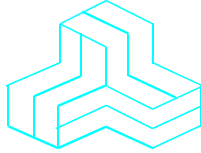


ENGINEERING TEST REPORT




Handheld Computer
Model No.: 7545MBWN
FCC ID: H9PRA1202
IC: 1549L-RA1202

Tested For
Symbol Technologies Inc.
One Motorola Plaza
Holtsville, NY 11742
United States

In accordance with
**SAR (Specific Absorption Rate) Requirements using guidelines established in
IEEE C95.1-1992, FCC OET Bulletin 65 (Supplement C), FCC 47CFR Part 2.1093
and Industry Canada RSS-102 (Issue 4)
EN 50360 (Council Recommendation 1999/519/EC)
ARPANSA Radio Protection Series Publication No. 3
EN 50566:2013 & EN 62479:2010**

UltraTech's File No.: TEK-737QR-SAR3

This Test report is Issued under the Authority of Tri M. Luu, BAsC, Vice President of Engineering UltraTech Group of Labs	
	
Date: September 17, 2014	
Report Prepared by: Maxavier Kee	Tested by: Maxavier Kee
Issued Date: September 17, 2014	Test Dates: August 2~18, 2014

The results in this Test Report apply only to the sample(s) tested, which has been randomly selected.

UltraTech Group of Labs

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91038



1309



46390-2049



NVLAP LAB
CODE 200093-0



SL2-IN-E-1119R



CA2049



TL363_B



TPTDP
DA1300

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	SAR (Specific Absorption Rate) Requirements IEEE C95.1-2005, FCC OET Bulletin 65 (Supplement C Edition 01-01), FCC 47CFR Part 2.1093 Industry Canada RSS-102 (Issue 4).
Title	Safety Levels with respect to human exposure to Radio Frequency Electromagnetic Fields Guideline for Evaluating the Environmental Effects of Radio Frequency Radiation
Purpose of Test:	To verify compliance with Federal regulated SAR requirements in Canada and the US.
Method of Measurements:	IEEE C95.1-2005, FCC OET Bulletin 65 (Supplement C Edition 01-01) and Industry Canada RSS-102 (Issue 4)
Device Category	Portable
Exposure Category	General/un-controlled

1.2. REVISION HISTORY

Document	Issue Date	Description
TEK-737QR-SAR	Sept 03, 2014	Initial Release to support for FCC KDB enquiry on SAR test reduction
TEK-737QR-SAR1	Sept 16, 2014	Added elements in response to FCC KDB items
TEK-737QR-SAR2	Sept 16, 2014	Added FCC 47CFR Part 2.1093 reference
TEK-737QR-SAR3	Sept 17, 2014	Updated Sec 2.4.1 and removed Sec 2.4.2

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1.3. REFERENCES

The methods and procedures used for the measurements contained in this report are details in the following reference standards:

Publications	Year	Title
IEEE Std. 1528	2013	Draft Recommended practice for determining the Peak Spatial-Average Specific Absorption rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.
Industry Canada RSS-102	2010	“Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada’s Safety Code 6 for Exposure of Humans to Radio Frequency Fields”
NCRP Report No.86	1986	“Biological Effects and Exposure Criteria for radio Frequency Electromagnetic Fields”
FCC OET Bulletin 65	2001	“Evaluating Compliance with FCC Guidelines for Human Exposure to radio Frequency Fields”
ANSI/IEEE C95.3	2002	“Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave”
ANSI/IEEE C95.1	2005	“Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz”
ARPANSA	2002	RADIATION PROTECTION STANDARD Maximum Exposure Levels to Radiofrequency Fields — 3 kHz to 300 GHz Radiation Protection Series Publication No. 3
EN 50566	2013	Product standard to demonstrate compliance of radio frequency fields from handheld and body-mounted wireless communication devices used by the general public (30 MHz - 6 GHz)
EN 62479	2010	Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)
IEC 62209-2	2010	Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 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)
FCC KDB	2014	865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03 248227 D01 SAR measurements for 802 11 a b g v01r02 648474 D04 Handset SAR v01r02 447498 D01 General RF Exposure Guidance v05r02 388624 D01 Permit But Ask Procedure v10 388624 D02 Permit But Ask List v15r02 865664 D02 RF Exposure Reporting v01r01 690783 D01 SAR Listings on Grants v01r0
Health Canada’s Safety Code 6	2009	Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz

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EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT AND MANUFACTURER INFORMATION

APPLICANT:	
Name:	Symbol Technologies Inc.
Address:	One Motorola Plaza Holtsville, NY 11742 United States
Contact Person:	Mark S. Luksich , DMTS, Regulatory Phone #: +1 (631) 738 5134 Fax #: +1 (631) 738 3318 Email Address: Mark.Luksich@motorolasolutions.com

MANUFACTURER:	
Name:	Symbol Technologies Inc.
Address:	One Motorola Plaza Holtsville, NY 11742 United States
Contact Person:	Sada Dharwarkar Regulatory Compliance 9 Phone #: 905 812 6200 Ext. 3358 Fax #: 905 812 6301 Email Address: Sada.Dharwarkar@motorolasolutions.com

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2.2. DEVICE UNDER TEST (D.U.T.) DESCRIPTION

The following is the information provided by the applicant.

Trade Name	Symbol Technologies Inc.
Type/Model Number	7545MBWN
Serial Number	STBCUD48749201
Transmitter Frequency Band	Narrow Band: 435-470MHz Bluetooth: 2400-2483.5 MHz 802.11 b/g/n : 2400 ~ 2483.5 MHz; 802.11 a/n: 5.150 ~ 5.350 GHz; 5.47 ~ 5.725GHz;
Maximum RF Output Power	Narrow Band: 30dBm±0.5dB average conducted 802.11b/g: 18/16dBm±1.5dB average conducted 802.11a: 13dBm±1.5dB average conducted 802.11n: 12dBm±1.5dB average conducted Bluetooth: 5.0dBm+1/-2dB average conducted
Modulation Employed	802.11 a/b/g/n: BPSK, QPSK, 16-QAM, 64-QAM Bluetooth: GFSK, $\pi/4$ DQPSK, 8DPSK
Antenna	Manufacturer: Celestica Model: 7545 2.4GHz Antenna Type: PCB Frequency Range: 2400~2484 MHz, Gain: 3.8 dBi Manufacturer: Celestica Model: 7545 5GHz Antenna` Type: PCB Frequency Range: 5100~5840 MHz Gain: 3.8 dBi Manufacturer: Laird Model: CAF23270 Type: Helical 1/4 wave Frequency Range: 450-480 MHz, Gain: 0 dBi
Power Supply	Rechargeable Li-Ion battery (M/N: ST-3003, 3.6V, 5300mAh)
Primary User Functions of D.U.T.	Transmit and receive data

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2.2.1. Photograph of D.U.T



< D.U.T.'s front view with battery >

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< D.U.T.'s rear view with battery >

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2.3. LIST OF D.U.T.'S ACCESSORIES:

2.3.1. *Li-ion Chargeable Battery (M/N: ST-3003)*



< ST-3003 Li-ion Battery >

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2.3.2. Protective Carrying Case



< Front Side >

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< Back Side >

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2.4. SPECIFIC OPERATING AND TEST CONDITIONS

OMNII supporting:

- UHF FSK data
- WiFi 802.11abgn
- Bluetooth V.2.0 + EDR

2.4.1. *Simultaneous Transmission Conditions*

UHF FSK 435-470 (data only) + WiFi abgn (data & voice) + Bluetooth V2.0 + EDR (data & voice)

Supported positions:

- 1) On belt with supported holsters: UHF (data only) + WiFi (data) + Bluetooth (data & voice)
- 2) Held in hand: UHF (data only) + WiFi (data) + Bluetooth (data & voice)
- 3) Too large to fit inside pocket: Device is too large to fit into pocket and this mode is not supported.

NarrowBand handheld terminal configuration has keyboard microphone and audio receiver disabled to disable headset mode. Only external Bluetooth audio is enabled with narrowband handheld configuration, therefore the head SAR was not tested.

The worst case configuration for final SAR evaluation was determined through a comprehensive series of SAR pre-scans performed by the manufacturer at SATIMO facilities and the SAR reports are attached in the appendix for reference.

KDB 941225 D07: SAR Evaluation Procedures for UMPC Mini-Tablet Devices, have been applied for Body exposure conditions.

SAR for body exposure was tested with the EUT in the accessory holster.

- Positions for Body exposure for the 435-470 MHz antenna was front, back, left edge and right edge of the EUT against the phantom with 0 mm air gap.
- Positions for Body exposure for the 2450MHz antenna was front and left edge of the EUT against the phantom with 0 mm air gap.
- Positions for Body exposure for the 5200-5800 MHz antenna was front and right edge of the EUT against the phantom with 0 mm air gap.

WLAN is tested on the channel with the highest measured average conducted power

SAR evaluation of 802.11g and 802.11n channels is not required when the maximum average output power is less than 0.25dB higher than the measured corresponding 802.11a and 802.11n channels.

The antenna-to-antenna separation distance between the 5GHz WLAN antenna and the 2.4GHz WLAN/Bluetooth antenna is 6.72cm. The Bluetooth (+5dBm) is below the 24mW test exclusion threshold and SAR evaluation is not required under FCC KDB 447498 and FCC KDB 648474. According to FCC KDB 447498 and FCC KDB 648474, simultaneous SAR evaluation is not required because the sum of 1g SAR values measured for all simultaneous transmitting antenna is less than 1.6W/kg limit.

The engineering Analysis determined that the worst case transmission duty cycle is 24% based on limitation of hardcoded available bit rates and bandwidth limitations; 30 % was used in the SAR report as a very conservative estimate; details of the analysis can be found in the Operation Description – Duty Cycle Addendum.

