S/m; ε_r = 40.645; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃ ； Liquid Temperature：23.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3971; ConvF(8.47, 8.47, 8.47); Calibrated: 2019/03/29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1431; Calibrated: 2019/03/25
- Phantom: ELI Phantom_2105; Type: QD OVA 004 Ax; Serial: 2105
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

- Area Scan (41x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.16 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.06 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.512 W/kg
Maximum value of SAR (measured) = 1.38 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/02

P02 WCDMA IV_RMC12.2K_Right Side_16mm_Ch1312

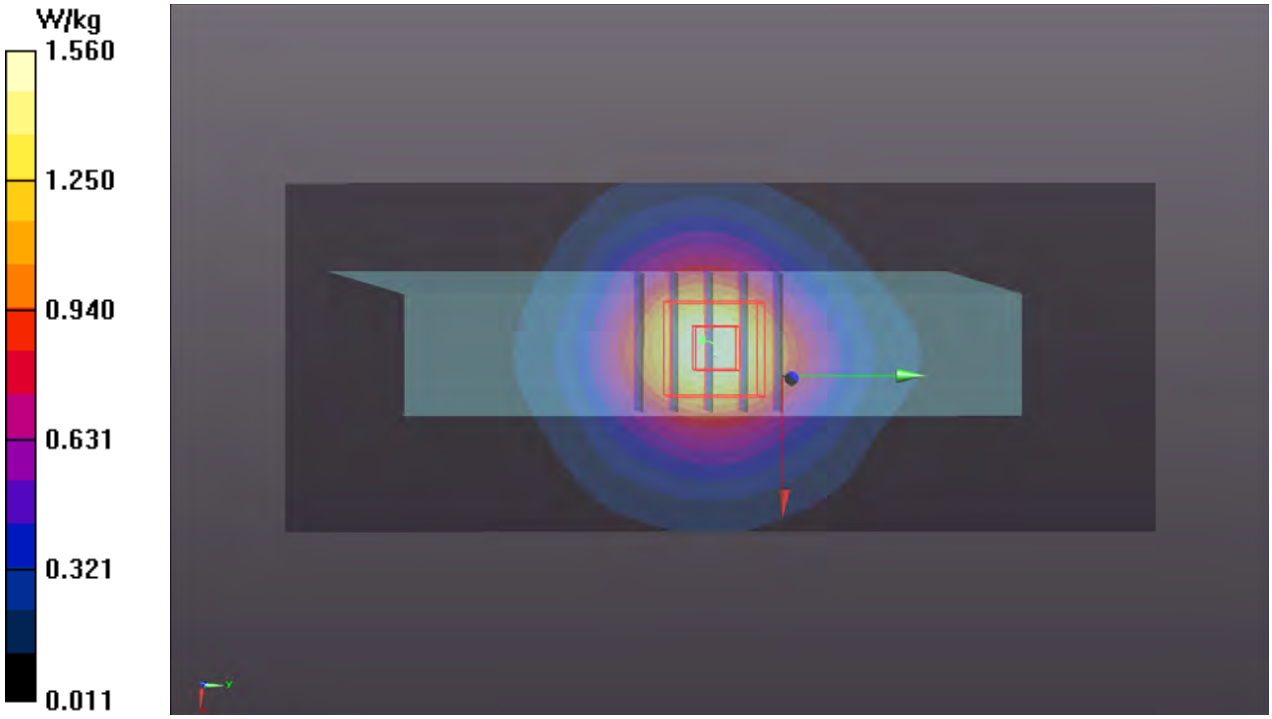
DUT: 190808C21

Communication System: WCDMA; Frequency: 1712.4 MHz;Duty Cycle: 1:1
Medium: H16T20N1_1002 Medium parameters used: f = 1712.4 MHz; σ = 1.29 S/m; ε_r = 39.115; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(8.58, 8.58, 8.58); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

- Area Scan (61x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.56 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.30 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.73 W/kg
SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.660 W/kg
Maximum value of SAR (measured) = 1.49 W/kg



P03 WCDMA V_RMC12.2K_Right Side_0mm_Ch4233

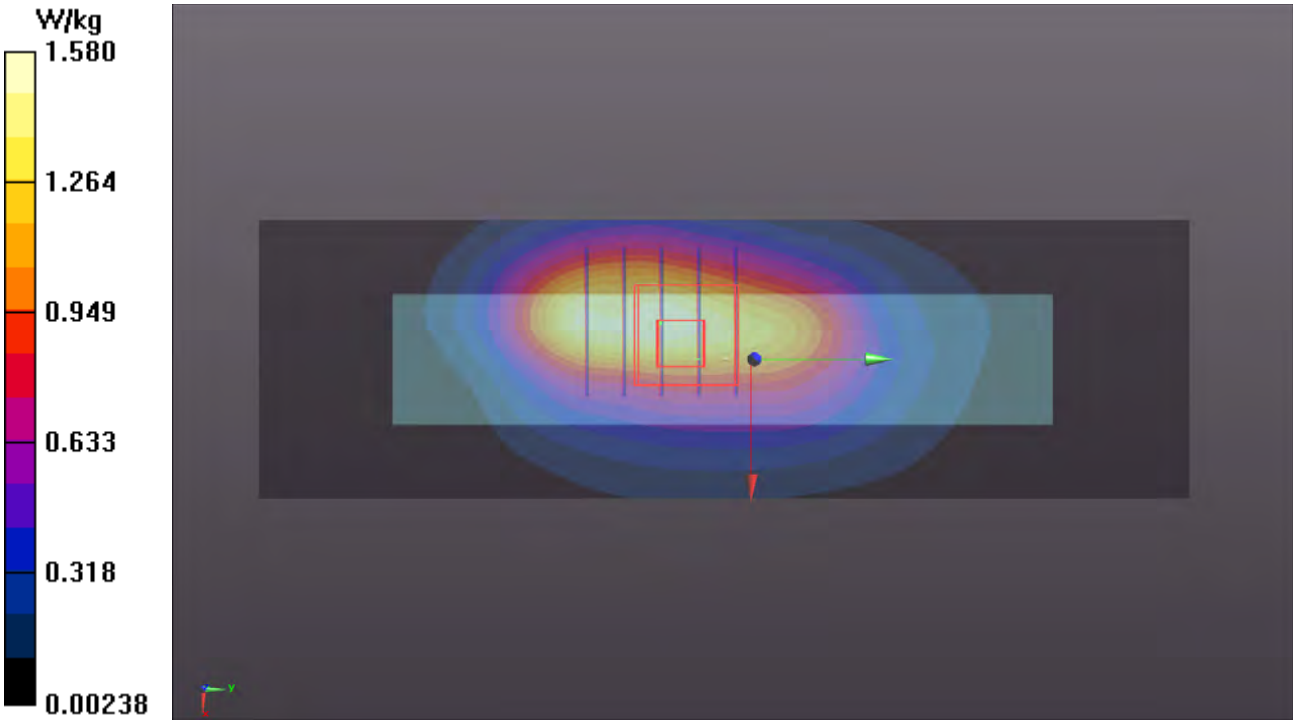
DUT: 190808C21

Communication System: WCDMA; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: H07T10N1_1024 Medium parameters used: f = 847 MHz; σ = 0.93 S/m; ε_r = 41.898; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7472; ConvF(10.18, 10.18, 10.18); Calibrated: 2019/08/30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2019/08/27
- Phantom: ELI Phantom_1043; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

- Area Scan (41x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.58 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.52 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.83 W/kg
SAR(1 g) = 1.18 W/kg; SAR(10 g) = 0.756 W/kg
Maximum value of SAR (measured) = 1.53 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/23

P04 LTE 2_QPSK20M_Right Side_0mm_Ch18700_1RB_OS0

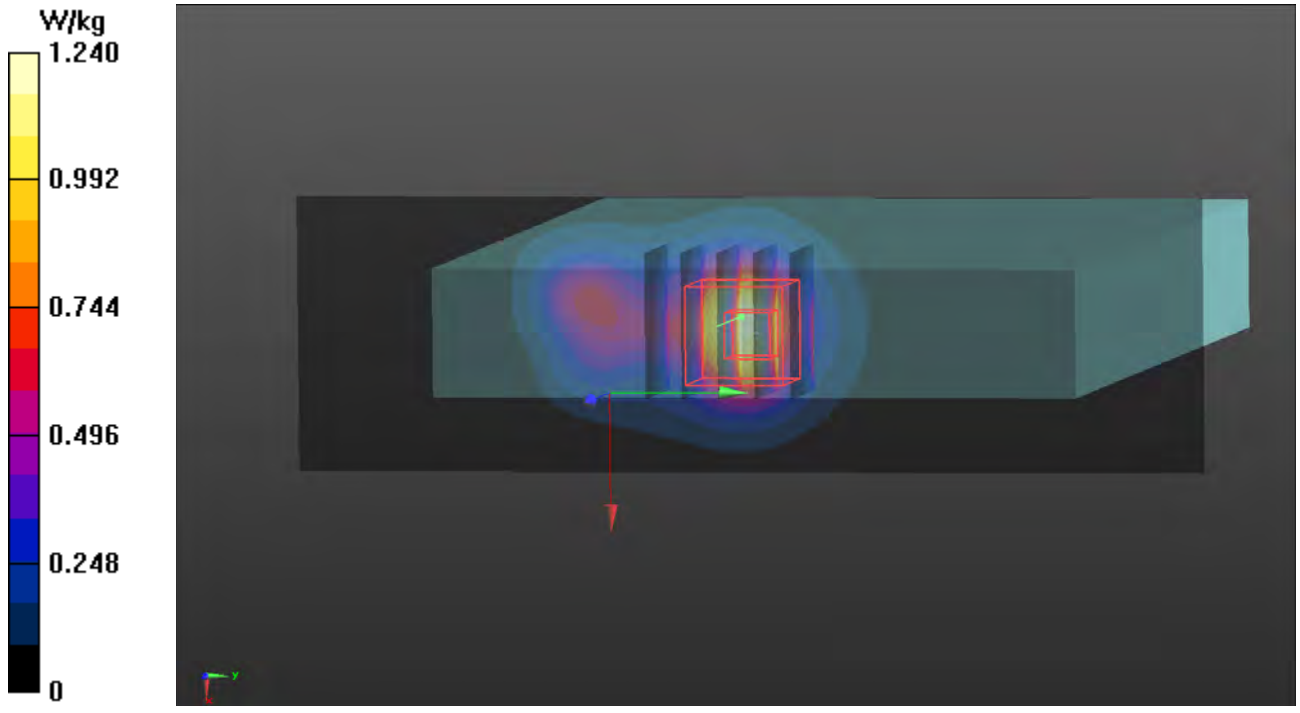
DUT: 190808C21

Communication System: LTE; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: H16T20N1_1023 Medium parameters used: f = 1860 MHz; σ = 1.431 S/m; ε_r = 40.632; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃ ； Liquid Temperature：23.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3971; ConvF(8.47, 8.47, 8.47); Calibrated: 2019/03/29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1431; Calibrated: 2019/03/25
- Phantom: ELI Phantom_2105; Type: QD OVA 004 Ax; Serial: 2105
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

- Area Scan (41x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.24 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.76 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.98 W/kg
SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.545 W/kg
Maximum value of SAR (measured) = 1.45 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/23

P05 LTE 4_QPSK20M_Right Side_0mm_Ch20050_1RB_OS0

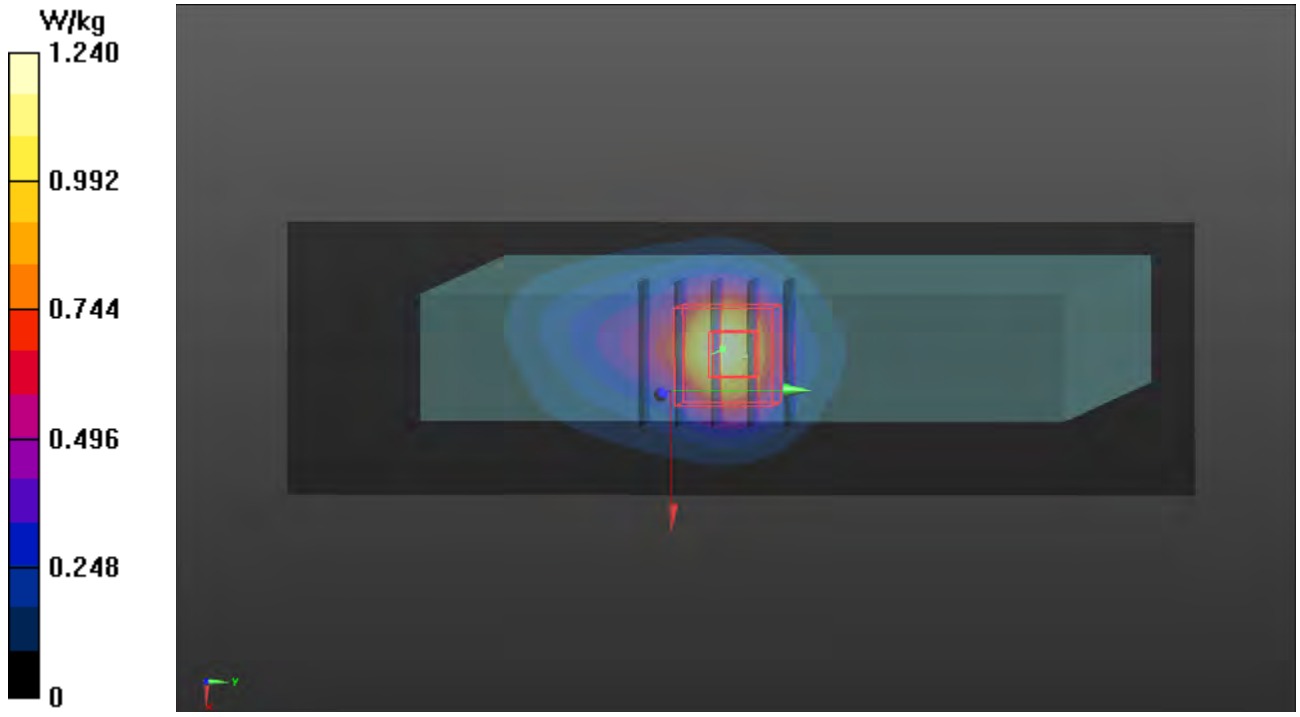
DUT: 190808C21

Communication System: LTE; Frequency: 1720 MHz;Duty Cycle: 1:1
Medium: H16T20N1_1023 Medium parameters used: f = 1720 MHz; σ = 1.314 S/m; ε_r = 41.164; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃ ； Liquid Temperature：23.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3971; ConvF(8.8, 8.8, 8.8); Calibrated: 2019/03/29
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1431; Calibrated: 2019/03/25
- Phantom: ELI Phantom_2105; Type: QD OVA 004 Ax; Serial: 2105
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

- Area Scan (41x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.24 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.27 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.66 W/kg
SAR(1 g) = 0.975 W/kg; SAR(10 g) = 0.509 W/kg
Maximum value of SAR (measured) = 1.37 W/kg



P06 LTE 5_QPSK10M_Right side_0mm_Ch20600_1RB_OS0

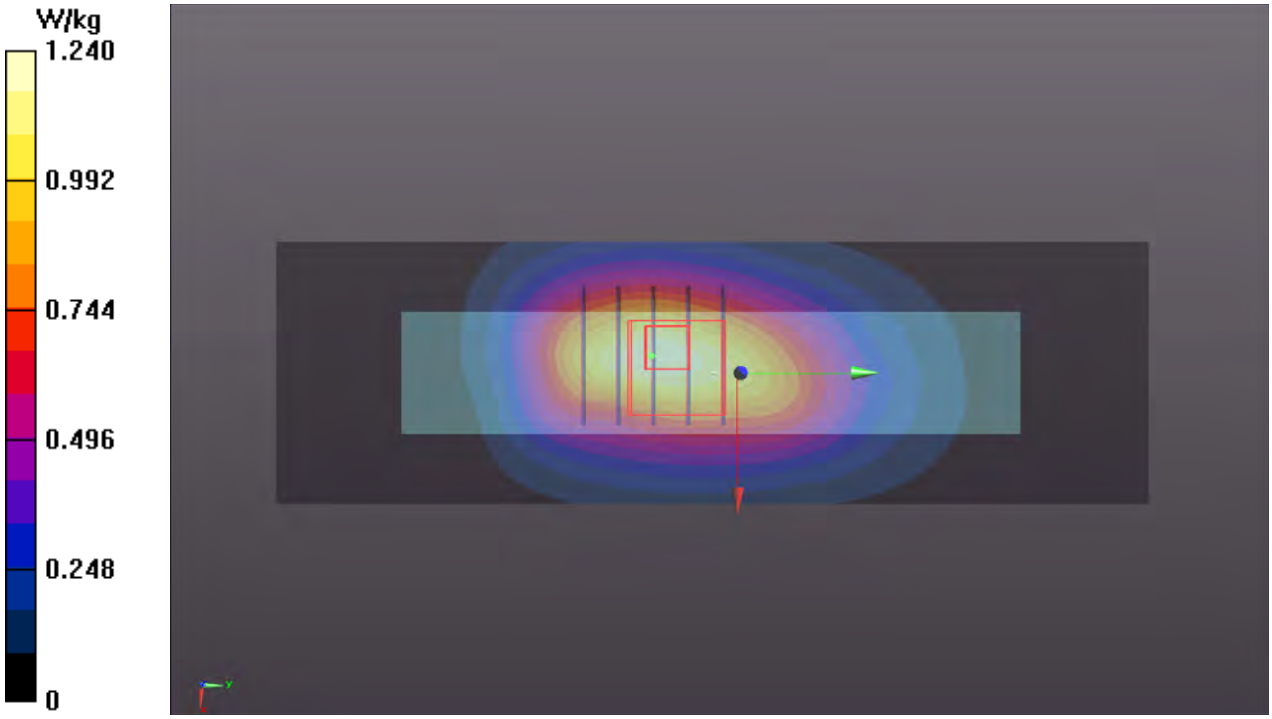
DUT: 190808C21

Communication System: LTE; Frequency: 844 MHz;Duty Cycle: 1:1
Medium: H07T10N1_0924 Medium parameters used: f = 844 MHz; σ = 0.924 S/m; ε_r = 42.85; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(10.13, 10.13, 10.13); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

- Area Scan (41x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.24 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.21 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.82 W/kg
SAR(1 g) = 0.904 W/kg; SAR(10 g) = 0.527 W/kg
Maximum value of SAR (measured) = 1.16 W/kg



P07 LTE 7_QPSK20M_Right Side_0mm_Ch21350_1RB_OS0

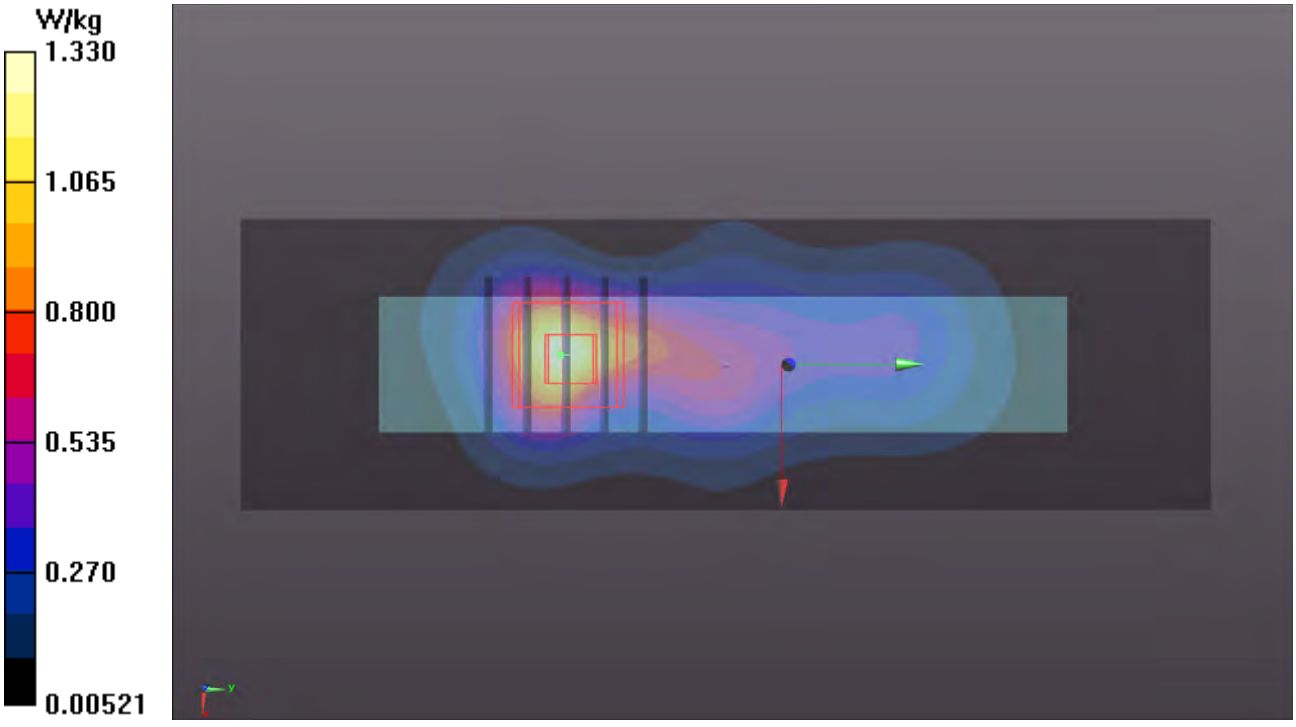
DUT: 190808C21

Communication System: LTE; Frequency: 2560 MHz;Duty Cycle: 1:1
Medium: H19T27N1_1024 Medium parameters used: f = 2560 MHz; σ = 1.976 S/m; ε_r = 37.417; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7472; ConvF(7.64, 7.64, 7.64); Calibrated: 2019/08/30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2019/08/27
- Phantom: ELI Phantom_1043; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

- Area Scan (51x171x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.33 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.38 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 2.02 W/kg
SAR(1 g) = 0.937 W/kg; SAR(10 g) = 0.424 W/kg
Maximum value of SAR (measured) = 1.55 W/kg



P08 LTE 12_QPSK10M_Right Side_0mm_Ch23095_1RB_OS0

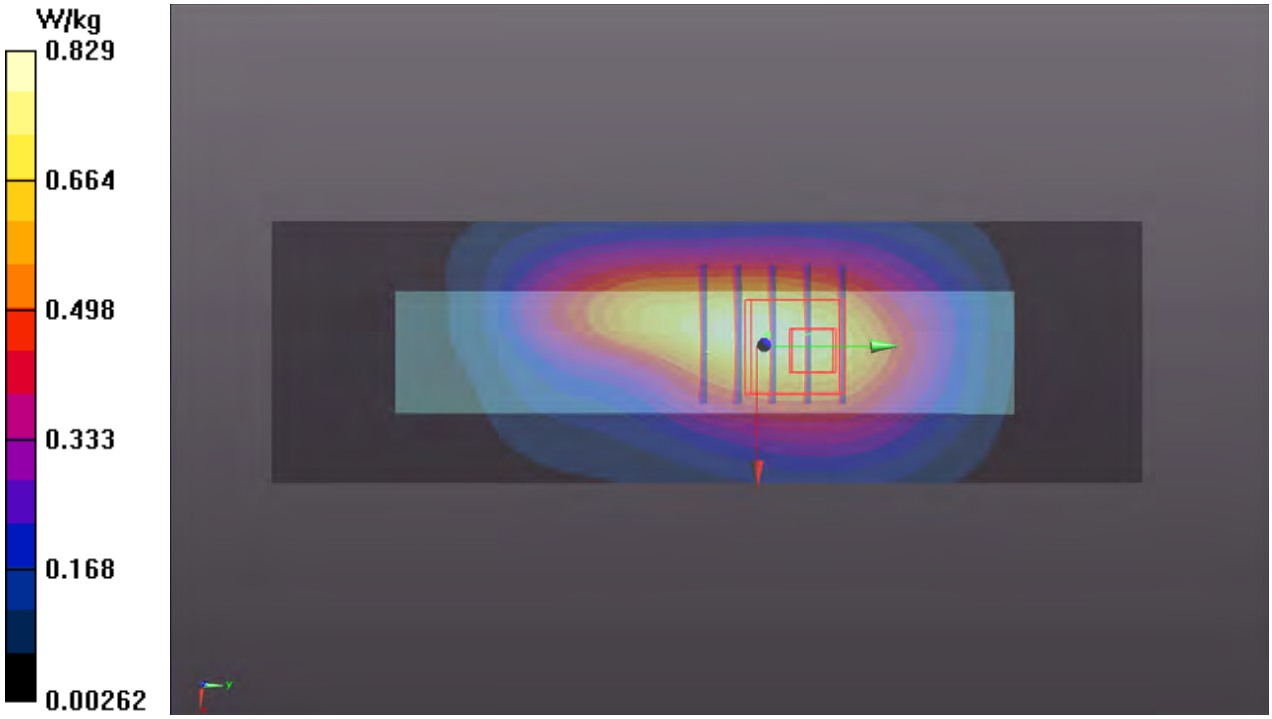
DUT: 190808C21

Communication System: LTE; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: H06T09N1_0924 Medium parameters used: f = 707.5 MHz; σ = 0.854 S/m; ε_r = 42.95; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(10.35, 10.35, 10.35); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

- Area Scan (41x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.829 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.38 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.742 W/kg; SAR(10 g) = 0.439 W/kg
Maximum value of SAR (measured) = 1.05 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/09/24

P09 LTE 13_QPSK10M_Right Side_0mm_Ch23230_1RB_OS0

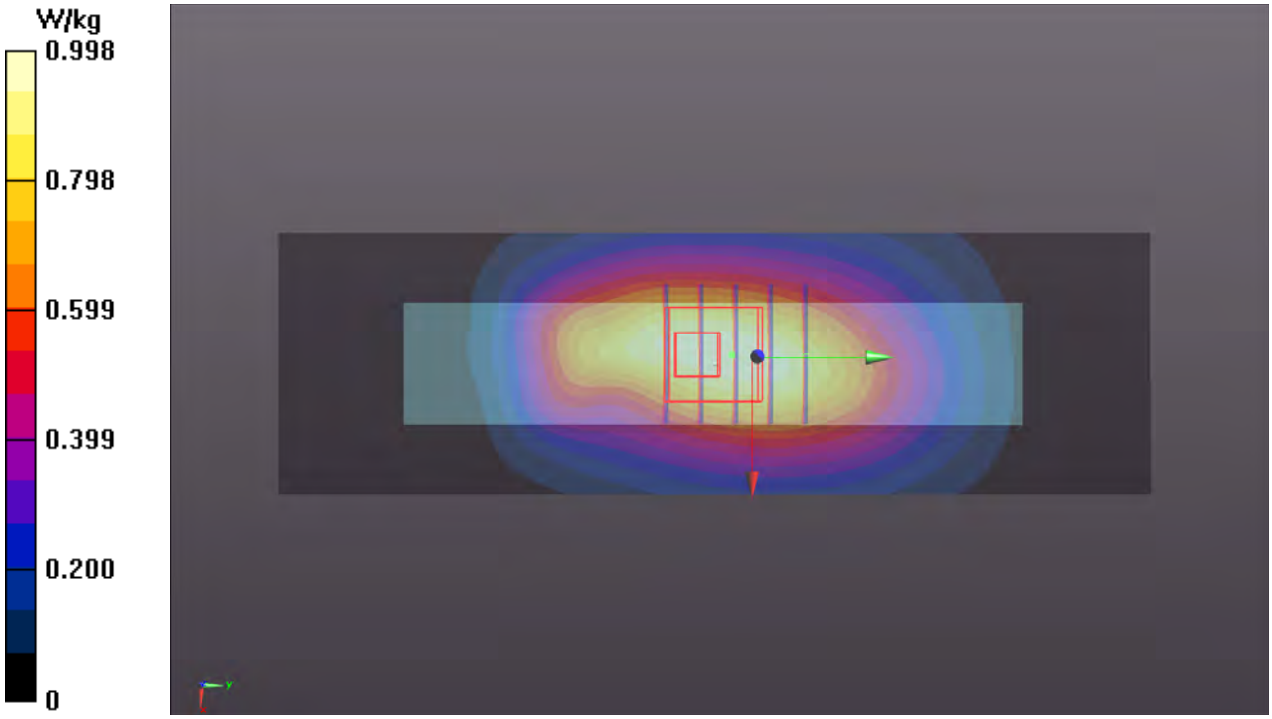
DUT: 190808C21

Communication System: LTE; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: H06T09N1_0924 Medium parameters used: f = 782 MHz; σ = 0.931 S/m; ε_r = 42.287; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(10.35, 10.35, 10.35); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