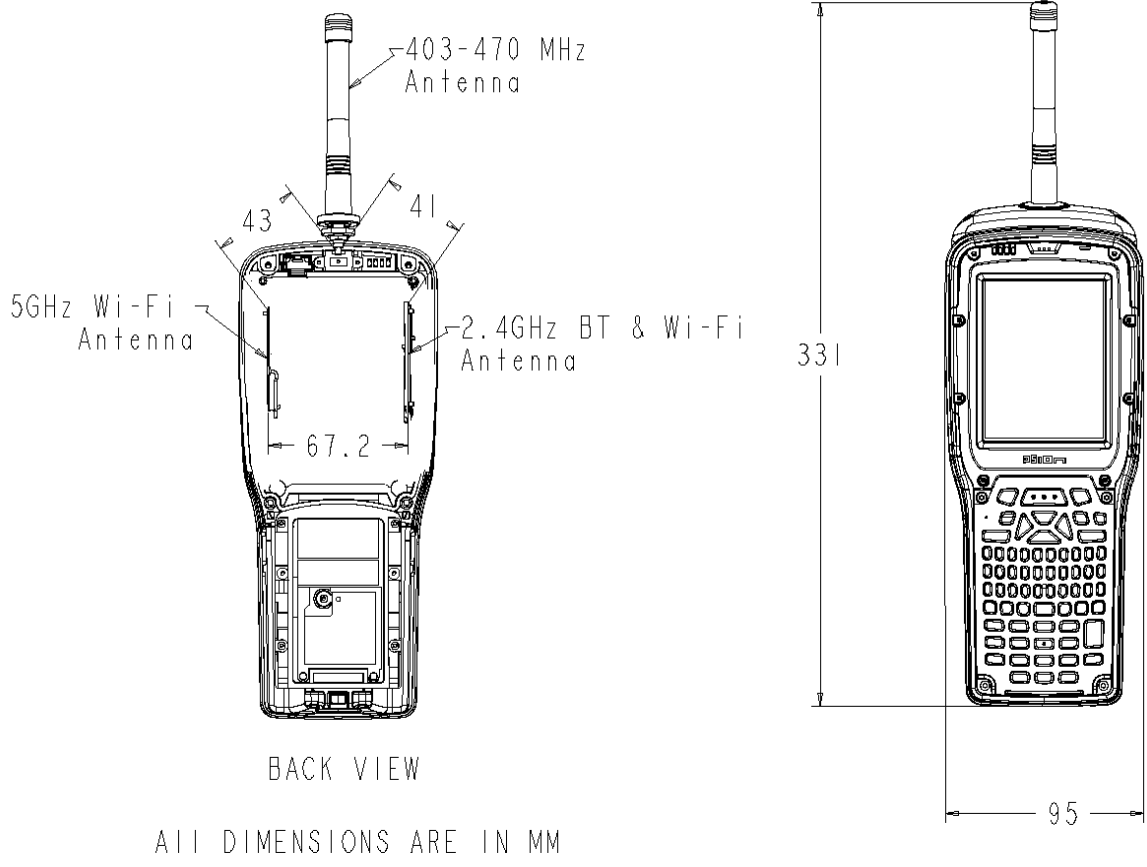
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Antenna Location

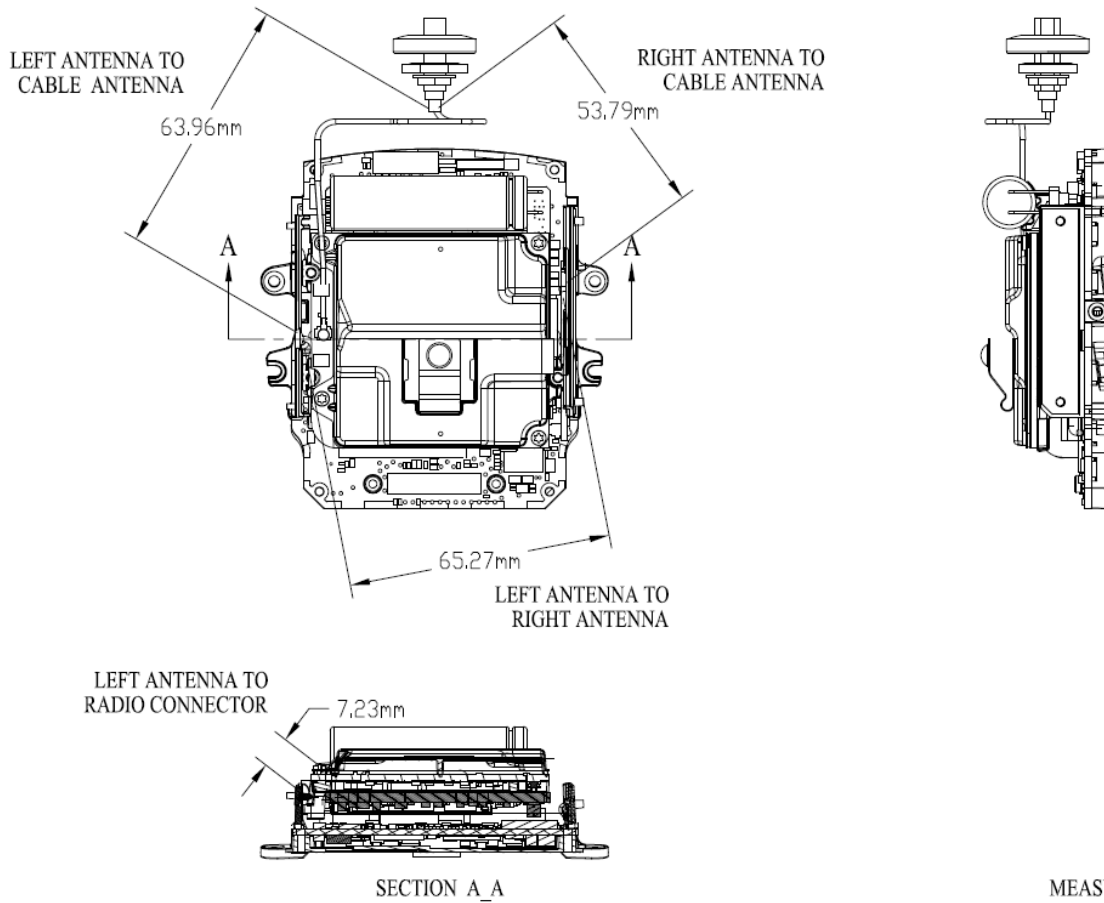


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MEASUREMENTS OF
 NARROWBAND ANTENNAS
 DATE: SEPT. 09, 2014
 NOT TO SCALE

Distance between each pair of transmitting antenna			
Reference Point	Antenna A	Antenna B	Distance (mm)
Closest Point	435-470 MHz	2450 MHz	41
Feed Point			64
Closest Point	435-470 MHz	5200-5800 MHz	43
Feed Point			54
Closest Point	2450 MHz	5200-5800 MHz	67
Feed Point			65

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EXHIBIT 3. SUMMARY OF TEST RESULTS

3.1. LOCATION OF TESTS

All of the measurements described in this report were performed at UltraTech Group of Labs located at: 3000 Bristol Circle, in the city of Oakville, Province of Ontario, Canada.

All measurements were performed in UltraTech's shielded chamber, 16' x 13' x 8'.

3.2. APPLICABILITY & SUMMARY OF SAR RESULTS

3.2.1. 7545MBW Combined Reported¹ SAR for simultaneous transmission (scaled)

Maximum Standalone Reported SAR1g (scaled W/Kg)				
Frequency	Front	Right	Left	Back
435-470	0.262	0.211	0.103	0.105
2450.000	0.062		1.250	
5200-5825	0.057	0.378		
Combined Reported SAR	0.381	0.589	1.353	0.105
SAR1g General Population Limit	1.6	1.6	1.6	1.6
Compliance Result	Pass	Pass	Pass	Pass

Maximum Standalone Reported SAR10g(scaled W/Kg)				
Frequency	Front	Right	Left	Back
435-470	0.191	0.156	0.076	0.070
2450.000	0.037		0.624	
5200-5825	0.022	0.136		
Combined Reported SAR	0.25	0.292	0.7	0.070
SAR10g General Population Limit	2	2	2	2
Compliance Result	Pass	Pass	Pass	Pass

¹ Reported SAR is scaled to maximum tune-up RF power

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3.2.2. 7545MBW Reported² SAR for standalone transmissions (scaled)

					Maximums	
					SAR1g	SAR10g
					(mW/g)	(mW/g)
		Channel	SAR1g	SAR10g		
		(MHz)	(mW/g)	(mW/g)		
435-470 MHz	Front	435	0.262	0.191	0.262	0.191
		446	0.202	0.147		
		458	0.161	0.117		
		470	0.135	0.098		
	Back	435	0.105	0.070	0.105	0.070
		446	0.064	0.048		
		458	0.054	0.040		
		470	0.041	0.031		
	Left	435	0.103	0.076	0.103	0.076
		446	0.008	0.061		
		458	0.059	0.043		
	Right	435	0.095	0.072	0.211	0.156
		446	0.211	0.156		
458		0.057	0.042			
470		0.039	0.029			
2450 MHz	Front	2,412	0.061	0.037	0.062	0.037
		2,437	0.062	0.037		
		2,462	0.017	0.010		
	Left	2,412	0.170	0.085	1.250	0.624
		2,437	0.311	0.155		
		2,462	1.250	0.624		
5200-5825 MHz	Front	5,180	0.053	0.022	0.057	0.022
		5,240	0.046	0.019		
		5,260	0.054	0.020		
		5,320	0.056	0.018		
		5,520	0.032	0.013		
		5,580	0.038	0.013		
		5,620	0.042	0.013		
		5,680	0.026	0.007		
		5,745	0.057	0.001		
	5,805	0.022	0.005			
	Right	5,180	0.281	0.093	0.378	0.136
		5,240	0.246	0.082		
		5,260	0.294	0.106		
		5,320	0.204	0.069		
		5,520	0.247	0.087		
		5,580	0.378	0.136		
		5,620	0.346	0.125		
		5,680	0.327	0.118		
5,745		0.266	0.092			
5,805	0.019	0.080				

² Reported SAR is scaled to maximum tune-up RF power

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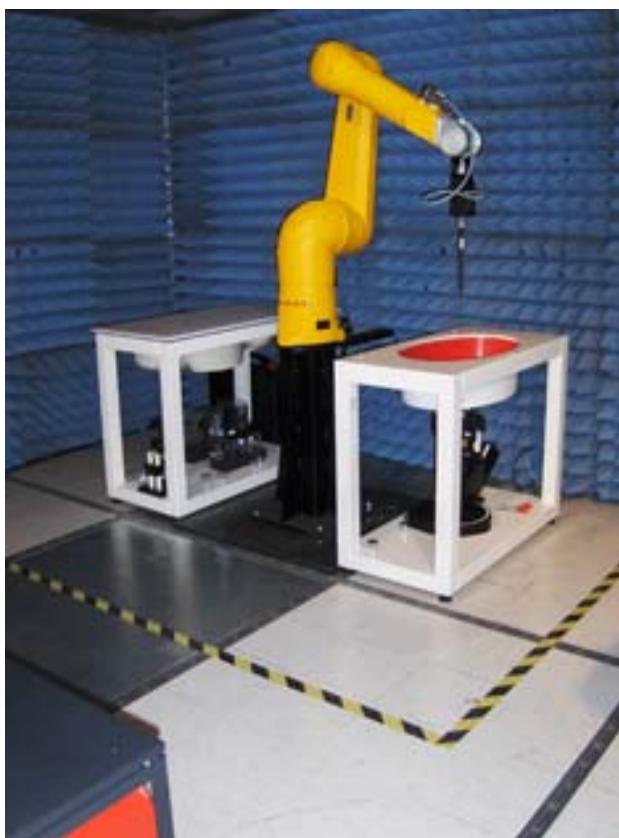
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EXHIBIT 4. SAR SYSTEM CONFIGURATION

4.1. DASY5 SYSTEM OVERVIEW



4.1.1. DASY5 System Specification

Positioning Equipment	Computer
DASY5 Measurement Server Data Acquisition Electronics (DAE) Light Beam Unit Device Holder Robot (STAUBLI TX90)	Type: HP Compaq dc7800p Convertible CPU : Intel® Core™ 2 Duo E8500 Memory : 2GB RAM Operating System : Windows XP Professional Monitor : HP L1950g LCD

4.1.1.1. DASY5 Measurement Server

The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz Intel ULV Celeron, 128MB chipdisk and 128MB RAM. The necessary circuits for communication with the DAE4 (or DAE3) electronics box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical

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processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

4.1.1.2. *Data Acquisition Electronics*

The data acquisition electronics (DAE4 or DAE3) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

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

The input impedance of both the DAE4 as well as of the DAE3 box is 200M Ω ; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

4.1.1.3. *Dosimetric Probes*

These probes are specially designed and calibrated for use in liquids with high permittivity. They should not be used in air, since the spherical isotropy in air is poor (-2 dB). The dosimetric probes have special calibrations in various liquids at different frequencies.