- Area Scan (41x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.998 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.96 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.859 W/kg; SAR(10 g) = 0.579 W/kg
Maximum value of SAR (measured) = 1.16 W/kg



P10 LTE 25_QPSK20M_Right Side_0mm_Ch26140_1RB_OS0

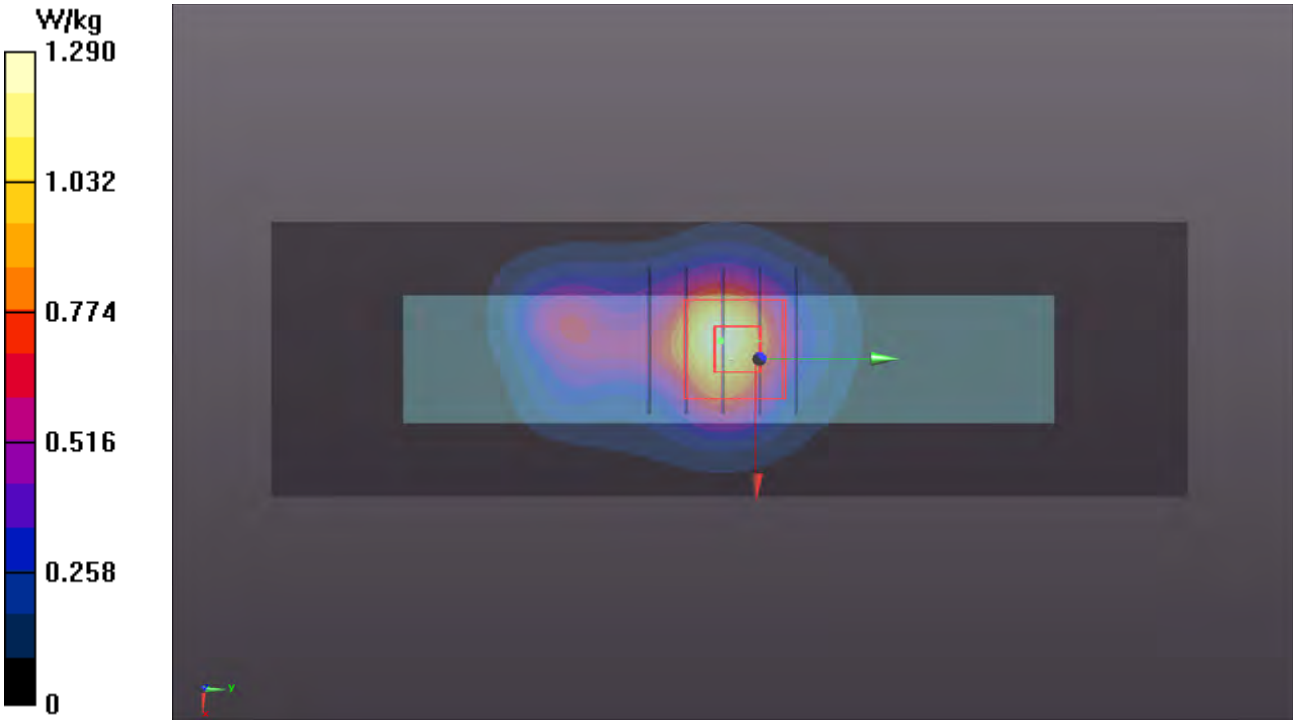
DUT: 190808C21

Communication System: LTE; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: H16T20N1_1024 Medium parameters used: f = 1860 MHz; σ = 1.424 S/m; ε_r = 39.708; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7472; ConvF(8.34, 8.34, 8.34); Calibrated: 2019/08/30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2019/08/27
- Phantom: ELI Phantom_1043; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

- Area Scan (41x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.29 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.27 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.87 W/kg
SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.510 W/kg
Maximum value of SAR (measured) = 1.45 W/kg



P11 LTE 26_QPSK15M_Right Side_0mm_Ch26965_1RB_OS0

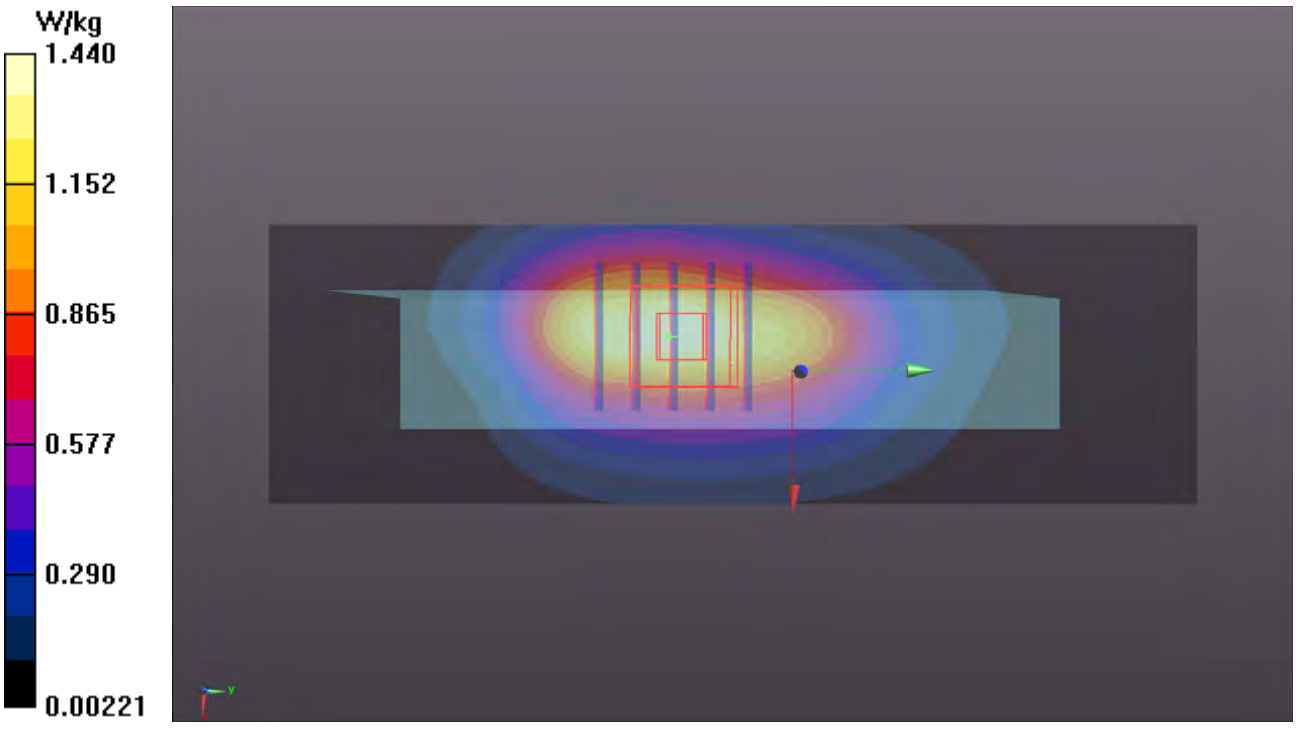
DUT: 190808C21

Communication System: LTE; Frequency: 841.5 MHz;Duty Cycle: 1:1
Medium: H07T10N1_1024 Medium parameters used: f = 841.5 MHz; σ = 0.925 S/m; ε_r = 41.956; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7472; ConvF(10.18, 10.18, 10.18); Calibrated: 2019/08/30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2019/08/27
- Phantom: ELI Phantom_1043; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

- Area Scan (41x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.44 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.381 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.78 W/kg
SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.744 W/kg
Maximum value of SAR (measured) = 1.57 W/kg



P12 LTE 41_QPSK20M_Right Side_0mm_Ch40185_1RB_OS0

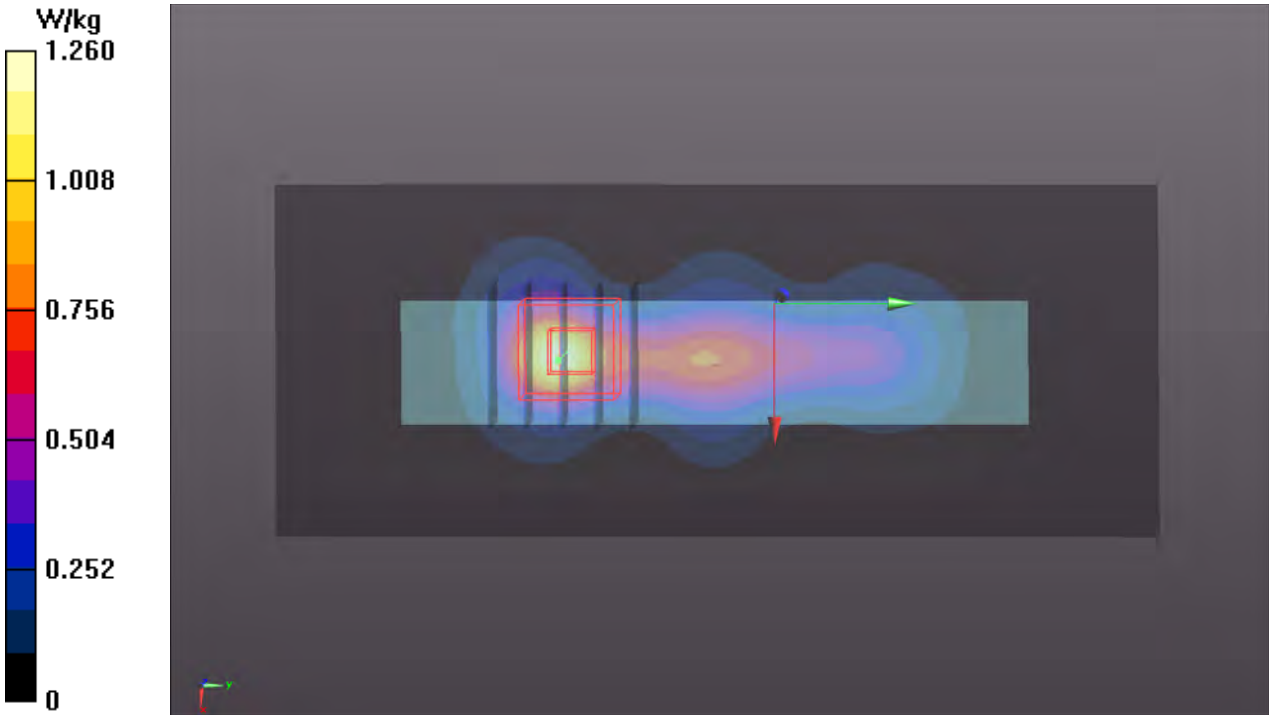
DUT: 190808C21

Communication System: LTE TDD CF0; Frequency: 2549.5 MHz;Duty Cycle: 1:1.58
Medium: H19T27N1_0924 Medium parameters used: f = 2550 MHz; σ = 1.928 S/m; ε_r = 38.099; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(7.42, 7.42, 7.42); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

- Area Scan (71x171x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.26 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.01 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.68 W/kg
SAR(1 g) = 0.778 W/kg; SAR(10 g) = 0.343 W/kg
Maximum value of SAR (measured) = 1.24 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/01

P13 WLAN2.4G_802.11b_Left Side_0mm_Ch11

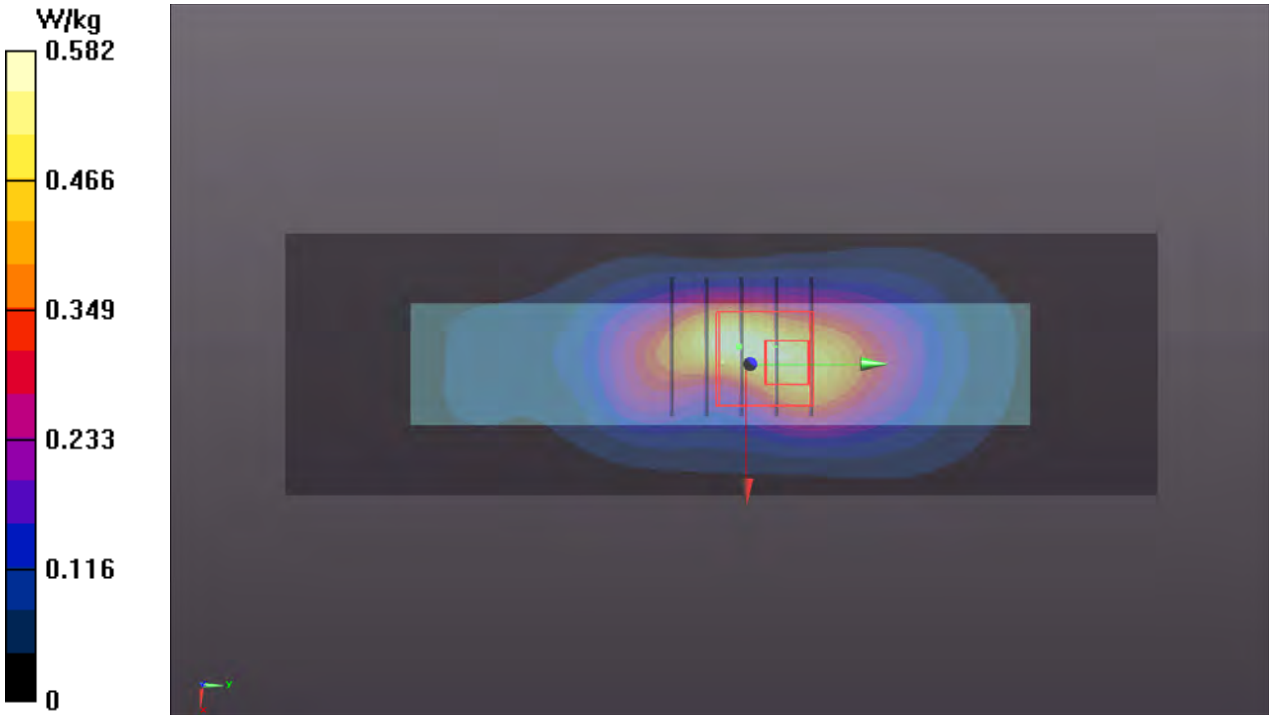
DUT: 190828C21

Communication System: WLAN_2.4G; Frequency: 2462 MHz;Duty Cycle: 1:1.01
Medium: H19T27N1_1001 Medium parameters used: f = 2462 MHz; σ = 1.884 S/m; ε_r = 38.866; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(7.64, 7.64, 7.64); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

- Area Scan (51x171x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.582 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.14 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.539 W/kg; SAR(10 g) = 0.221 W/kg
Maximum value of SAR (measured) = 0.821 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/01

P14 WLAN5.3G_802.11a_Left Side_0mm_Ch64

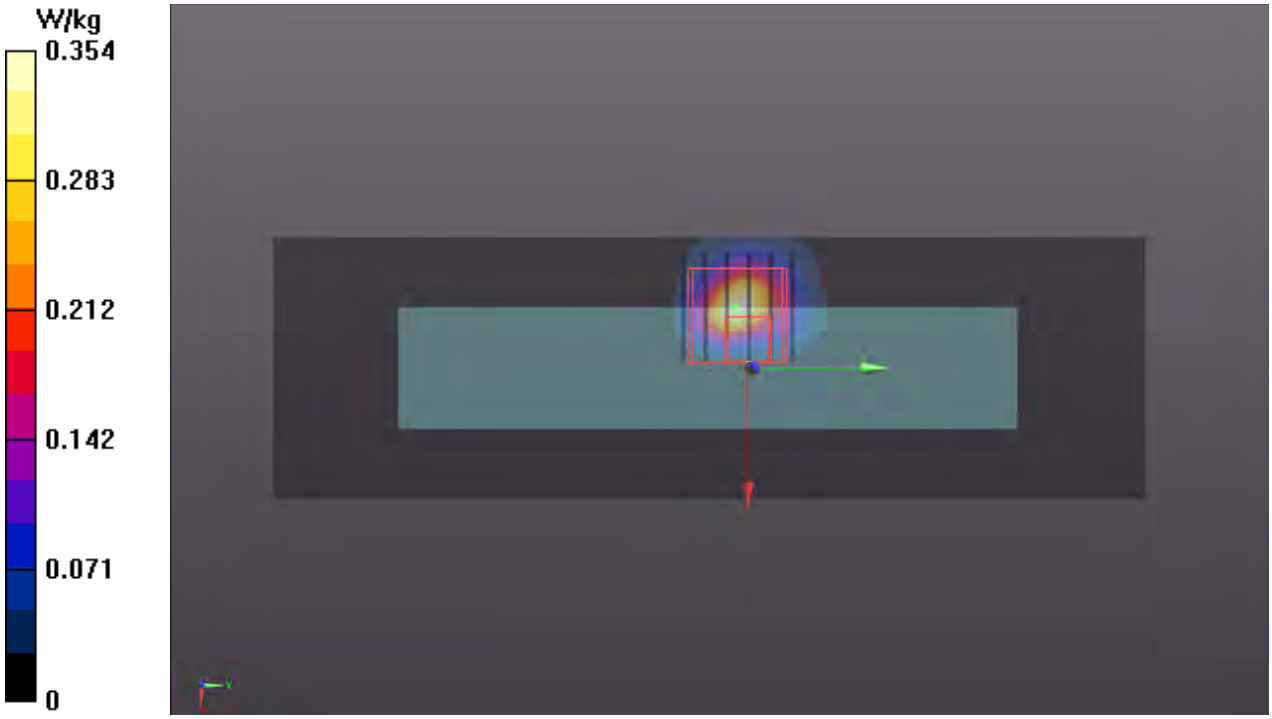
DUT: 190828C21

Communication System: WLAN_5G; Frequency: 5320 MHz;Duty Cycle: 1:1.07
Medium: H34T60N1_1001 Medium parameters used: f = 5320 MHz; σ = 4.64 S/m; ε_r = 34.891; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(5.29, 5.29, 5.29); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

- Area Scan (61x201x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.354 W/kg

- Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 7.253 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.690 W/kg
SAR(1 g) = 0.125 W/kg; SAR(10 g) = 0.035 W/kg
Maximum value of SAR (measured) = 0.313 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/01

P15 WLAN5.6G_802.11a_Left Side_0mm_Ch132

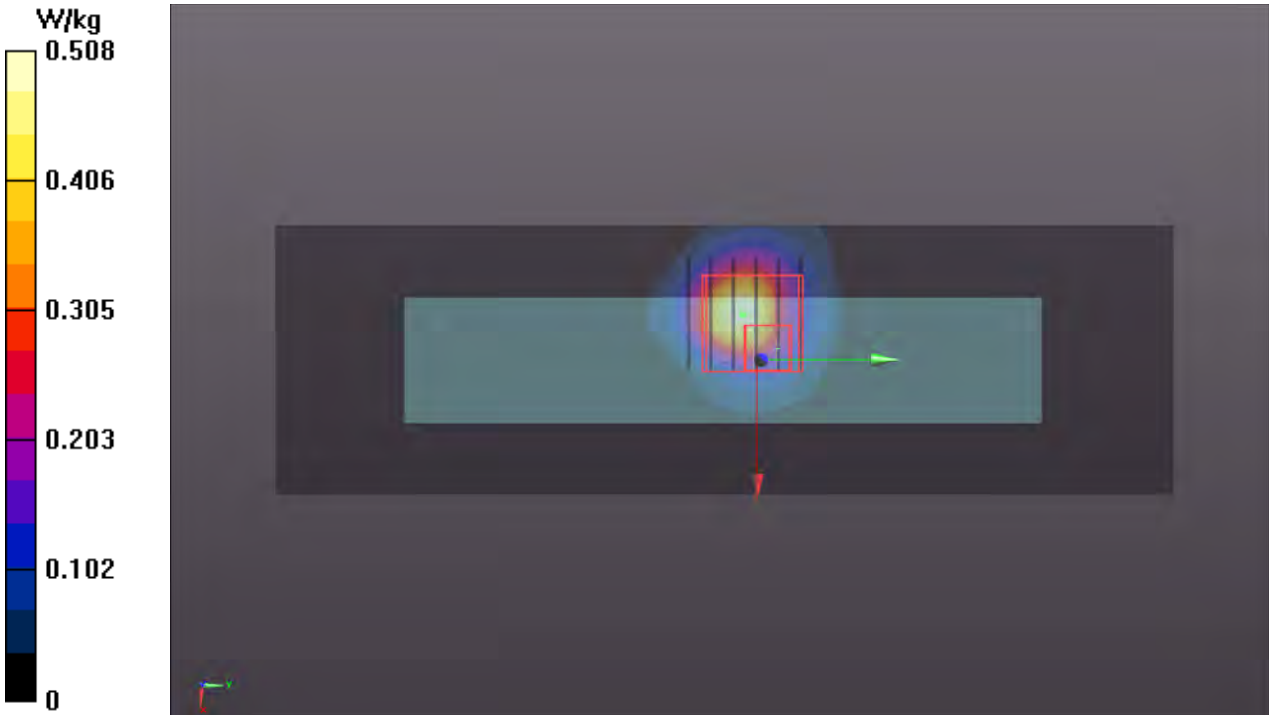
DUT: 190828C21

Communication System: WLAN_5G; Frequency: 5660 MHz;Duty Cycle: 1:1.07
Medium: H34T60N1_1001 Medium parameters used: f = 5660 MHz; σ = 4.954 S/m; ε_r = 34.479; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(4.69, 4.69, 4.69); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

- Area Scan (61x201x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.508 W/kg

- Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 10.71 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.286 W/kg; SAR(10 g) = 0.090 W/kg
Maximum value of SAR (measured) = 0.740 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/01

P16 WLAN5.8G_802.11a_Left Side_0mm_Ch157

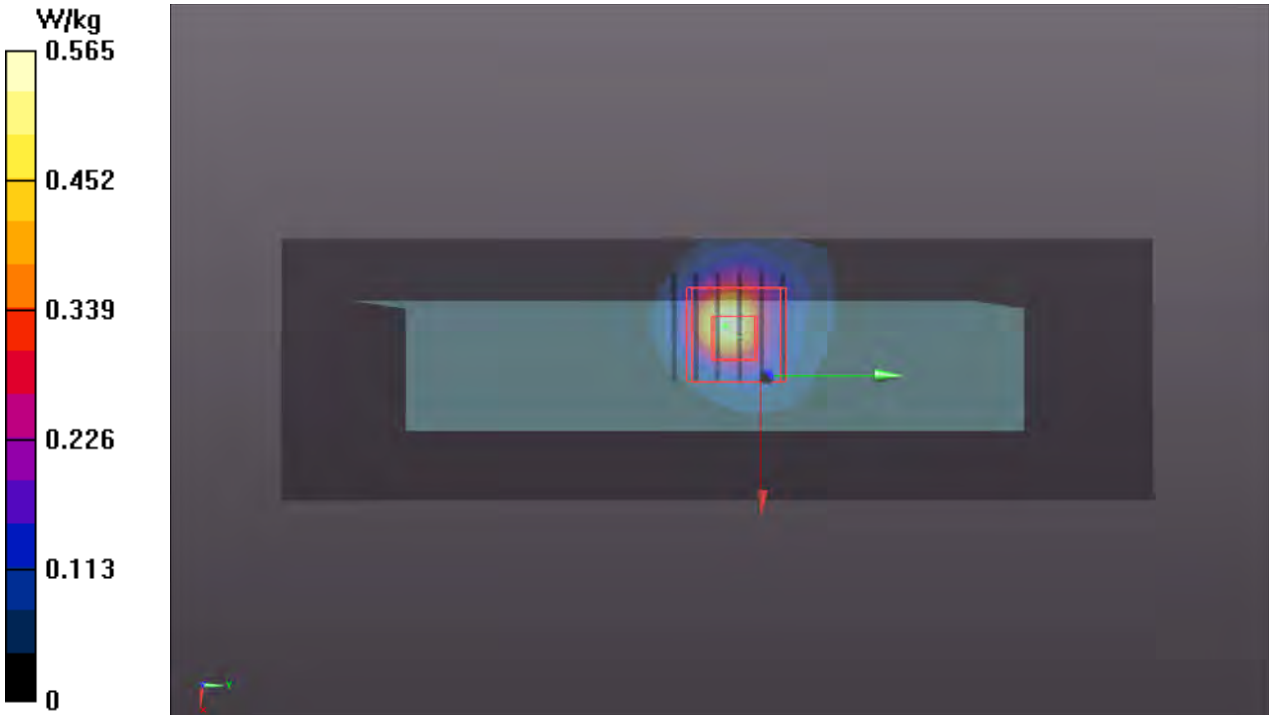
DUT: 190828C21

Communication System: WLAN_5G; Frequency: 5785 MHz;Duty Cycle: 1:1.07
Medium: H34T60N1_1001 Medium parameters used: f = 5785 MHz; σ = 5.072 S/m; ε_r = 34.326; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃ ； Liquid Temperature：23.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7375; ConvF(4.85, 4.85, 4.85); Calibrated: 2018/12/13
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2019/01/24
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

- Area Scan (61x201x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.565 W/kg

- Zoom Scan (6x6x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 11.26 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.954 W/kg
SAR(1 g) = 0.239 W/kg; SAR(10 g) = 0.080 W/kg
Maximum value of SAR (measured) = 0.616 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2019/10/22