4.1.1.3.1. ES3DV3 Isotropic E-Filed Probe

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 900 and HSL 1750 Additional CF for other liquids and frequencies
Frequency	10 MHz to 4 GHz Linearity ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 μ W/g to > 100 mW/g Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm

4.1.1.3.2. EX3DV4 Isotropic E-Filed Probe

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 900 and HSL 1750 Additional CF for other liquids and frequencies
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

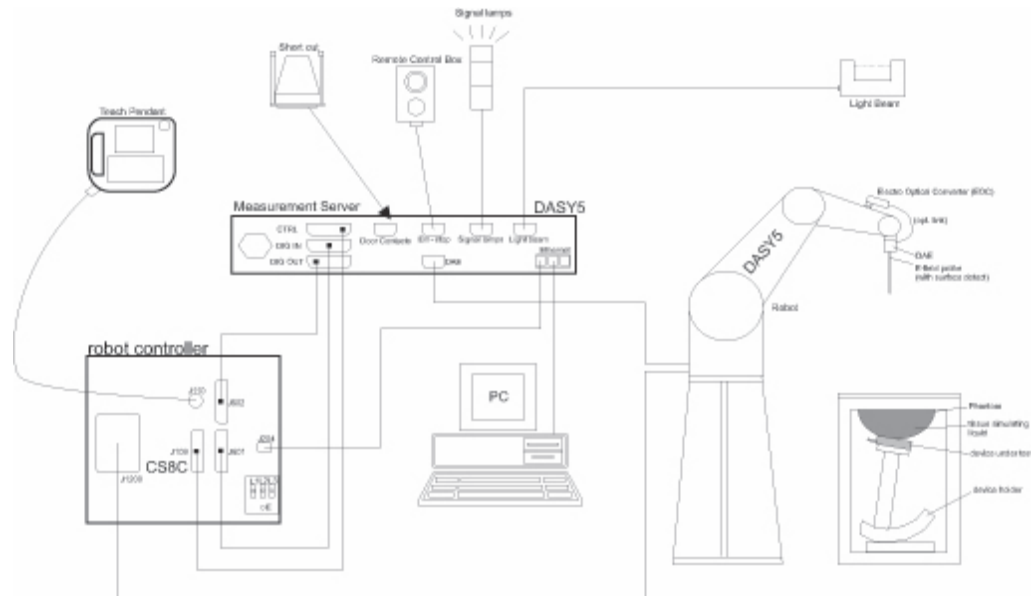
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4.1.2. *DASY5 SAR SYSTEM block diagram*



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4.2. SAR TEST PHANTOMS

4.2.1. SAM Twin Phantom



For Head mounted devices placed next to the ear, the phantom used in the evaluation of the RF exposure of the user of the wireless device is an IEEE P1528 compliant SAM Twin phantom, shaped like a human head and filled with a mixture simulating the dielectric characteristics of the brain. A left sided head and a right sided head are evaluated to determine the worst case orientation for SAR.

4.2.2. ELI 4.0 Phantom



For body mounted and frontal held push-to-talk devices, an IEC 62209-2 compliant Oval Flat Phantom (ELI 4.0) with a base plate thickness of 2mm is used.

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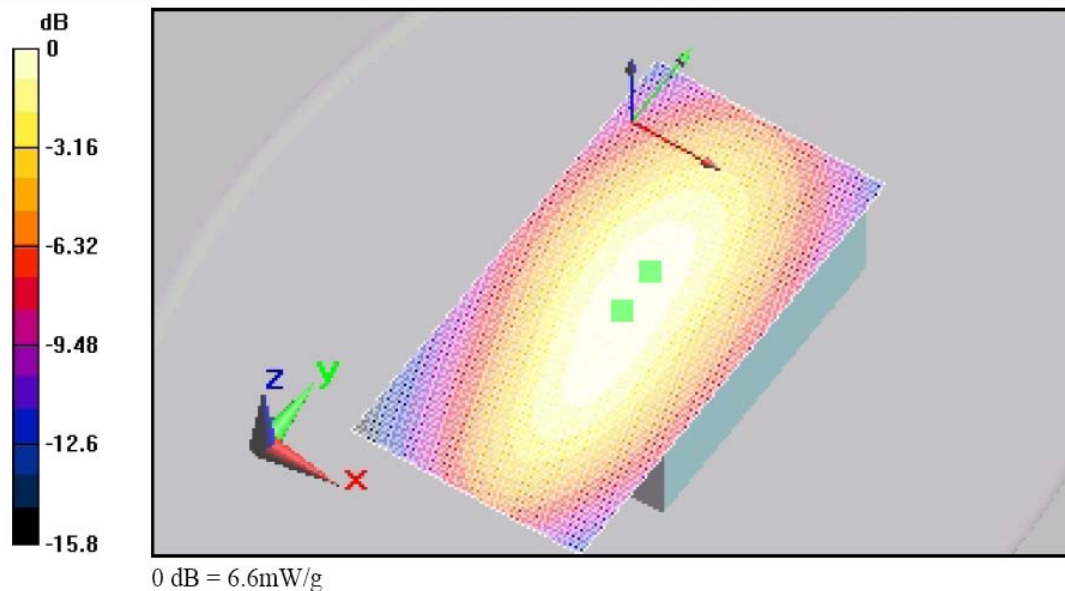
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EXHIBIT 5. SAR DATA ACQUISITION METHODOLOGY

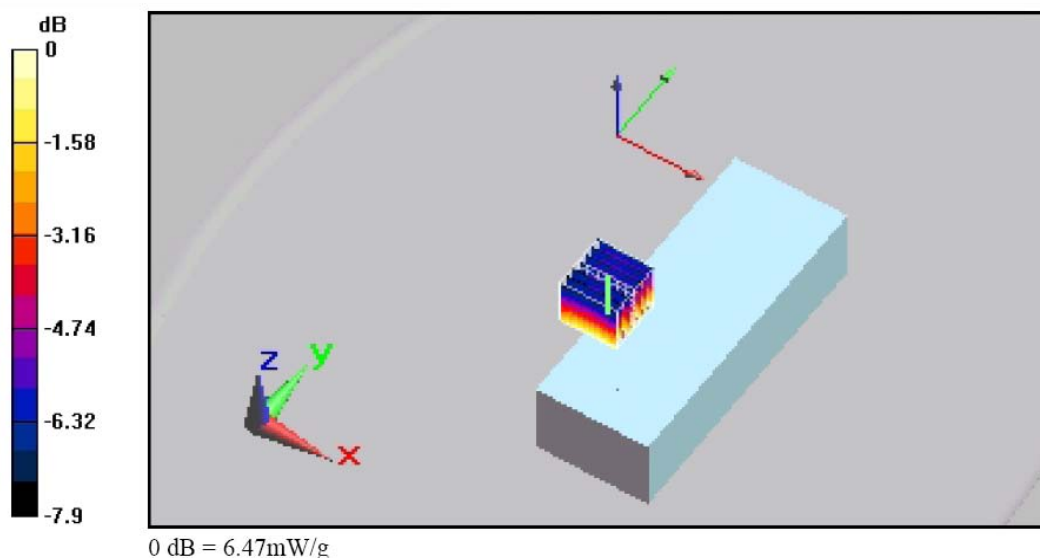
5.1. SAR MEASUREMENT PROCEDURE

The goal of the measurement process is to scan the phantom over a selected area in order to find the region of highest levels of RF energy and then to obtain a single value for the peak spatial-average of SAR over a volume that would contain one gram (in the shape of a cube) of biological tissue. The test procedure, of course, measures SAR in the simulated tissue.



< Area scan >

The software requests the user to move the probe to locations at two extreme corners of a rectangle that encloses the area to be scanned. An arbitrary origin and the spatial resolution for the scan are also specified. Under program control, the scan is performed automatically by the robot-guided probe.



< Zoom Scan >

The DASY5 software includes all numerical procedures necessary to evaluate the spatial peak SAR values.

Based on the Draft: SCC-34, SC-2, WG-2 - Computational Dosimetry, IEEE P1529/D0.0 (Draft Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) Associated with the Use of Wireless Handsets - Computational Techniques), a new algorithm has been implemented. The spatial-peak SAR can be computed over any required mass.

The base for the evaluation is a "cube" measurement in a volume of (30mm)³ (7x7x7 points). The measured volume must include the 1 g and 10 g 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. If the 10g cube or both cubes are not entirely inside the measured volumes, the system issues a warning regarding the evaluated spatial peak values within the postprocessing engine (SEMCAD X). This means that if the measured volume is shifted, higher values might be possible. To get the correct values you can use a finer measurement grid for the area scan. In complicated field distributions, a large grid spacing for the area scan might miss some details and give an incorrectly interpolated peak location.

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

1. extraction of the measured data (grid and values) from the Zoom Scan
2. calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. generation of a high-resolution mesh within the measured volume
4. interpolation of all measured values from the measurement grid to the high-resolution grid
5. extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. calculation of the averaged SAR within masses of 1 g and 10 g

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The significant parts are outlined in more detail within the following sections.

5.1.1. *Interpolation, Extrapolation and Detection of Maxima*

The probe is calibrated at the center of the dipole sensors which is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated.

In DASYS, the choice of the coordinate system defining the location of the measurement points has no influence on the uncertainty of the interpolation, Maxima Search and extrapolation routines. The interpolation, extrapolation and maximum search routines are all based on the modified Quadratic Shepard's method.

Thereby, 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. The DASYS routines construct a once-continuously differentiable function that interpolates the measurement values as follows:

- For each measurement point a trivariate (3-D) / bivariate (2-D) quadratic is computed. It interpolates the measurement values at the data point and forms a least-square fit to neighboring measurement values.
- the spatial location of the quadratic with respect to the measurement values is attenuated by an inverse distance weighting. This is performed since the calculated quadratic will fit measurement values at nearby points more accurate than at points located further away.
- After the quadratics are calculated for all measurement points, the interpolating function is calculated as a weighted average of the quadratics.

There are two control parameters that govern the behavior of the interpolation method. One specifies the number of measurement points to be used in computing the least-square fits for the local quadratics. These measurement points are the ones nearest the input point for which the quadratic is being computed. The second parameter specifies the number of measurement points that will be used in calculating the weights for the quadratics to produce the final function. The input data points used there are the ones nearest the point at which the interpolation is desired. Appropriate defaults are chosen for each of the control parameters

The trivariate quadratics that have been previously computed for the 3-D interpolation and whose input data are at the closest distance from the phantom surface, are used in order to extrapolate the fields to the surface of the phantom.

In order to determine all the field maxima in 2-D (Area Scan) and 3-D (Zoom Scan), the measurement grid is refined by a default factor of 10 and the interpolation function is used to evaluate all field values between corresponding measurement points. Subsequently, a linear search is applied to find all the candidate maxima. In a last step, non physical maxima are removed and only those maxima which are within 2 dB of the global maximum value are retained.

Important: To be processable by the interpolation/extrapolation scheme, the Area Scan requires at least 6 measurement points. The Cube Scan requires at least 10 measurement points to allow an application of these algorithms.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extrema of the SAR distribution. The uncertainty on the locations of the extrema is less than 1/20 of the grid size. Only local maxima within -2 dB of the global maximum are searched and passed for the Cube Scan measurement.

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In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). 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 5mm.

5.1.2. *Averaging and Determination of Spatial Peak SAR*

The interpolated data is used to average the SAR over the 1g and 10g cubes by spatially discretizing the entire measured volume. The resolution of this spatial grid used to calculate the averaged SAR is 1mm or about 42875 interpolated points. The resulting volumes are defined as cubical volumes containing the appropriate tissue parameters that are centered at the location. The location is defined as the center of the incremental volume (voxel).

The spatial-peak SAR must be evaluated in cubical volumes containing a mass that is within 5% of the required mass. The cubical volume centered at each location, as defined above, should be expanded in all directions until the desired value for the mass is reached, with no surface boundaries of the averaging volume extending beyond the outermost surface of the considered region. In addition, the cubical volume should not consist of more than 10% of air. If these conditions are not satisfied then the center of the averaging volume is moved to the next location. Otherwise, the exact size of the final sampling cube is found using an inverse polynomial approximation algorithm, leading to results with improved accuracy. If one boundary of the averaging volume reaches the boundary of the measured volume during its expansion, it will not be evaluated at all. Reference is kept of all locations used and those not used for averaging the SAR. All average SAR values are finally assigned to the centered location in each valid averaging volume.

All locations included in an averaging volume are marked to indicate that they have been used at least once. If a location has been marked as used, but has never been assigned to the center of a cube, the highest averaged SAR value of all other cubical volumes which have used this location for averaging, is assigned to this location. Only those locations that are not part of any valid averaging volume should be marked as unused. For the case of an unused location, a new averaging volume must be constructed which will have the unused location centered at one surface of the cube. The remaining five surfaces are expanded evenly in all directions until the required mass is enclosed, regardless of the amount of included air. Of the six possible cubes with one surface centered on the unused location, the smallest cube is used, which still contains the required mass.

If the final cube containing the highest averaged SAR touches the surface of the measured volume, an appropriate warning is issued within the postprocessing engine.

5.1.3. *Evaluation Errors*

5.1.3.1. *Cube shape*

The mentioned procedures search for the maximum averaged 1g and 10g volumes of cubical shape according to the ANSI and ICNIRP standard. A density of 1000 kg/m³ is used to represent the head tissue density and not the tissue simulating liquid density.

5.1.3.2. *Extrapolation*

For the extrapolation the distance must be specified in the Area Scan and Zoom Scan Jobs. The distance is defined as the distance between the probe sensor center and the phantom surface. The recommended distance is 4-5 mm.

5.1.3.3. *Boundary effects*

The dosimetric probes are calibrated in a gradient field with energy flow and decay in direction of the probe axis. During calibration the probe tip is completely surrounded by the simulating solution. If the probe is used in the immediate vicinity of a media boundary, the field in the probe is altered due to interaction with the field in the boundary and the probe sensitivity changes. The influence of the boundary effect depends on the probe construction, the media parameters and the probe orientation with respect to the boundary. It disappears at a distance of 1mm (E1D-probe) to 5mm (ET3D-probes) between the probe tip and the boundary. The boundary effect must be considered in the extrapolation to the surface.

EXHIBIT 6. MEASUREMENTS, EXAMINATIONS & TEST DATA

6.1. TEST CONFIGURATIONS

6.1.1. UHF Narrow Band 435-470MHz

D.U.T. Information		Condition	
Product Name	Symbol Technologies Inc.	Robot Type	6 Axis
Model Number	7545MBWN	Scan Type	SAR – Area/Zoom/Att. Vs Depth
Serial Number	STBCUD48749201	Measured Field	E
Frequency Band [MHz]	Narrow Band: 435-470 MHz	Phantom Type	2 _{mm} base Flat Phantom
Frequency Tested [MHz]	435 ,447, 458, 470 MHz	Phantom Position	Waist
Maximum Conducted Power	Narrow Band: 30dBm ± 0.5dB ³	Room Temperature [°C]	24.0 ± 1
Antenna Type	One – Rubber Duck type	Room Humidity [%]	40 ± 10
Modulation	UHF FSK	Tissue Temperature [°C]	21.4 ± 1
Worst Case Duty Cycle	100 %		
Duty Cycle Tested	30% ⁴ UHF		
Source(or Usage)-Based Time-Average Factor	1		

Type of Tissue	Muscle
Test Frequency [MHz]	450
Target Conductivity [S/m]	0.94
Measured Conductivity [S/m]	0.98 (4.3 %)
Target Dielectric Constant	56.7
Measured Dielectric Constant	56.4 (-0.5 %)
Penetration Depth (Plane Wave Excitation) [mm]	20.2
Probe Model Number	EX3DV3
Probe Serial Number	3208
Probe Orientation	Isotropic
Probe Sensor Offset [mm]	1
Probe Tip Diameter [mm]	4.0
Conversion Factor (γ)	7.08 (+/- 12.0%)

³ Tolerance specified is obtained from the manufacturer’s tune-up procedures

⁴ The UHF data operation was set to transmit at 30% duty cycle to reduce thermal issues encountered in transmitting at 100% Duty Cycle. The manufacturer’s UHF network protocol/architecture limits the maximum duty cycle to below 24%.

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6.1.2. Wifi 802.11 a/b/g/n 2450 MHz

D.U.T. Information		Condition	
Product Name	Symbol Technologies Inc.	Robot Type	6 Axis
Model Number	7545MBWN	Scan Type	SAR – Area/Zoom/Att. Vs Depth
Serial Number	STBCUD48749201	Measured Field	E
Frequency Band [MHz]	802.11 b/g 2450 MHz	Phantom Type	2 _{mm} base Flat Phantom
Frequency Tested [MHz]	2412, 2437, 2462 MHz	Phantom Position	Waist
Maximum Conducted Power	18/16 dBm ± 1.5dB ⁵	Room Temperature [°C]	24.0 ± 1
Antenna Type	One – Integrated PCB type	Room Humidity [%]	40 ± 10
Modulation	BPSK, QPSK, QAM, OFDM	Tissue Temperature [°C]	21.4 ± 1
Worst Case Duty Cycle	100 %		
Duty Cycle Tested	100%		
Source(or Usage)-Based Time-Average Factor	1		

Type of Tissue	Muscle
Test Frequency [MHz]	2450
Target Conductivity [S/m]	1.95
Measured Conductivity [S/m]	1.97 (0.9 %)
Target Dielectric Constant	52.7
Measured Dielectric Constant	52.7 (0.1 %)
Penetration Depth (Plane Wave Excitation) [mm]	19.8
Probe Model Number	EX3DV4
Probe Serial Number	3673
Probe Orientation	Isotropic
Probe Sensor Offset [mm]	1
Probe Tip Diameter [mm]	2.5
Conversion Factor (γ)	7.10 (+/- 12.0%)

⁵ Tolerance specified is obtained from the manufacturer’s tune-up procedures

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6.1.3. Wifi 802.11 a/b/g/n 5200-5825 MHz

D.U.T. Information		Condition	
Product Name	Symbol Technologies Inc.	Robot Type	6 Axis
Model Number	7545MBWN	Scan Type	SAR – Area/Zoom/Att. Vs Depth
Serial Number	STBCUD48749201	Measured Field	E
Frequency Band [MHz]	802.11 a/n 5200-5825 MHz	Phantom Type	2mm base Flat Phantom
Frequency Tested [MHz]	5.180, 5240, 5260, 5320, 5520, 5580, 5620, 5680, 5745, 5785, 5825 MHz	Phantom Position	Waist
Maximum Conducted Power	13/12 dBm±1.5dB ⁶	Room Temperature [°C]	24.0 ± 1
Antenna Type	One – Integrated PCB type	Room Humidity [%]	40 ± 10
Modulation	BPSK, QPSK, QAM, OFDM	Tissue Temperature [°C]	21.4 ± 1
Worst Case Duty Cycle	100 %		
Duty Cycle Tested	100%		
Source(or Usage)-Based Time-Average Factor	1		

Type of Tissue	Muscle
Test Frequency [MHz]	5500
Target Conductivity [S/m]	5.65
Measured Conductivity [S/m]	5.75 (1.8 %)
Target Dielectric Constant	48.6
Measured Dielectric Constant	46.6 (-4.1 %)
Penetration Depth (Plane Wave Excitation) [mm]	6.4
Probe Model Number	EX3DV4
Probe Serial Number	3673
Probe Orientation	Isotropic
Probe Sensor Offset [mm]	1
Probe Tip Diameter [mm]	2.5
Conversion Factor (γ)	5200MHz - 4.95 (+/- 12.0%) 4300MHz - 4.73 (+/- 12.0%) 5500MHz - 4.87 (+/- 12.0%) 5600MHz - 4.66 (+/- 12.0%) 5800MHz - 4.42 (+/- 12.0%)

⁶ Tolerance specified is obtained from the manufacturer’s tune-up procedures

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6.2. GENERAL TEST SETUP

6.2.1. *Equipment Configuration*

Power and signal distribution, grounding, interconnecting cabling and physical placement of equipment of a test system shall simulate the typical application and usage in so far as is practicable, and shall be in accordance with the relevant product specifications of the manufacturer.

The configuration that tends to maximize the D.U.T's emission or minimize its immunity is not usually intuitively obvious and in most instances selection will involve some trial and error testing. For example, interface cables may be moved or equipment re-orientated during initial stages of testing and the effects on the results observed.