P17 BT_LE_Left Side_0mm_Ch0

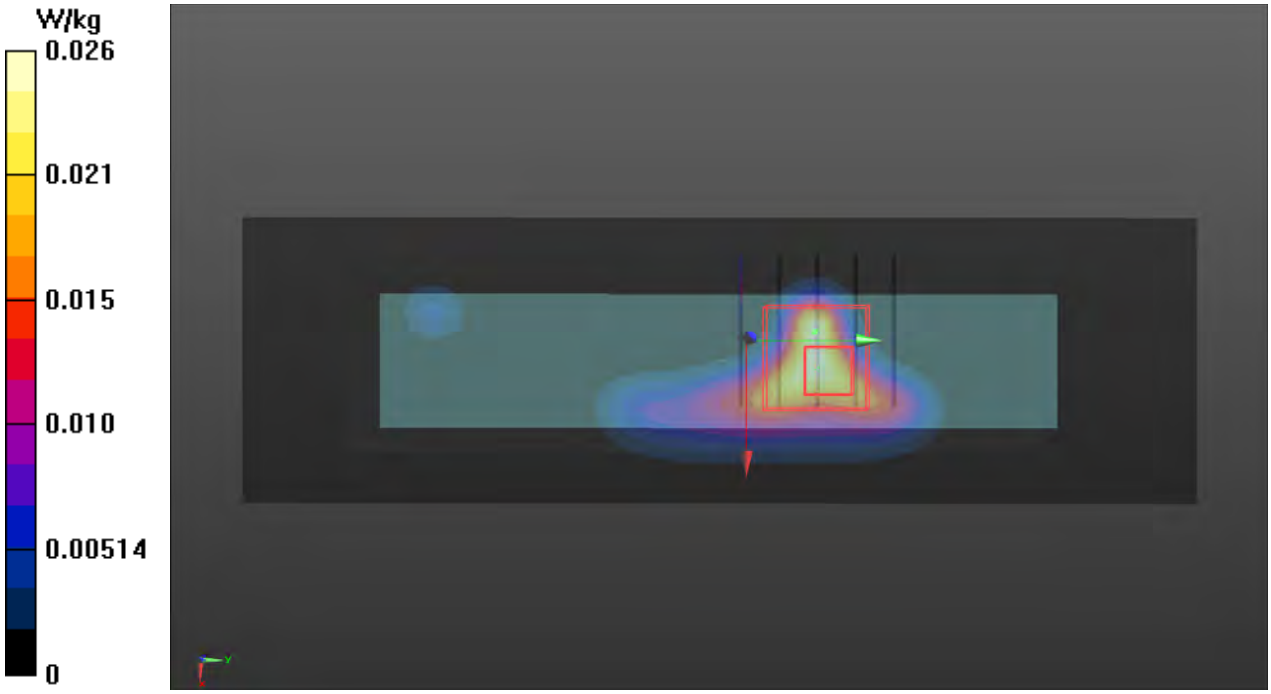
DUT: 190808C21

Communication System: BT; Frequency: 2402 MHz;Duty Cycle: 1:1.41
Medium: H19T27N3_1022 Medium parameters used: f = 2402 MHz; σ = 1.814 S/m; ε_r = 39.286; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃ ； Liquid Temperature：23.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN7537; ConvF(7.39, 7.39, 7.39); Calibrated: 2019/06/18
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1585; Calibrated: 2019/06/07
- Phantom: ELI Phantom_1245; Type: QDOVA002AA;
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

- Area Scan (51x171x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0257 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.346 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.0860 W/kg
SAR(1 g) = 0.012 W/kg; SAR(10 g) = 0.00239 W/kg
Maximum value of SAR (measured) = 0.0568 W/kg



Appendix C. Calibration Certificate for Probe and Dipole

The SPEAG calibration certificates are shown as follows.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **B.V. ADT (Auden)** **Certificate No: D750V3-1013_Aug19**

CALIBRATION CERTIFICATE

Object D750V3 - SN:1013

Calibration procedure(s) QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: August 23, 2019

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 (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	29-May-19 (No. EX3-7349_May19)	May-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 23, 2019

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.7 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.56 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.62 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.7 Ω - 0.2 jΩ
Return Loss	- 28.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.034 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 23.08.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1013

Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.9 S/m; ε_r = 42.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

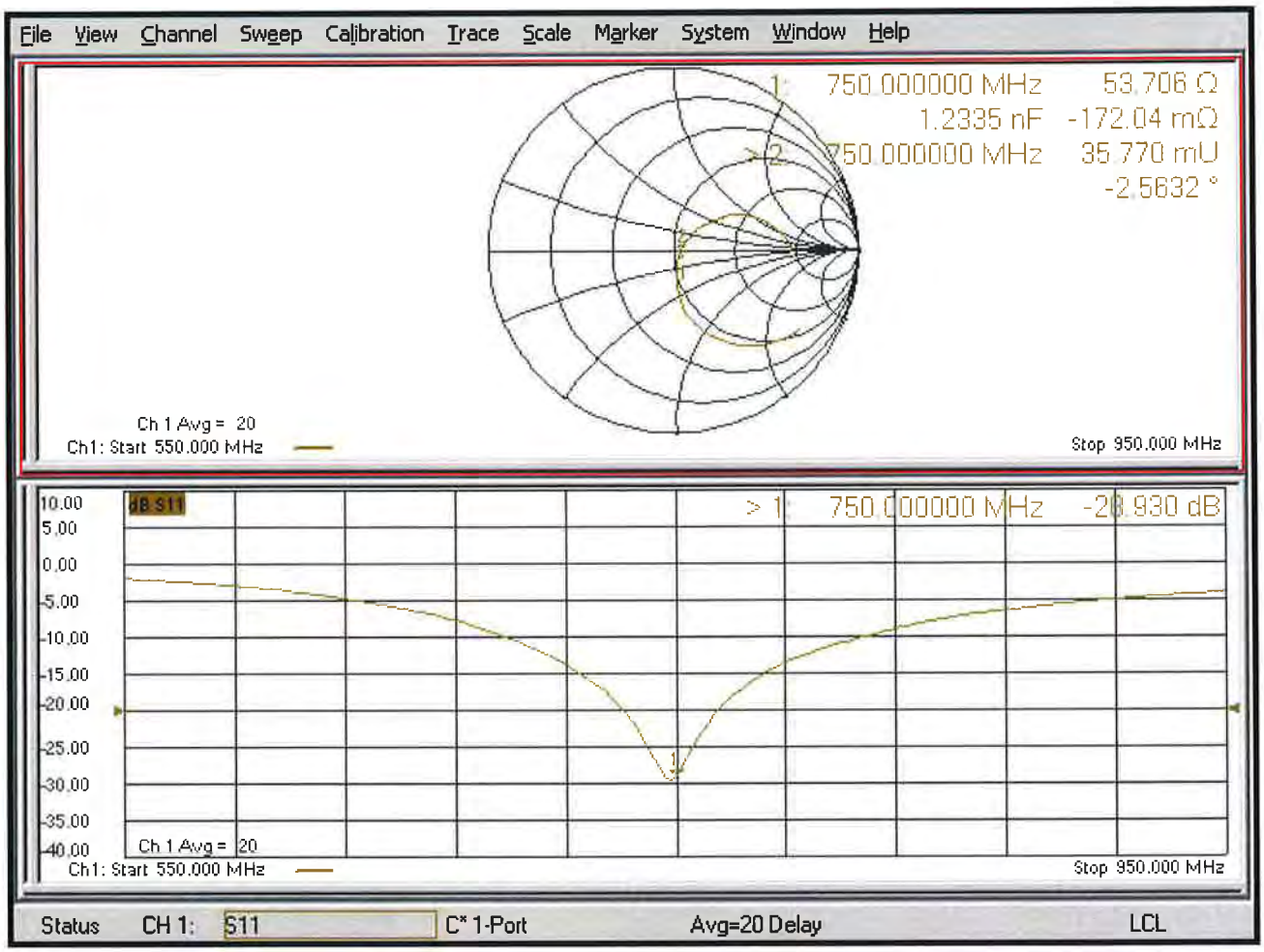
- Probe: EX3DV4 - SN7349; ConvF(10.07, 10.07, 10.07) @ 750 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.83 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.22 W/kg
SAR(1 g) = 2.15 W/kg; SAR(10 g) = 1.41 W/kg
Maximum value of SAR (measured) = 2.86 W/kg

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

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client **B.V. ADT (Auden)** **Certificate No: D835V2-4d121_Aug19**

CALIBRATION CERTIFICATE

Object D835V2 - SN:4d121

Calibration procedure(s) QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: August 23, 2019

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 (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	29-May-19 (No. EX3-7349_May19)	May-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 23, 2019

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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.5 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.61 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.22 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.8 Ω - 2.7 jΩ
Return Loss	- 31.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.395 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 23.08.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d121

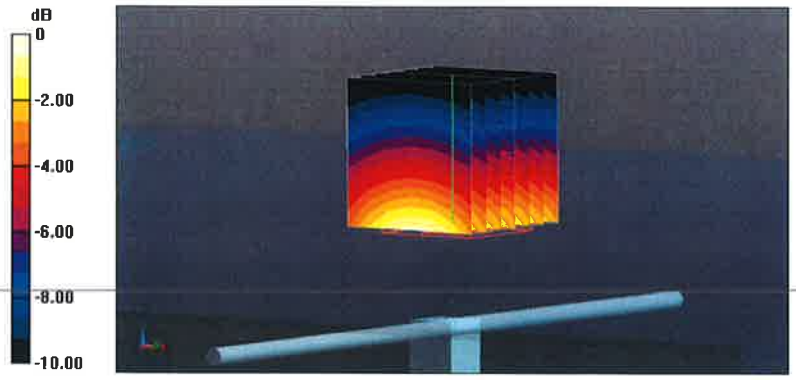
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.92 S/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.89, 9.89, 9.89) @ 835 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

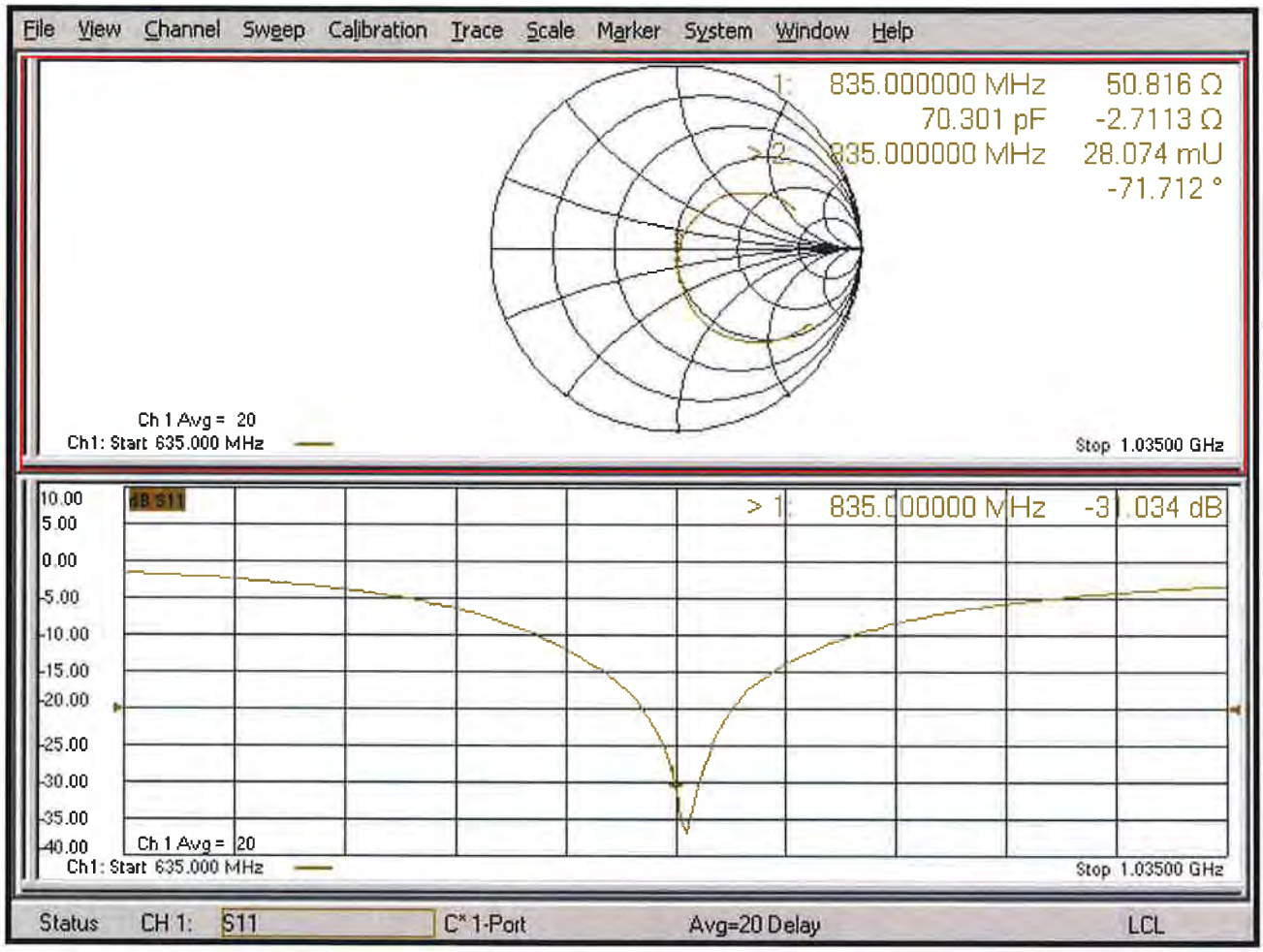
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.40 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.63 W/kg
SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 3.23 W/kg



0 dB = 3.23 W/kg = 5.09 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client **B.V. ADT (Auden)** **Certificate No: D1750V2-1055_Aug19**

CALIBRATION CERTIFICATE

Object	D1750V2 - SN:1055
Calibration procedure(s)	QA CAL-05.v11 Calibration Procedure for SAR Validation Sources between 0.7-3 GHz
Calibration date:	August 23, 2019

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 (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	29-May-19 (No. EX3-7349_May19)	May-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 23, 2019

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.8 ± 6 %	1.36 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**37.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.85 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.5 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.8 Ω + 1.1 jΩ
Return Loss	- 39.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.221 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 23.08.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1055