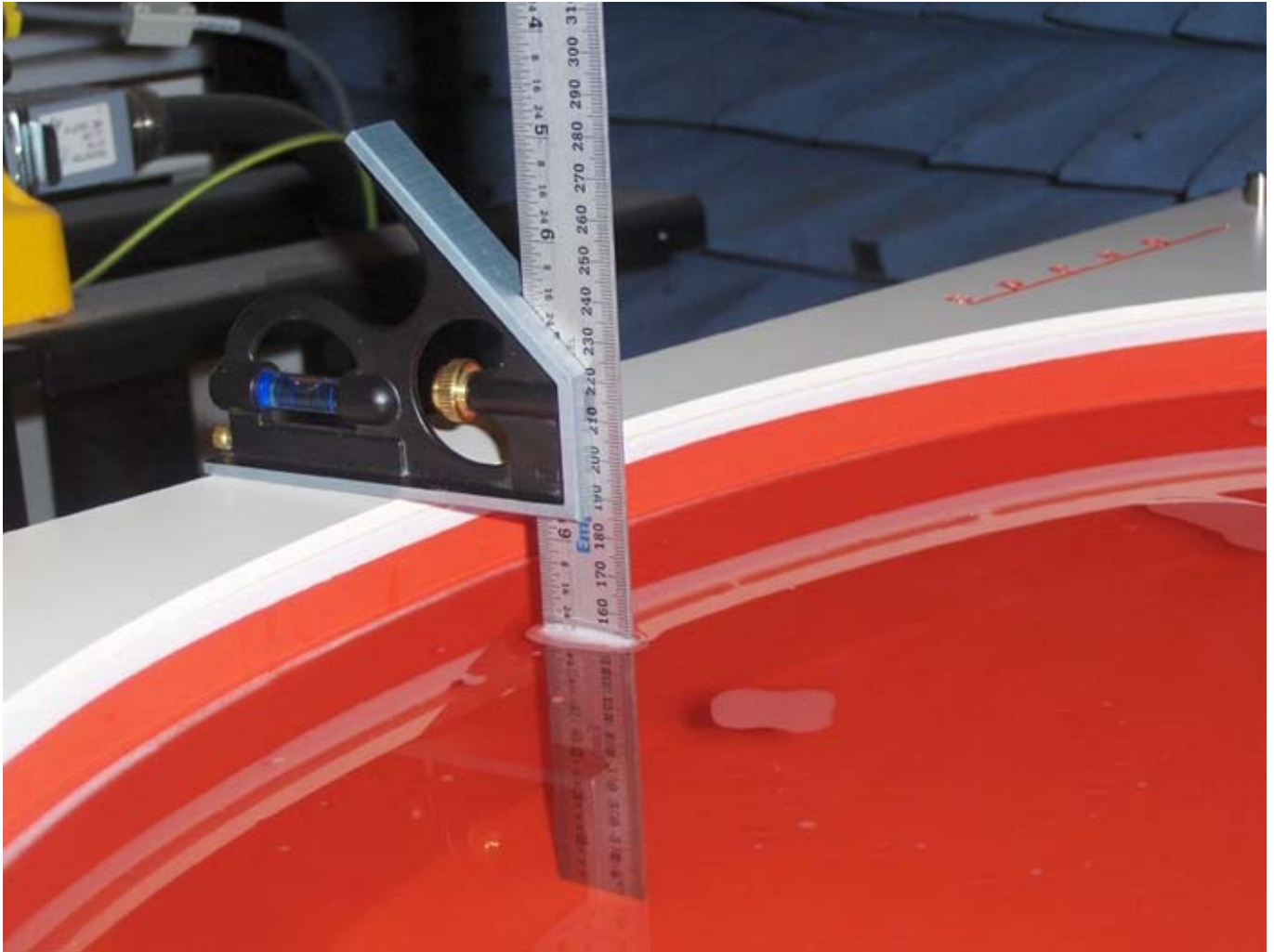
Only configurations within the range of positions likely to occur in normal use need to be considered.

The configuration selected shall be fully detailed and documented in the test report, together with the justification for selecting that particular configuration.

6.2.2. *Exercising Equipment*

The exercising equipment and other auxiliary equipment shall be sufficiently decoupled from the D.U.T. so that the performance of such equipment does not significantly influence the test results.

6.3. PHOTOGRAPHS OF TISSUE DEPTH



< Phantom filled with body tissue liquid: liquid level = 150mm \pm 5mm >

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6.3.1. *Body Configuration for Front Side Position*



<Front Side Position >

Remark: Distance between Front side of the EUT and the phantom = 0 mm

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6.3.2. *Body Configuration for Front Side Position*



< Back Side Position >

Remark: Distance between Back side of the EUT and the phantom = 0 mm

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6.3.3. *Body Configuration for Left Edge Position*



<Left Edge Position >

Remark: Distance between Left Edge side of the EUT and the phantom = 0 mm

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6.3.4. *Body Configuration for Right Edge Position*



<Right Edge Position >

Remark: Distance between Right Edge side of the EUT and the phantom = 0 mm

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6.4. SAR MEASUREMENT DATA

6.4.1. Body Configuration Measured SAR Results:

		Channel (MHz)	SAR1g (mW/g)	SAR10g (mW/g)	Drift (dB)	Scaling	
						Factor	(dB)
435-470 MHz	Front	435	0.262	0.191	0.090	1.00	0.00
		446	0.202	0.147	0.040	1.00	0.00
		458	0.157	0.114	0.090	1.02	0.10
		470	0.132	0.096	0.070	1.02	0.10
	Back	435	0.105	0.070	0.040	1.00	0.00
		446	0.064	0.048	0.010	1.00	0.00
		458	0.053	0.039	0.070	1.02	0.10
		470	0.040	0.030	0.140	1.02	0.10
	Left	435	0.103	0.076	0.050	1.00	0.00
		446	0.008	0.061	0.090	1.00	0.00
		458	0.058	0.042	0.150	1.02	0.10
		470	0.065	0.048	0.100	1.02	0.10
	Right	435	0.095	0.072	0.040	1.00	0.00
		446	0.211	0.156	0.070	1.00	0.00
		458	0.056	0.041	0.100	1.02	0.10
		470	0.038	0.028	0.110	1.02	0.10
2450 MHz	Front	2,412	0.038	0.023	0.350	1.58	2.00
		2,437	0.039	0.023	0.090	1.58	2.00
		2,462	0.010	0.006	-0.162	1.78	2.50
	Left	2,412	0.107	0.054	-0.160	1.58	2.00
		2,437	0.196	0.098	0.140	1.58	2.00
		2,462	0.703	0.351	-0.150	1.78	2.50
5200-5825 MHz	Front	5,180	0.041	0.017	-0.140	1.29	1.10
		5,240	0.038	0.016	0.140	1.23	0.90
		5,260	0.047	0.018	-0.140	1.15	0.60
		5,320	0.050	0.016	0.210	1.12	0.50
		5,520	0.024	0.010	-0.200	1.32	1.20
		5,580	0.025	0.009	0.140	1.55	1.90
		5,620	0.029	0.009	-0.190	1.41	1.50
		5,680	0.017	0.005	-0.160	1.55	1.90
		5,745	0.034	0.001	0.130	1.66	2.20
	Right	5,805	0.014	0.003	0.180	1.62	2.10
		5,180	0.218	0.072	-0.040	1.29	1.10
		5,240	0.200	0.066	-0.010	1.23	0.90
		5,260	0.256	0.093	-0.050	1.15	0.60
		5,320	0.182	0.062	0.050	1.12	0.50
		5,520	0.187	0.066	0.042	1.32	1.20
		5,580	0.244	0.088	0.110	1.55	1.90
		5,620	0.245	0.089	0.220	1.41	1.50
		5,680	0.211	0.076	0.200	1.55	1.90
5,745	0.160	0.055	0.060	1.66	2.20		
5,805	0.012	0.050	0.210	1.62	2.10		

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File #: TEK-737QR-SAR3
September 17, 2014

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6.4.2. Body - Front Facing Phantom, 435MHz, UHF 30% Duty Cycle ; #01

Test Laboratory: Ultratech Group of Labs
File Name: [435MHz_2.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 450 MHz

Communication System: UID 10000, CW; Frequency: 435 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 435$ MHz; $\sigma = 0.969$ S/m; $\epsilon_r = 56.807$; $\rho = 1000$ kg/m

Phantom section: Flat Section

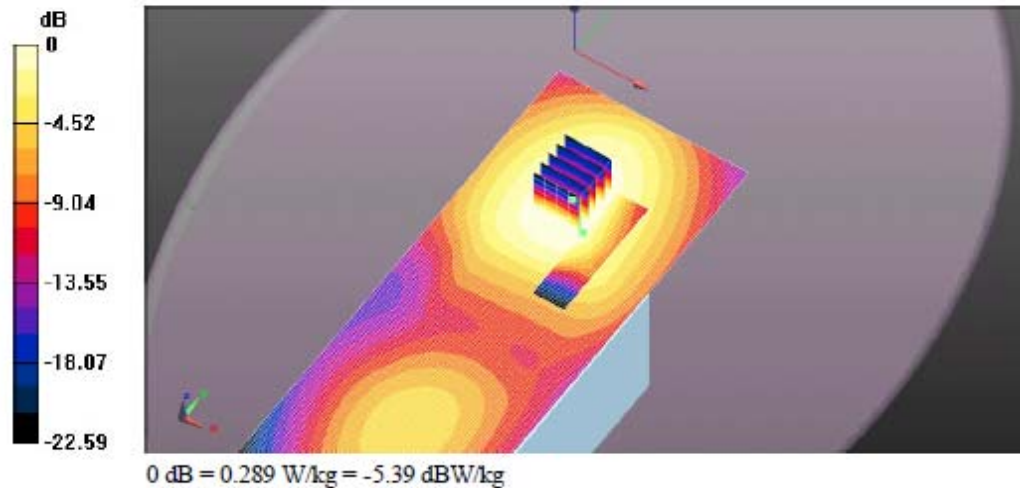
DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 3.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- SEMCAD X Version 14.6.10 (7164)

Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/Area Scan (81x211x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.289 W/kg

Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/Zoom Scan (5x5x7) (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 15.671 V/m; Power Drift= 0.10 dB Peak SAR (extrapolated) = 0.358 W/kg
SAR(1 g) = 0.262 W/kg; SAR(10 g) = 0.191 W/kg (SAR corrected for target medium) Maximum value of SAR (measured) = 0.276 W/kg

Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/FindMax (11x41x1): Interpolated grid:
dx=2.000 mm, dy=2.000 mm
Maximum value of SAR (interpolated) = 0.240 W/kg



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File #: **TEK-737QR-SAR3**
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6.4.2.1. Body - Front Facing Phantom, 435MHz, UHF 30% Duty Cycle; #02

Test Laboratory: Ultratech Group of Labs
File Name: [446MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 450 MHz
Communication System: UID 10000, CW; Frequency: 446.66 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 446.66$ MHz; $\sigma = 0.979$ S/m; $\epsilon_r = 56.507$; $\rho = 1000$ kg/m
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 3.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- SEMCAD X Version 14.6.10 (7164)

Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/Area Scan (81x121x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.223 W/kg

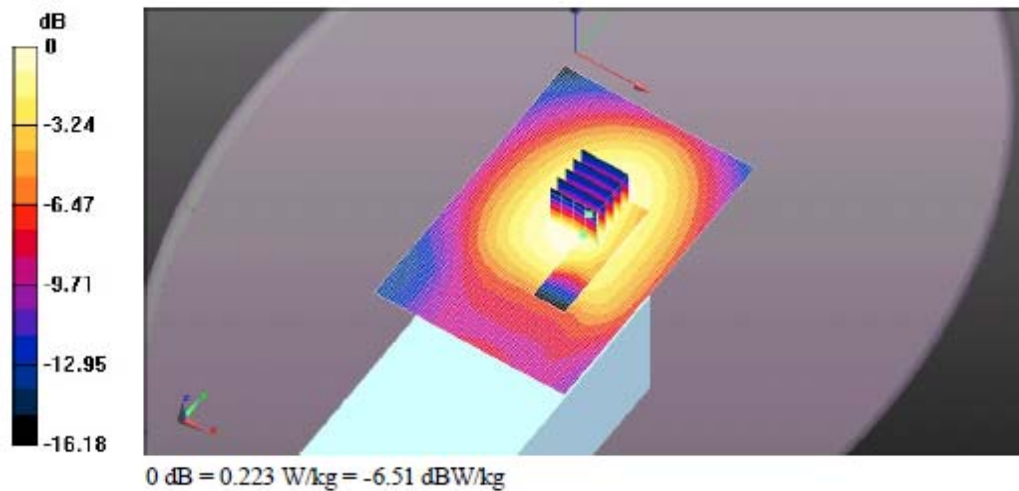
Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 14.988 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 0.280 W/kg
SAR(1 g) = 0.202 W/kg; SAR(10 g) = 0.147 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.213 W/kg

Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/FindMax (11x41x1): Interpolated grid:
dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.210 W/kg



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File #: **TEK-737QR-SAR3**
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6.4.2.1. Body - Front Facing Phantom, 458MHz, UHF 30% Duty Cycle; #03

Test Laboratory: Ultratech Group of Labs
File Name: [458MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 450 MHz

Communication System: UID 10000, CW; Frequency: 458.32 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 458.32$ MHz; $\sigma = 0.987$ S/m; $\epsilon_r = 56.34$; $\rho = 1000$ kg/m
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 3.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- SEMCAD X Version 14.6.10 (7164)

Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/Area Scan (81x101x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

[Info: Interpolated medium parameters used for SAR evaluation.](#) Maximum value of SAR (interpolated) = 0.175 W/kg

Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

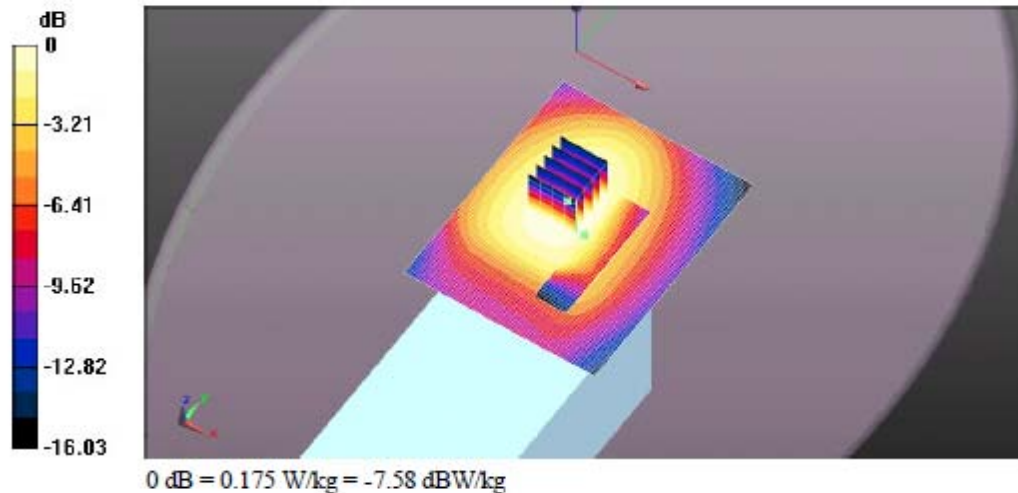
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.554 V/m; Power Drift = 0.09 dB Peak SAR (extrapolated) = 0.219 W/kg
SAR(1 g) = 0.157 W/kg; SAR(10 g) = 0.114 W/kg (SAR corrected for target medium)

[Info: Interpolated medium parameters used for SAR evaluation.](#) Maximum value of SAR (measured) = 0.165 W/kg

Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/FindMax (11x41x1): Interpolated grid:
dx=2.000 mm, dy=2.000 mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.132 W/kg



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File #: TEK-737QR-SAR3
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6.4.2.2. Body - Front Facing Phantom, 470MHz, UHF 30% Duty Cycle; #4

Test Laboratory: Ultratech Group of Labs
File Name: [470MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 450 MHz

Communication System: UID 10000, CW; Frequency: 470 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 470$ MHz; $\sigma = 0.997$ S/m; $\epsilon_r = 56.237$; $\rho = 1000$ kg/m

Phantom section: Flat Section

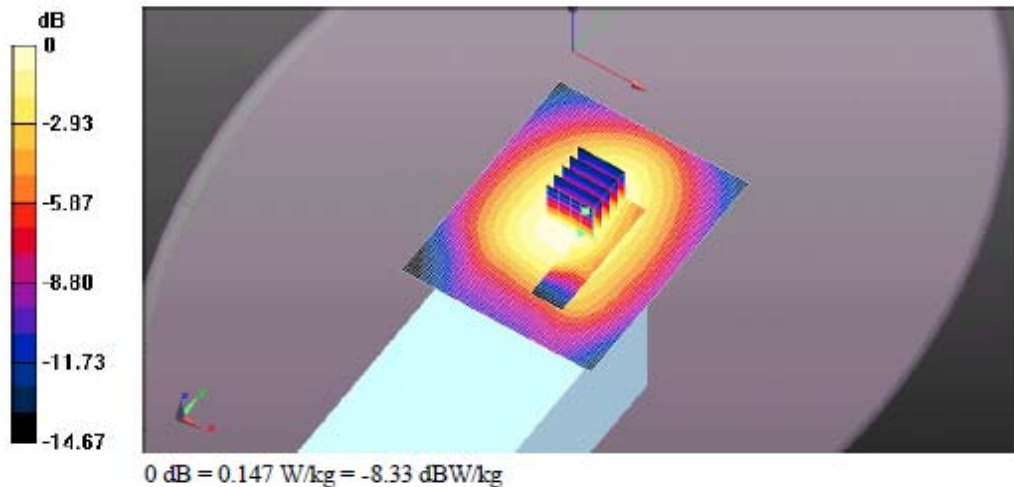
DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 3.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- SEMCAD X Version 14.6.10 (7164)

Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/Area Scan (81x101x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.147 W/kg

Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/Zoom Scan (5x5x7) (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 11.848 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 0.184 W/kg
SAR(1 g) = 0.132 W/kg; SAR(10 g) = 0.095 W/kg (SAR corrected for target medium) Maximum value of SAR (measured) = 0.139 W/kg

Front to Phantom 435-470MHz/Body - Front Facing, d=0mm, Pin=1W (ES-Probe)/FindMax (11x41x1): Interpolated grid:
dx=2.000 mm, dy=2.000 mm
Maximum value of SAR (interpolated) = 0.136 W/kg



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6.4.2.1. Body - Back Facing Phantom, 435MHz, UHF 30% Duty Cycle; #5

Test Laboratory: Ultratech Group of Labs
File Name: [435_FullScanMHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 450 MHz

Communication System: UID 10000, CW; Frequency: 435 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 435$ MHz; $\sigma = 0.969$ S/m; $\epsilon_r = 56.807$; $\rho = 1000$ kg/m

Phantom section: Flat Section

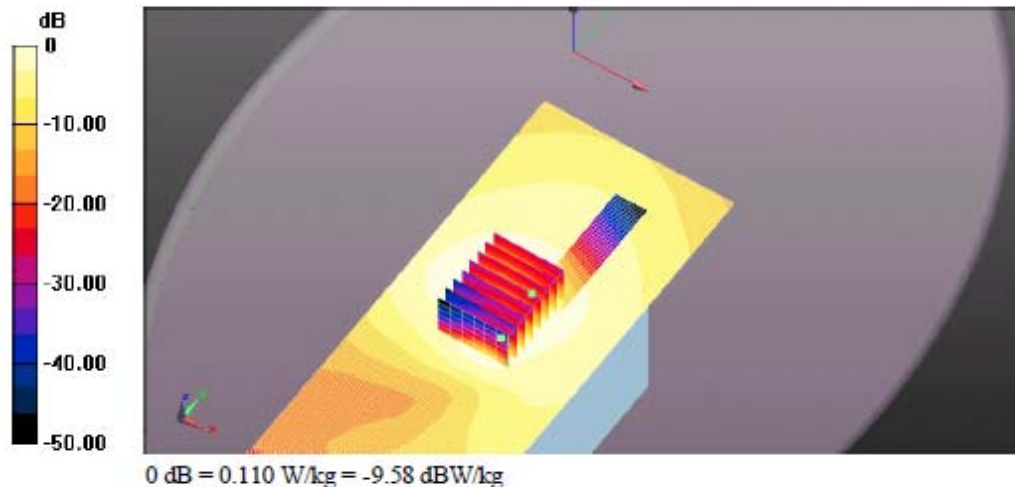
DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 3.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- SEMCAD X Version 14.6.10 (7164)

Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/Area Scan (81x201x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.110 W/kg

Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/Zoom Scan (5x5x7) (7x8x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 9.718 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 0.186 W/kg
SAR(1 g) = 0.105 W/kg; SAR(10 g) = 0.070 W/kg (SAR corrected for target medium) Maximum value of SAR (measured) = 0.116 W/kg

Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/FindMax (11x41x1): Interpolated grid:
dx=2.000 mm, dy=2.000 mm
Maximum value of SAR (interpolated) = 0.0862 W/kg



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File #: **TEK-737QR-SAR3**
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6.4.2.1. Body - Back Facing Phantom, 446MHz, UHF 30% Duty Cycle; #6

Test Laboratory: Ultratech Group of Labs
File Name: [446MHz_da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 450 MHz

Communication System: UID 10000, CW; Frequency: 446 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 446$ MHz; $\sigma = 0.978$ S/m; $\epsilon_r = 56.521$; $\rho = 1000$ kg/m
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 3.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/Area Scan (81x101x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

Info: [Interpolated medium parameters used for SAR evaluation.](#) Maximum value of SAR (interpolated) = 0.0703 W/kg

Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

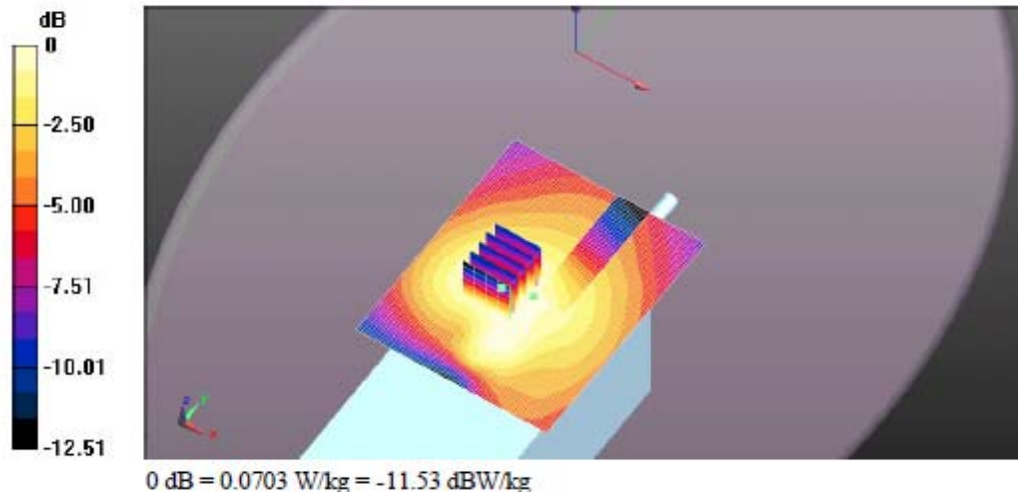
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 8.227 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 0.0860 W/kg
SAR(1 g) = 0.064 W/kg; SAR(10 g) = 0.048 W/kg (SAR corrected for target medium)