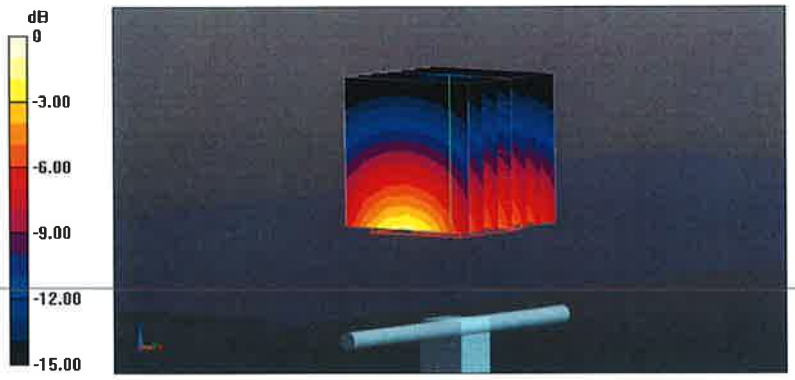
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.36 S/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.67, 8.67, 8.67) @ 1750 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

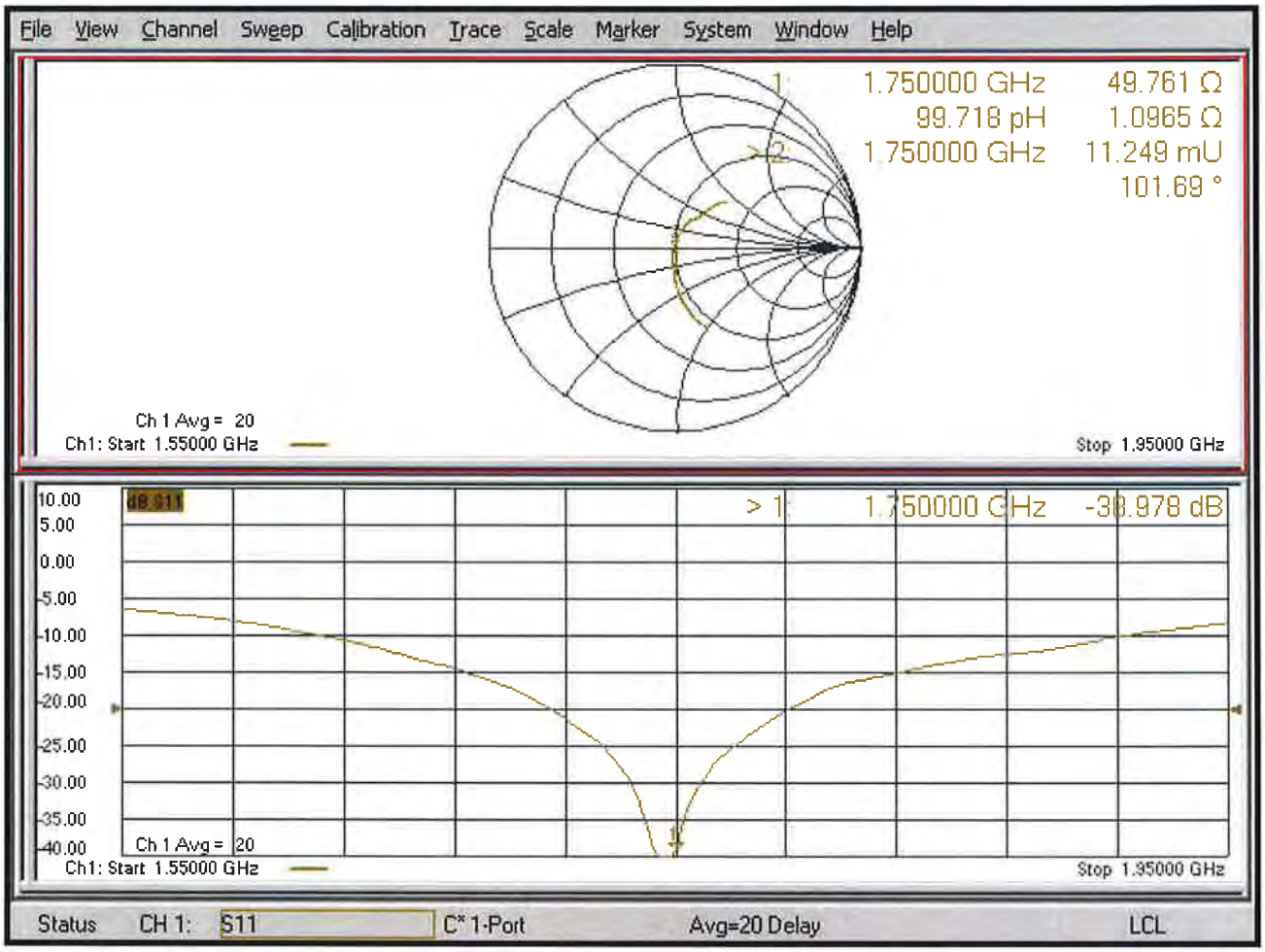
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.5 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.17 W/kg; SAR(10 g) = 4.85 W/kg
Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.49 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client **B.V. ADT (Auden)** **Certificate No: D1900V2-5d036_Jan19**

CALIBRATION CERTIFICATE

Object D1900V2 - SN:5d036

Calibration procedure(s) QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: January 25, 2019

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 (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	31-Dec-18 (No. EX3-7349_Dec18)	Dec-19
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 28, 2019

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 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	40.8 ± 6 %	1.39 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.96 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.9 W/kg ± 16.5 % (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	53.8 ± 6 %	1.49 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.97 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.3 Ω + 5.2 jΩ
Return Loss	- 25.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.6 Ω + 6.0 jΩ
Return Loss	- 23.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.200 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 25.01.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d036

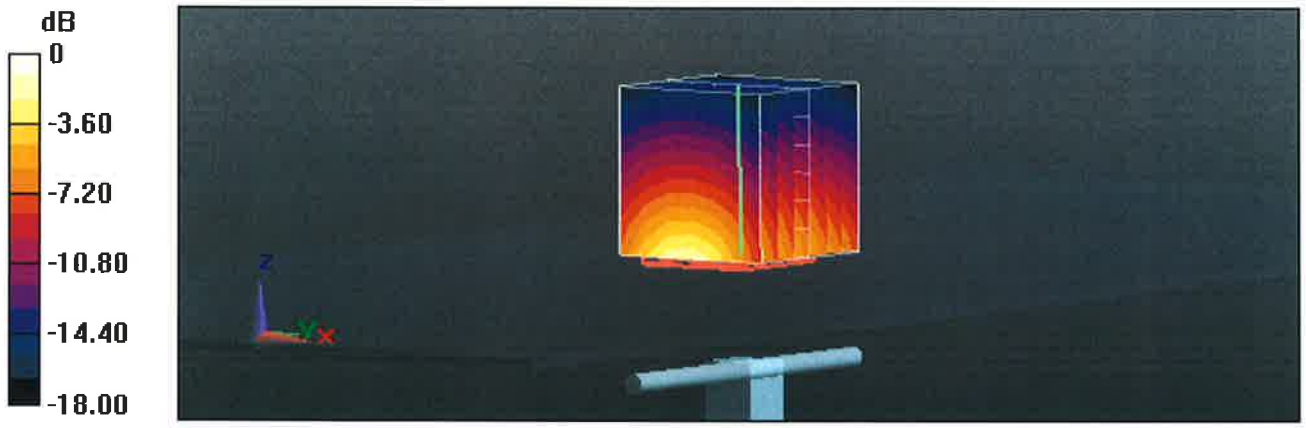
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.39 S/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.26, 8.26, 8.26) @ 1900 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

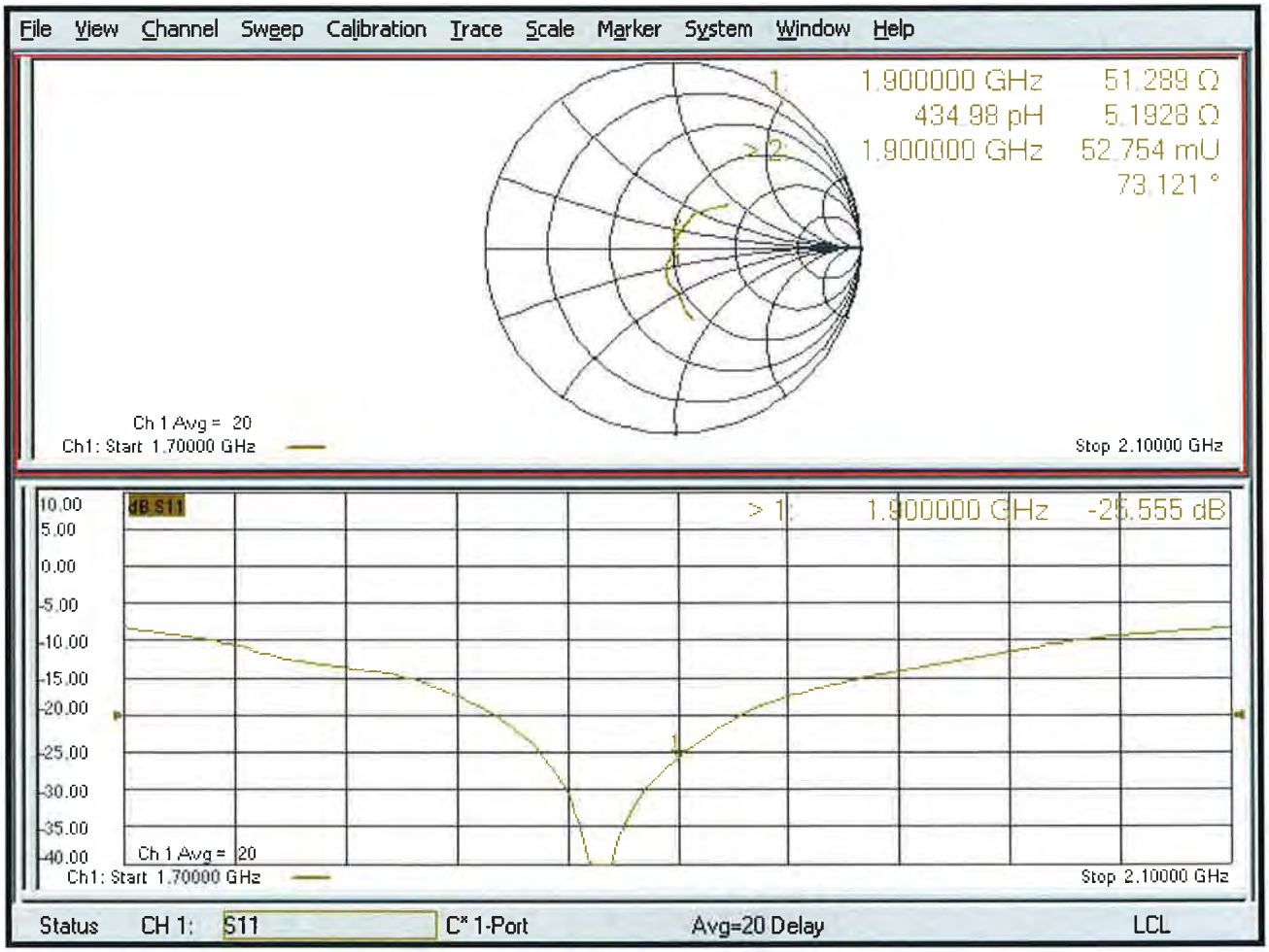
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 110.1 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 18.4 W/kg
SAR(1 g) = 9.96 W/kg; SAR(10 g) = 5.2 W/kg
Maximum value of SAR (measured) = 15.5 W/kg



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

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.01.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d036

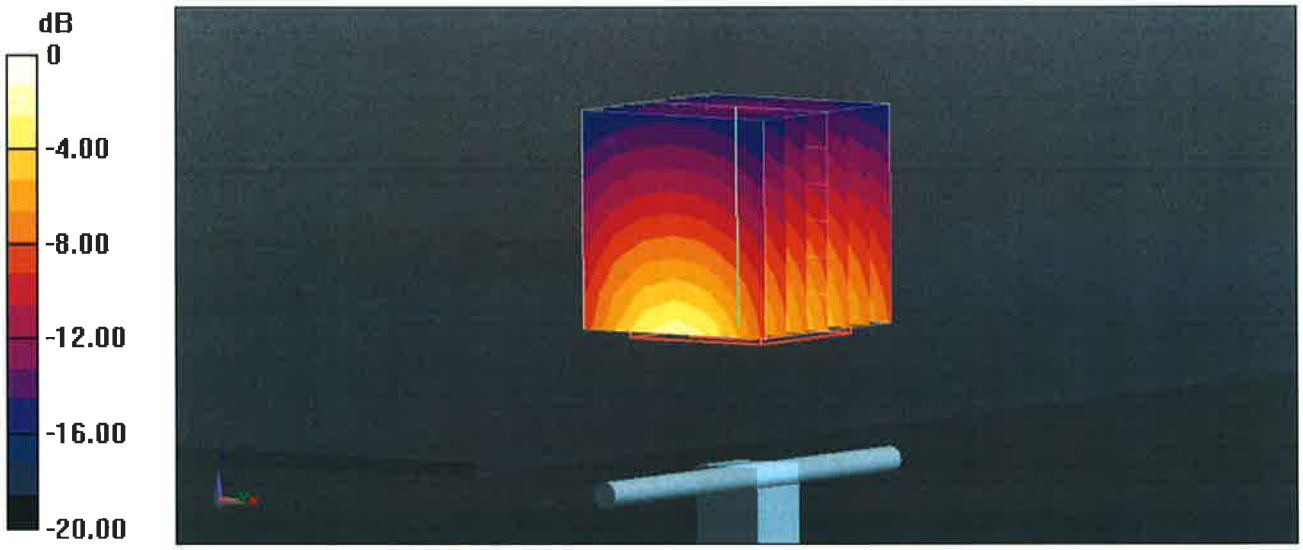
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.49 S/m; ε_r = 53.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.23, 8.23, 8.23) @ 1900 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