Info: [Interpolated medium parameters used for SAR evaluation.](#) Maximum value of SAR (measured) = 0.0681 W/kg

Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/FindMax (11x41x1): Interpolated grid:
dx=2.000 mm, dy=2.000 mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.0621 W/kg



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6.4.2.1. Body - Back Facing Phantom, 458MHz, UHF 30% Duty Cycle; #7

Test Laboratory: Ultratech Group of Labs
File Name: [458MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 450 MHz

Communication System: UID 10000, CW; Frequency: 458 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 458 \text{ MHz}$; $\sigma = 0.987 \text{ S/m}$; $\epsilon_r = 56.343$; $\rho = 1000 \text{ kg/m}$
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 3.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- SEMCAD X Version 14.6.10 (7164)

Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/Area Scan (81x101x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm

[Info: Interpolated medium parameters used for SAR evaluation.](#) Maximum value of SAR (interpolated) = 0.0581 W/kg

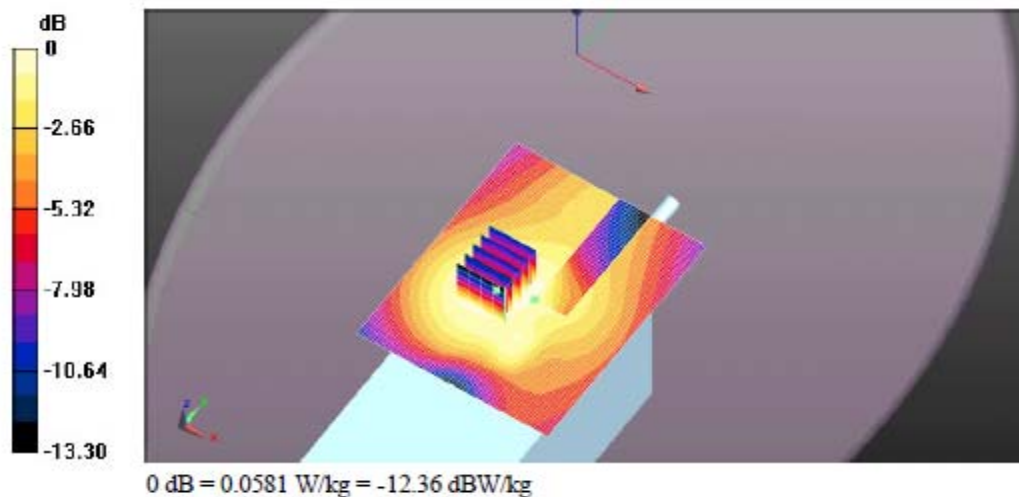
Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/Zoom Scan (5x5x7) (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 7.099 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 0.0710 W/kg
SAR(1 g) = 0.053 W/kg; SAR(10 g) = 0.039 W/kg (SAR corrected for target medium)

[Info: Interpolated medium parameters used for SAR evaluation.](#) Maximum value of SAR (measured) = 0.0562 W/kg

Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/FindMax (11x41x1): Interpolated grid:
dx=2.000 mm, dy=2.000 mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.0467 W/kg



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6.4.2.1. Body - Back Facing Phantom, 470MHz, UHF 30% Duty Cycle; #8

Test Laboratory: Ultratech Group of Labs
File Name: [470MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 450 MHz

Communication System: UID 10000, CW; Frequency: 470 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 470$ MHz; $\sigma = 0.997$ S/m; $\epsilon_r = 56.237$; $\rho = 1000$ kg/m

Phantom section: Flat Section

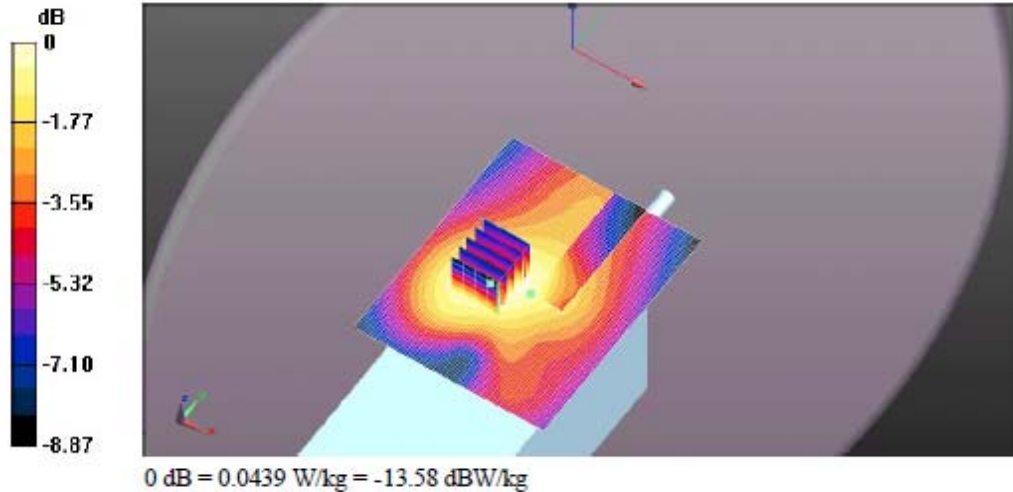
DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 3.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/Area Scan (81x101x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0439 W/kg

Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/Zoom Scan (5x5x7) (5x5x7)/Cube 0:
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 6.078 V/m; Power Drift = 0.14 dB Peak SAR (extrapolated) = 0.0520 W/kg
SAR(1 g) = 0.040 W/kg; SAR(10 g) = 0.030 W/kg (SAR corrected for target medium) Maximum value of SAR (measured) = 0.0424 W/kg

Front to Phantom 435-470MHz/Body - Back Facing, d=0mm, Pin=1W (ES-Probe)/FindMax (11x41x1): Interpolated grid:
dx=2.000 mm, dy=2.000 mm
Maximum value of SAR (interpolated) = 0.0346 W/kg



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6.4.2.1. Body – Left Facing Phantom, 435MHz, UHF 30% Duty Cycle; #9

Test Laboratory: Ultratech Group of Labs
File Name: [435MHz_Full Area Scan Front.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 435 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 435 \text{ MHz}$; $\sigma = 0.969 \text{ S/m}$; $\epsilon_r = 56.807$; $\rho = 1000 \text{ kg/m}$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_2.45G/Left Side Position,d=0mm, Pin=1W, EX-Probe/FindMax (11x71x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Maximum value of SAR (interpolated) = 0.155 W/kg

Configuration_Body_2.45G/Left Side Position,d=0mm, Pin=1W, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

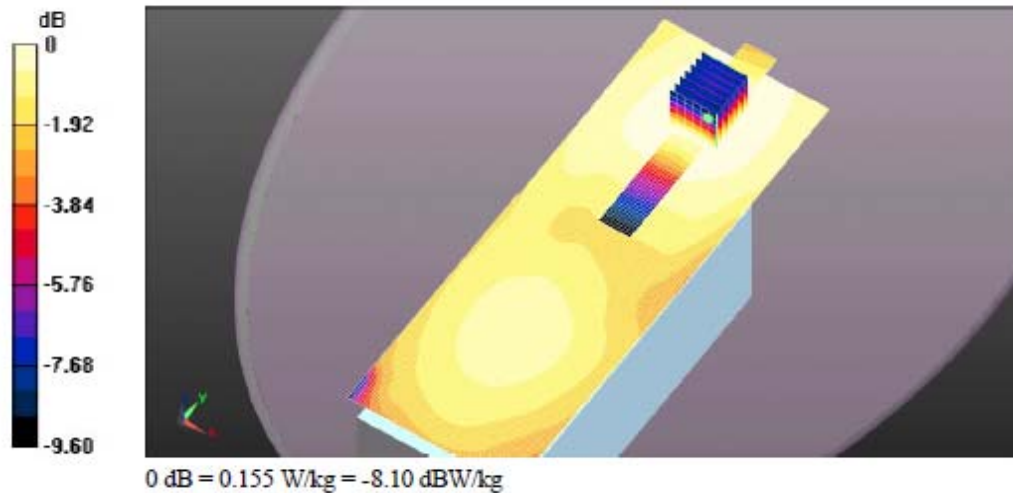
dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.838 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 0.209 W/kg

SAR(1 g) = 0.153 W/kg; SAR(10 g) = 0.112 W/kg (SAR corrected for target medium) Maximum value of SAR (measured) = 0.161 W/kg

Configuration_Body_2.45G/Left Side Position,d=0mm, Pin=1W, EX-Probe/Area Scan (71x201x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.202 W/kg



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File #: **TEK-737QR-SAR3**
September 17, 2014

- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

6.4.2.1. Body – Left Facing Phantom, 446MHz, UHF 30% Duty Cycle; #10

Test Laboratory: Ultratech Group of Labs
File Name: [446MHz_Left Side.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number

Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 446.66 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 446.66$ MHz; $\sigma = 0.979$ S/m; $\epsilon_r = 56.507$; $\rho = 1000$ kg/m

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_435-470MHz/Left Side, d=0mm, Pin=1W, EX-Probe/FindMax (11x71x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0890 W/kg

Configuration_Body_435-470MHz/Left Side, d=0mm, Pin=1W, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.276 V/m; Power Drift = 0.09 dB Peak SAR (extrapolated) = 0.115 W/kg

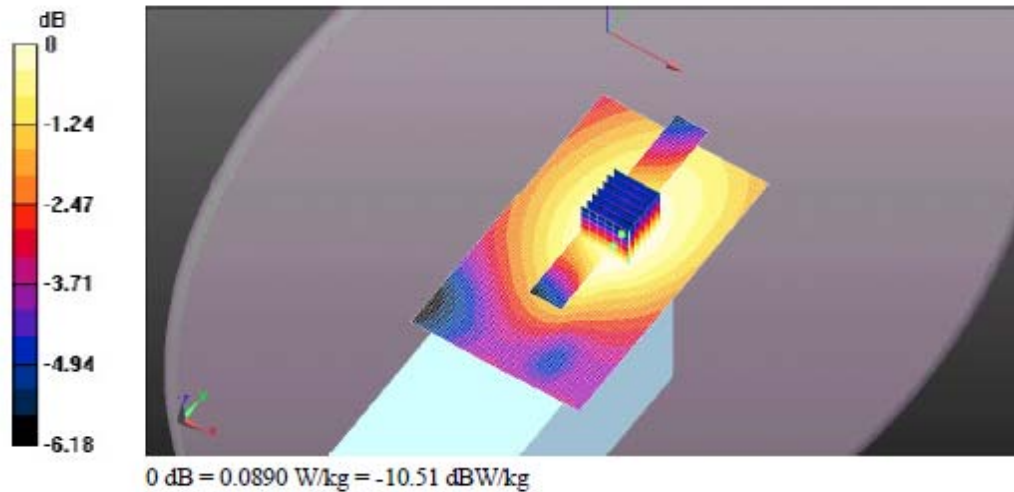
SAR(1 g) = 0.083 W/kg; SAR(10 g) = 0.061 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0881 W/kg