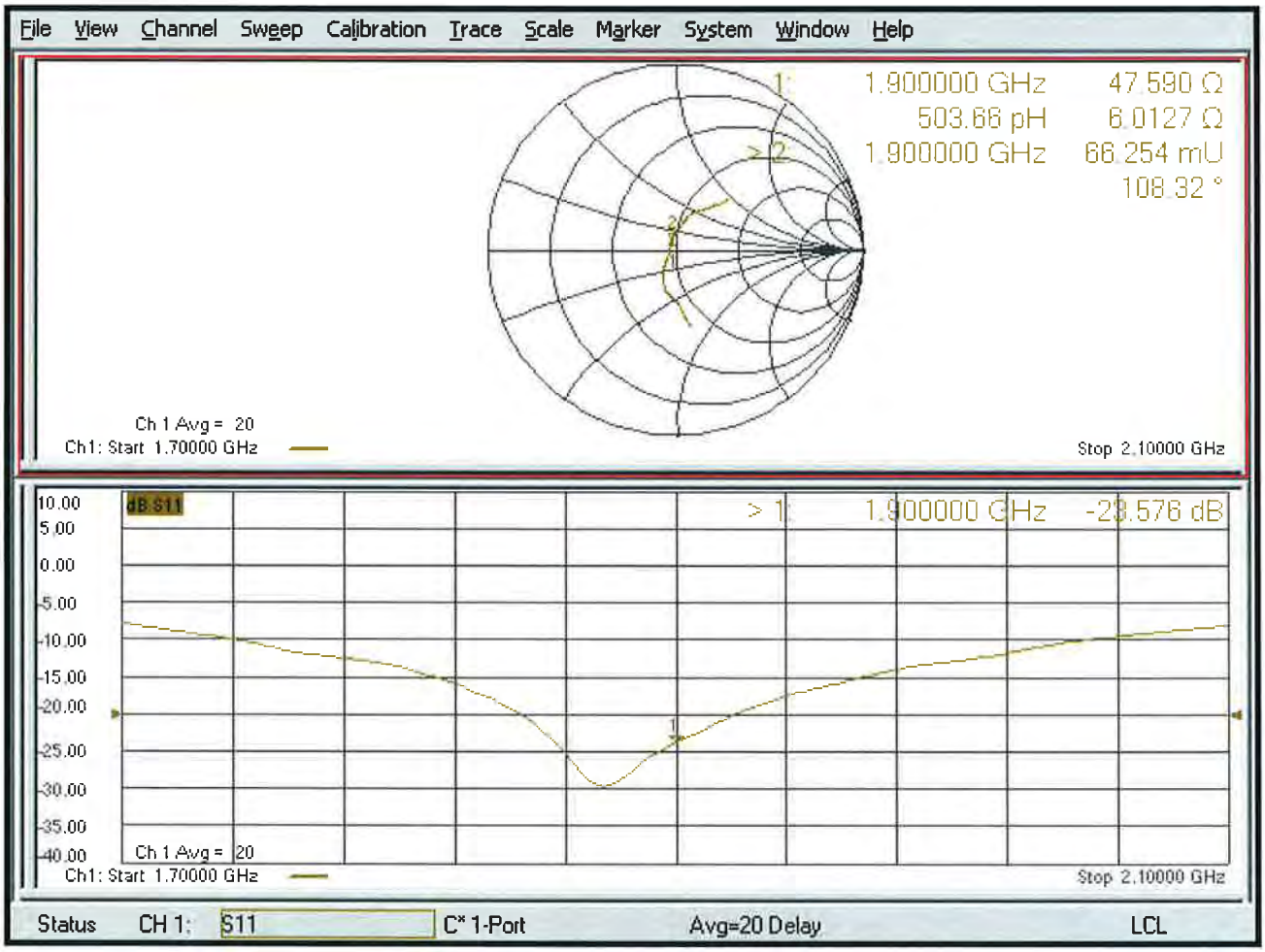
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.1 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 9.97 W/kg; SAR(10 g) = 5.25 W/kg
Maximum value of SAR (measured) = 15.2 W/kg



0 dB = 15.2 W/kg = 11.82 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **B.V. ADT (Auden)** **Certificate No: D2450V2-737_Aug19**

CALIBRATION CERTIFICATE

Object D2450V2 - SN:737

Calibration procedure(s) QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: August 26, 2019

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 (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	29-May-19 (No. EX3-7349_May19)	May-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 26, 2019

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	1.83 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**52.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.5 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.3 Ω + 4.5 jΩ
Return Loss	- 24.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.162 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 26.08.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:737

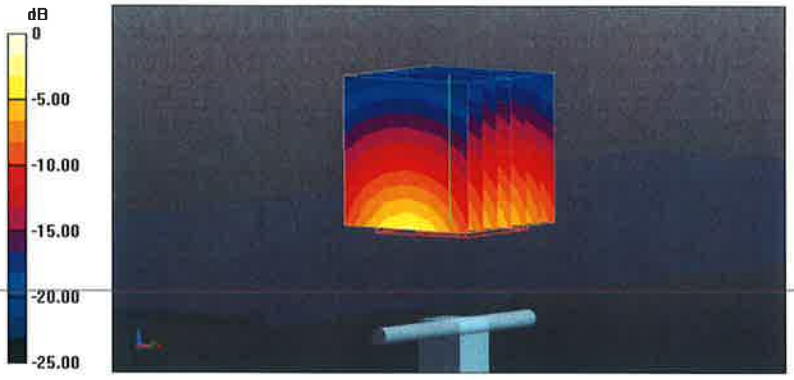
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.83 S/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.9, 7.9, 7.9) @ 2450 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

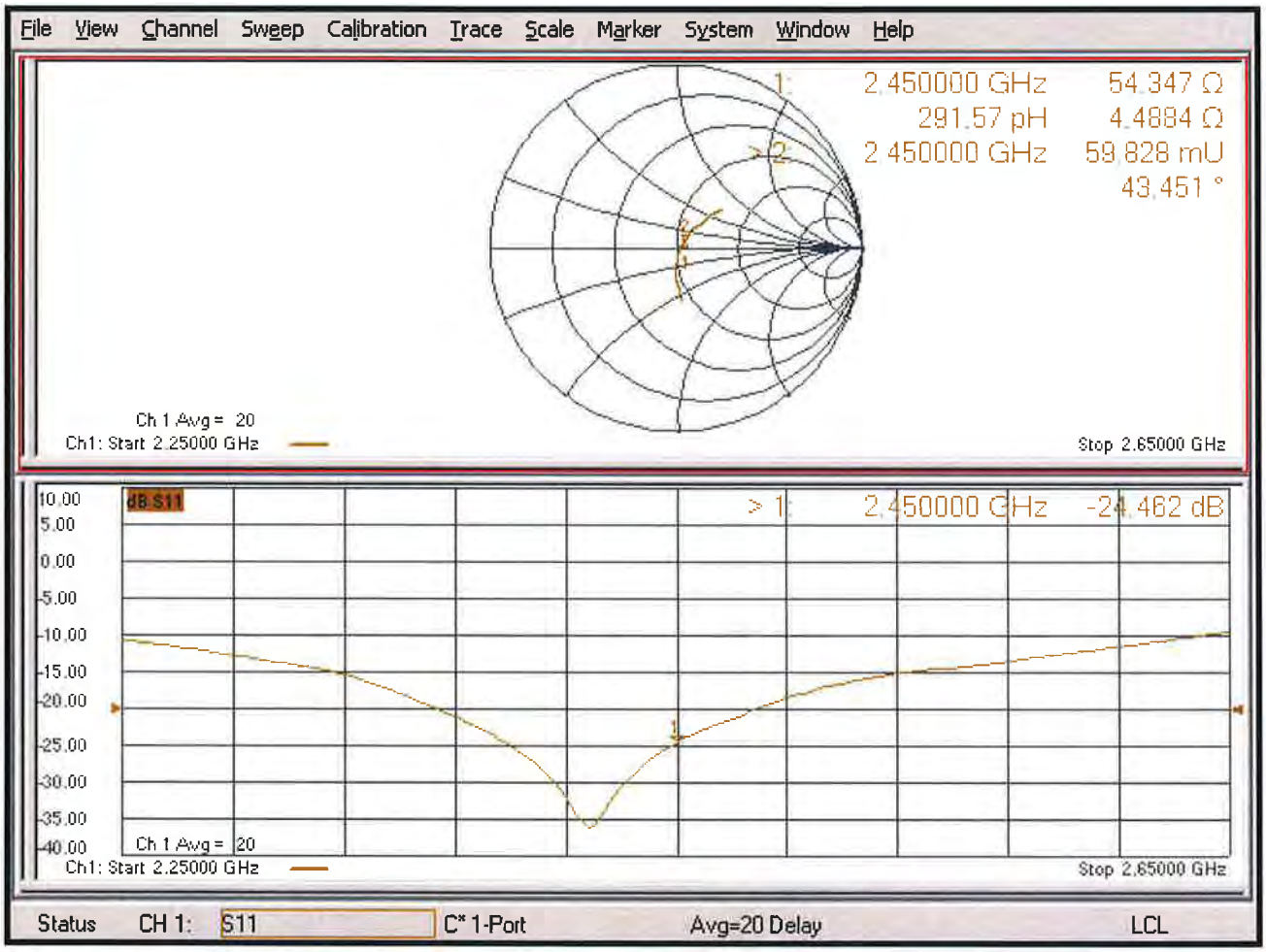
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 117.9 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.2 W/kg
Maximum value of SAR (measured) = 22.1 W/kg



0 dB = 22.1 W/kg = 13.44 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client B.V. ADT (Auden)

Certificate No: D2600V2-1020_Aug19

CALIBRATION CERTIFICATE

Object: D2600V2 - SN:1020

Calibration procedure(s): QA CAL-05.v11
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: August 26, 2019

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 (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	29-May-19 (No. EX3-7349_May19)	May-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 26, 2019

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Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.3 ± 6 %	2.00 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**57.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.48 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.6 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.6 Ω - 5.8 jΩ
Return Loss	- 23.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.154 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 26.08.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1020

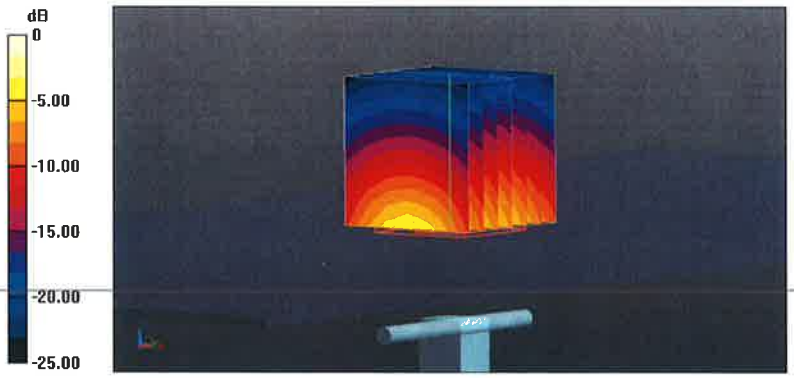
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2 S/m; ε_r = 37.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.69, 7.69, 7.69) @ 2600 MHz; Calibrated: 29.05.2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2019
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

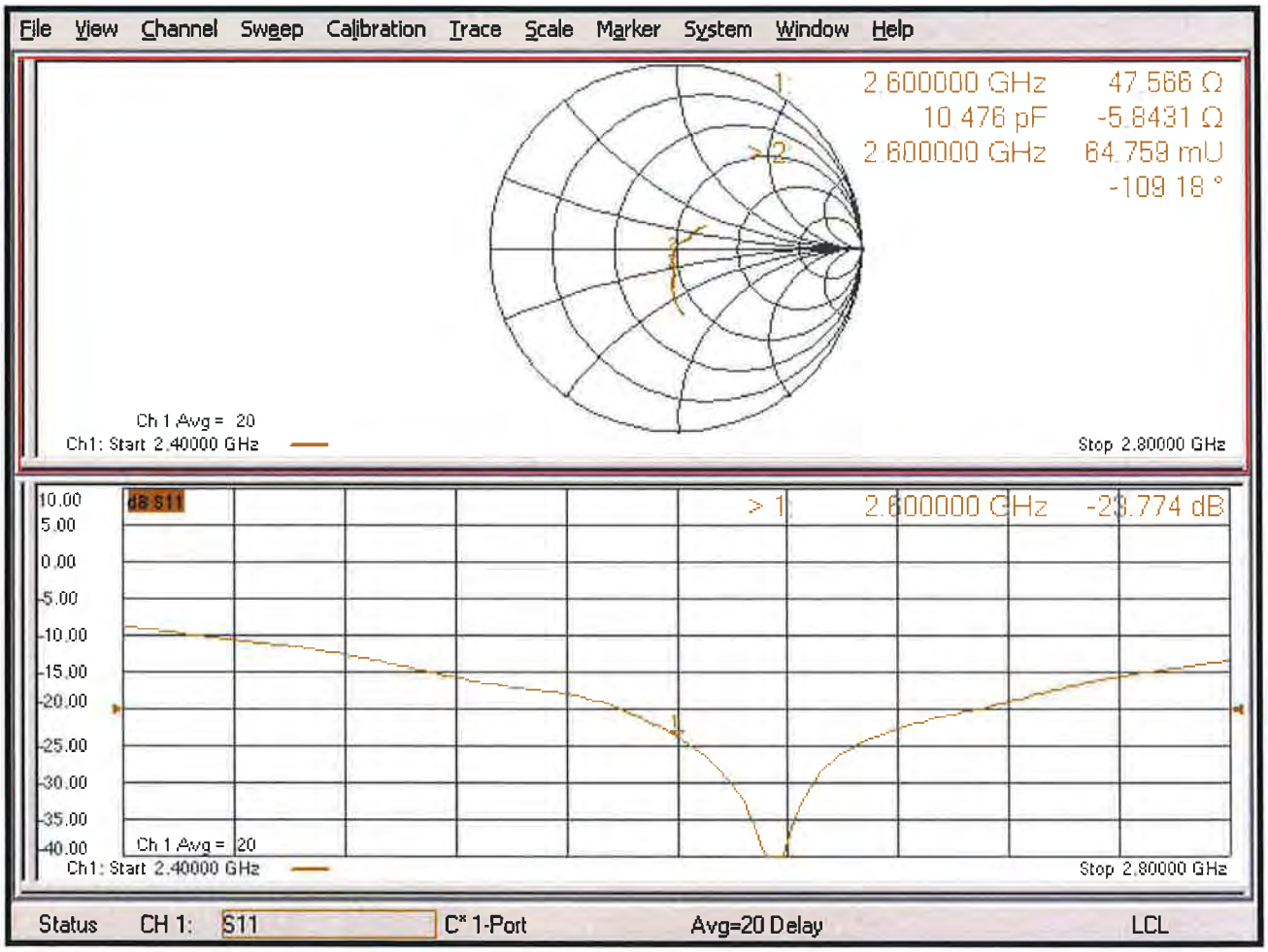
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 121.0 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 29.5 W/kg
SAR(1 g) = 14.6 W/kg; SAR(10 g) = 6.48 W/kg
Maximum value of SAR (measured) = 24.5 W/kg



0 dB = 24.5 W/kg = 13.89 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client **B.V. ADT (Auden)** **Certificate No: D5GHzV2-1019_Mar19**

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN:1019
Calibration procedure(s)	QA CAL-22.v4 Calibration Procedure for SAR Validation Sources between 3-6 GHz
Calibration date:	March 21, 2019

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 (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 3503	31-Dec-18 (No. EX3-3503_Dec18)	Dec-19
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 25, 2019

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.7 ± 6 %	4.85 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.64 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**85.8 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.5 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.5 ± 6 %	5.00 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.21 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.2 W/kg ± 19.5 % (k=2)**

Measurement Conditions

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

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.2 ± 6 %	4.50 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.2 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.8 ± 6 %	5.45 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.54 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**74.8 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.9 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.2 ± 6 %	5.92 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.80 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.18 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.5 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.0 ± 6 %	6.13 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.62 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.5 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.12 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.0 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	52.3 Ω - 5.8 jΩ
Return Loss	- 24.3 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	56.8 Ω - 1.1 jΩ
Return Loss	- 23.8 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	58.3 Ω + 3.2 jΩ
Return Loss	- 21.7 dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	52.5 Ω - 3.7 jΩ
Return Loss	- 27.3 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	58.1 Ω - 1.2 jΩ
Return Loss	- 22.4 dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	58.7 Ω + 4.8 jΩ
Return Loss	- 20.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.204 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

DASY5 Validation Report for Head TSL

Date: 21.03.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1019

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 4.5 S/m; ε_r = 35.2; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.85 S/m; ε_r = 34.7; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 5 S/m; ε_r = 34.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

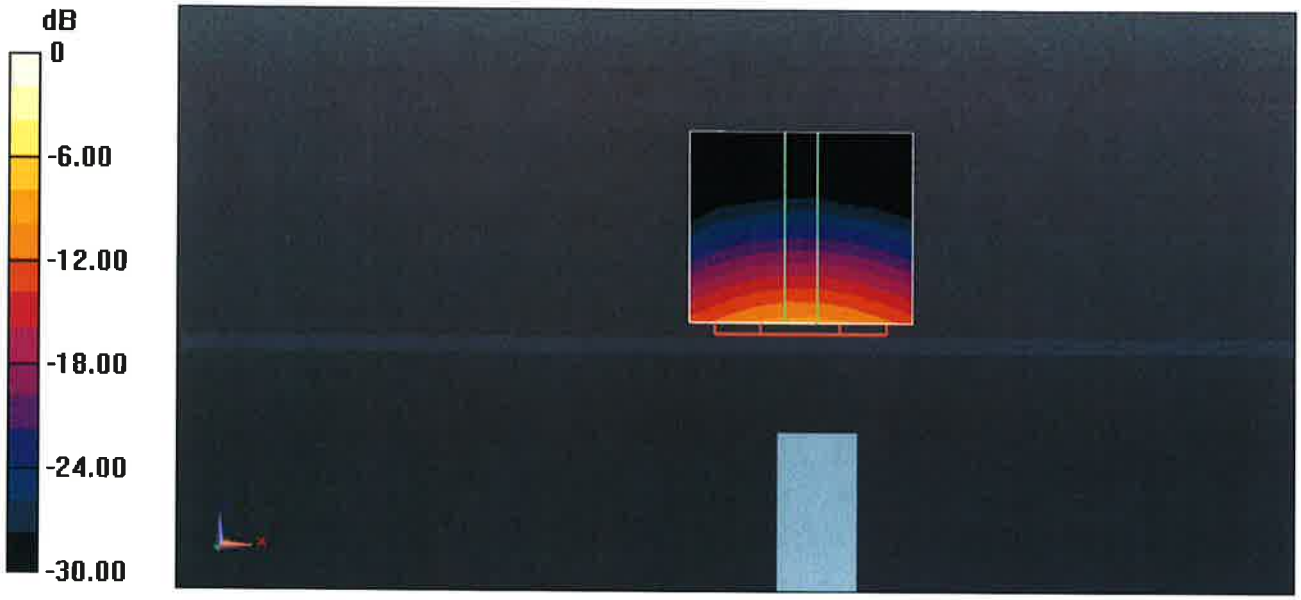
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.4, 5.4, 5.4) @ 5250 MHz, ConvF(4.95, 4.95, 4.95) @ 5600 MHz, ConvF(4.98, 4.98, 4.98) @ 5750 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 78.16 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 28.1 W/kg
SAR(1 g) = 8.12 W/kg; SAR(10 g) = 2.34 W/kg
Maximum value of SAR (measured) = 18.1 W/kg

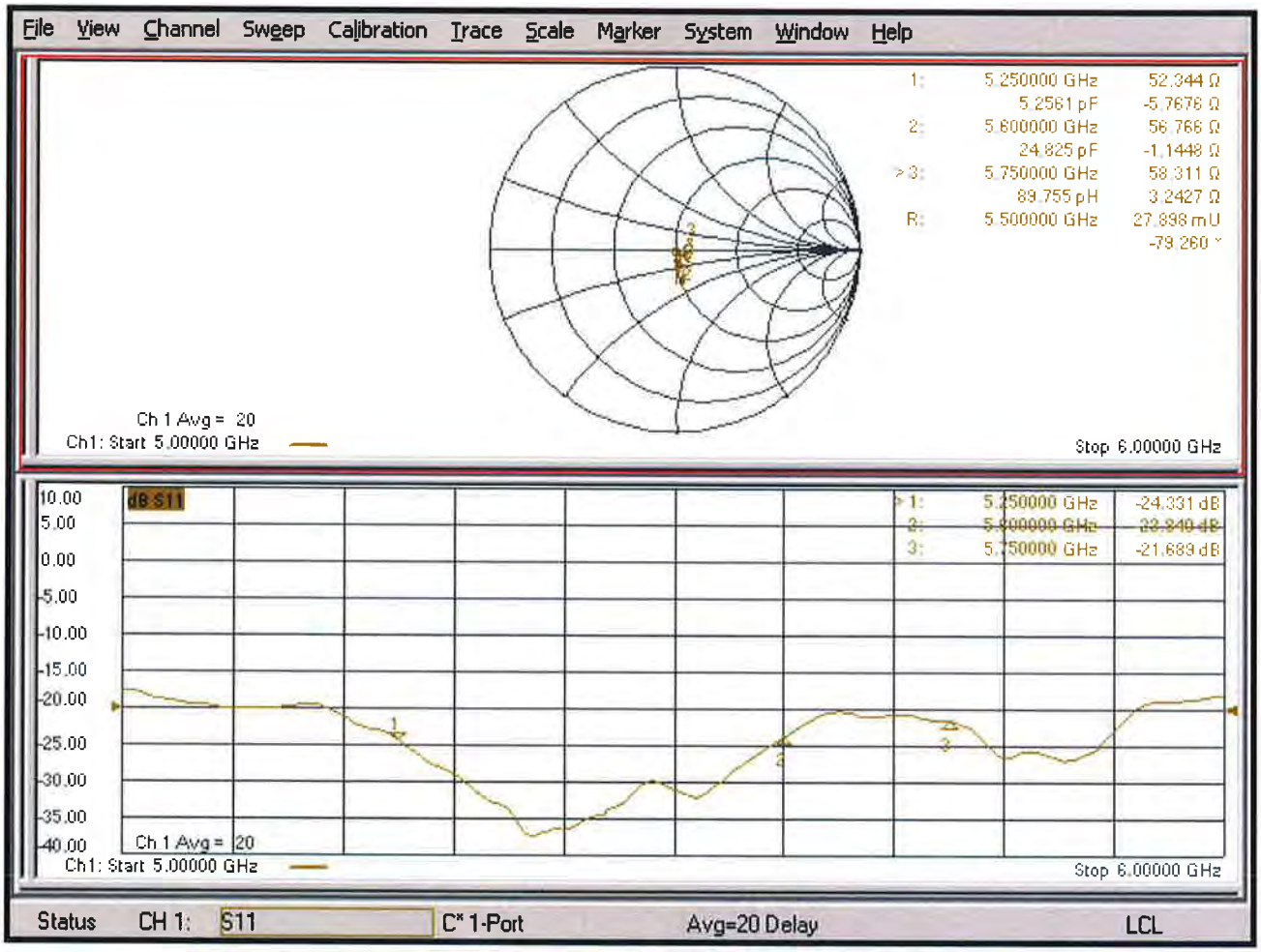
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 77.63 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 32.2 W/kg
SAR(1 g) = 8.64 W/kg; SAR(10 g) = 2.47 W/kg
Maximum value of SAR (measured) = 19.7 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 74.85 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 32.4 W/kg
SAR(1 g) = 8.21 W/kg; SAR(10 g) = 2.34 W/kg
Maximum value of SAR (measured) = 19.1 W/kg



0 dB = 19.1 W/kg = 12.81 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 20.03.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1019

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 5.45 S/m; ε_r = 46.8; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 5.92 S/m; ε_r = 46.2; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 6.13 S/m; ε_r = 46; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

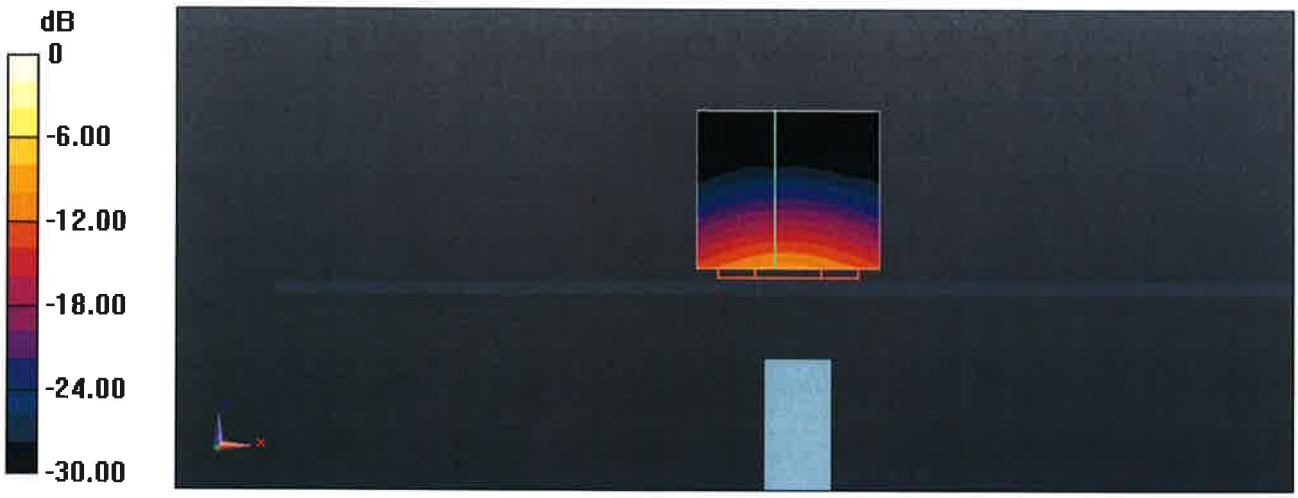
DASY52 Configuration:

- Probe: EX3DV4 - SN3503testing; ConvF(5.26, 5.26, 5.26) @ 5250 MHz, ConvF(4.7, 4.7, 4.7) @ 5600 MHz, ConvF(4.59, 4.59, 4.59) @ 5750 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.09 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 29.2 W/kg
SAR(1 g) = 7.54 W/kg; SAR(10 g) = 2.11 W/kg
Maximum value of SAR (measured) = 17.2 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 68.10 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 33.4 W/kg
SAR(1 g) = 7.8 W/kg; SAR(10 g) = 2.18 W/kg
Maximum value of SAR (measured) = 18.5 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.59 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 34.1 W/kg
SAR(1 g) = 7.62 W/kg; SAR(10 g) = 2.12 W/kg
Maximum value of SAR (measured) = 18.3 W/kg



0 dB = 17.2 W/kg = 12.36 dBW/kg