Configuration_Body_435-470MHz/Left Side, d=0mm, Pin=1W, EX-Probe/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.0948 W/kg



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File #: TEK-737QR-SAR3
September 17, 2014

- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

6.4.2.1. Body – Left Facing Phantom, 458 MHz, UHF 30% Duty Cycle; #11

Test Laboratory: Ultratech Group of Labs
File Name: [458MHz_Left Side.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 458.32 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 458.32$ MHz; $\sigma = 0.987$ S/m; $\epsilon_r = 56.34$; $\rho = 1000$ kg/m
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_435-470MHz/Left Side, d=0mm, Pin=1W, EX-Probe/FindMax (11x71x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0599 W/kg

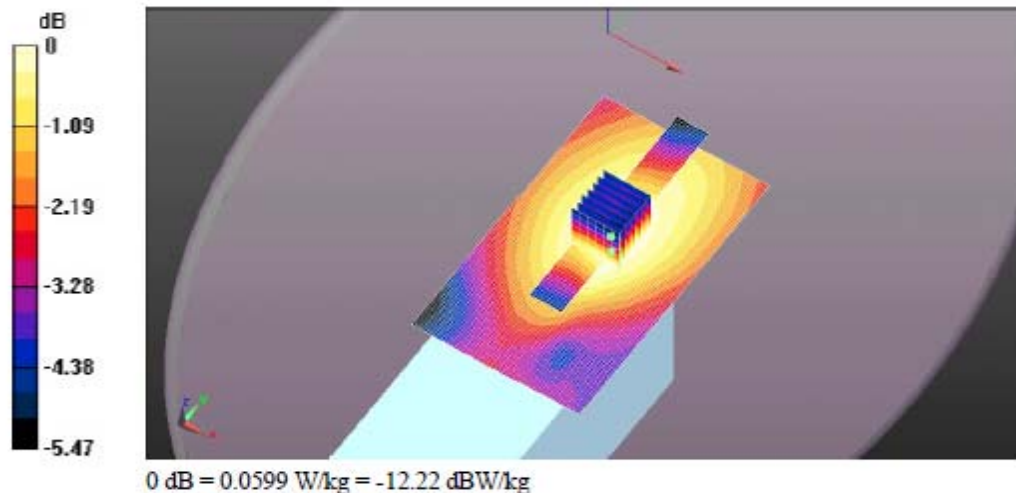
Configuration_Body_435-470MHz/Left Side, d=0mm, Pin=1W, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.396 V/m; Power Drift = 0.15 dB Peak SAR (extrapolated) = 0.0800 W/kg
SAR(1 g) = 0.058 W/kg; SAR(10 g) = 0.042 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0611 W/kg

Configuration_Body_435-470MHz/Left Side, d=0mm, Pin=1W, EX-Probe/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0661 W/kg



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File #: TEK-737QR-SAR3
September 17, 2014

- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

6.4.2.1. Body – Left Facing Phantom, 470 MHz, UHF 30% Duty Cycle; #12

Test Laboratory: Ultratech Group of Labs
File Name: [470MHz_Left Side.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 470 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 470$ MHz; $\sigma = 0.997$ S/m; $\epsilon_r = 56.237$; $\rho = 1000$ kg/m

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_435-470 MHz/Left Side, d=0mm, Pin=1W, EX-Probe/FindMax (11x71x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Maximum value of SAR (interpolated) = 0.0692 W/kg

Configuration_Body_435-470 MHz/Left Side, d=0mm, Pin=1W, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm

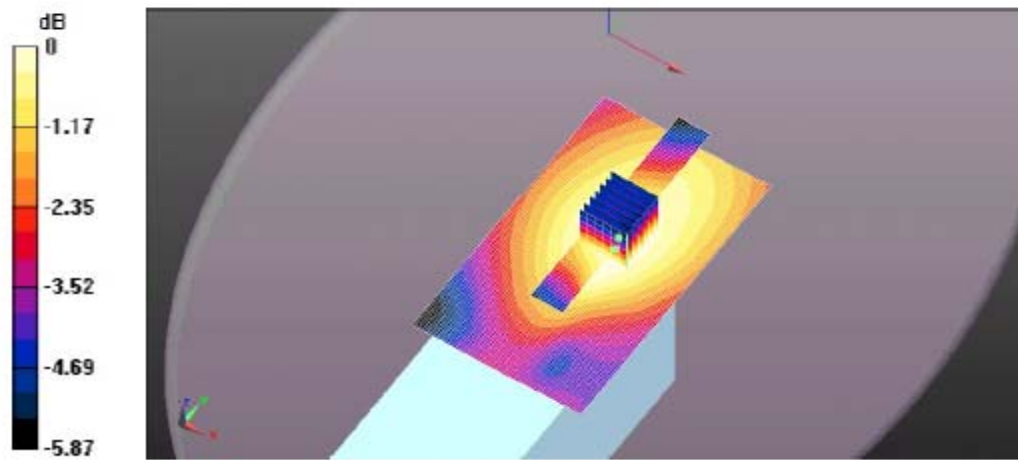
Reference Value = 9.016 V/m; Power Drift = 0.10 dB Peak SAR (extrapolated) = 0.0900 W/kg

SAR(1 g) = 0.065 W/kg; SAR(10 g) = 0.048 W/kg (SAR corrected for target medium) Maximum value of SAR (measured) = 0.0696 W/kg

Configuration_Body_435-470 MHz/Left Side, d=0mm, Pin=1W, EX-Probe/Area Scan (71x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0745 W/kg



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File #: TEK-737QR-SAR3
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- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

6.4.2.1. Body – Right Facing Phantom, 435 MHz, UHF 30% Duty Cycle; #13

Test Laboratory: Ultratech Group of Labs
File Name: [435MHz_Full Area Scan Front_2.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 435 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 435 \text{ MHz}$; $\sigma = 0.969 \text{ S/m}$; $\epsilon_r = 56.807$; $\rho = 1000 \text{ kg/m}$

Phantom section: Flat Section

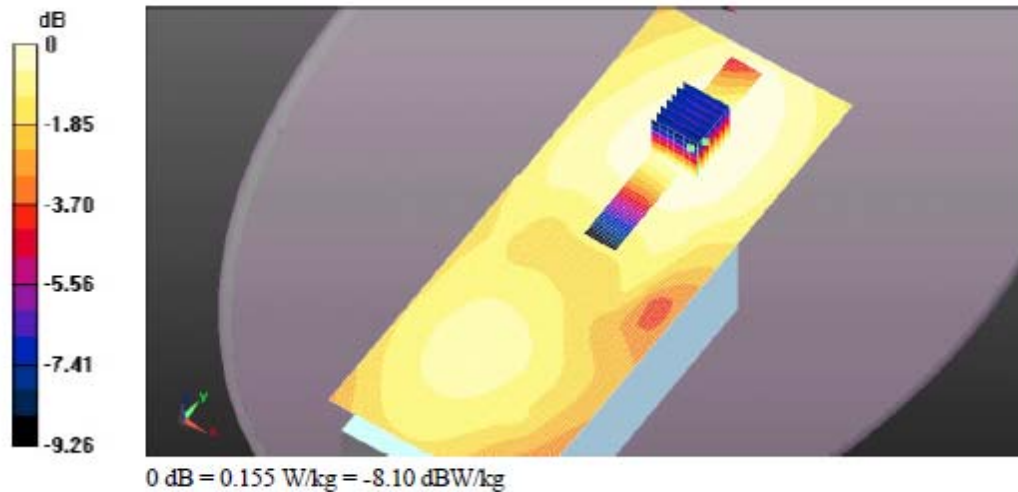
DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_2.45G/Right Side Position_d=0mm, Pin=1W, EX-Probe/FindMax (11x71x1): Interpolated grid:
dx=2.000 mm, dy=2.000 mm
Maximum value of SAR (interpolated) = 0.155 W/kg

Configuration_Body_2.45G/Right Side Position_d=0mm, Pin=1W, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid:
dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.264 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 0.204 W/kg
SAR(1 g) = 0.148 W/kg; SAR(10 g) = 0.109 W/kg (SAR corrected for target medium) Maximum value of SAR (measured) = 0.156 W/kg

Configuration_Body_2.45G/Right Side Position_d=0mm, Pin=1W, EX-Probe/Area Scan (81x211x1): Interpolated grid:
dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.198 W/kg



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File #: **TEK-737QR-SAR3**
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6.4.2.1. Body – Right Facing Phantom, 446 MHz, UHF 30% Duty Cycle; #14

Test Laboratory: Ultratech Group of Labs
File Name: [446MHz_Right Side.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number

Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 446.66 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated): $f = 446.66$ MHz; $\sigma = 0.979$ S/m; $\epsilon_r = 56.507$; $\rho = 1000$ kg/m

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_435-470MHz/Right Side, d=0mm, Pin=1W, EX-Probe/FindMax (11x71x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.210 W/kg

Configuration_Body_435-470MHz/Right Side, d=0mm, Pin=1W, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm

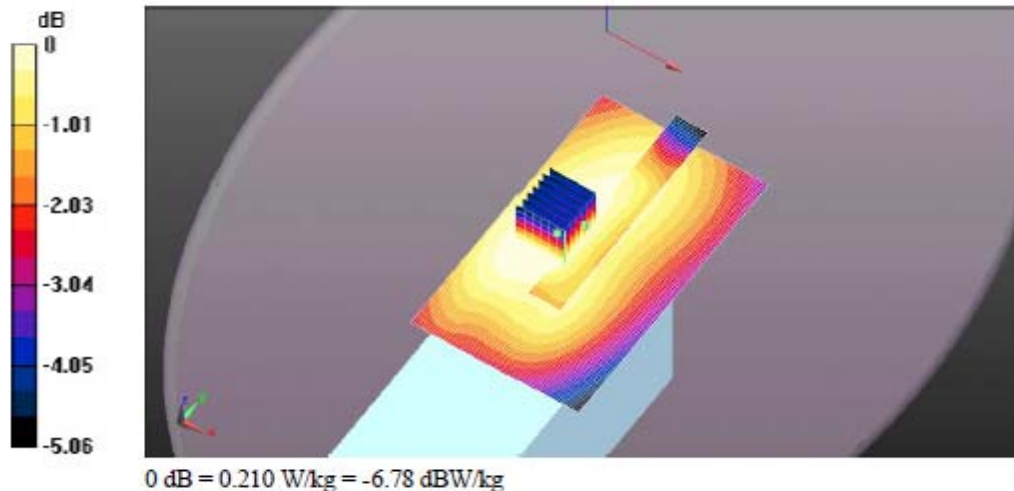
Reference Value = 15.996 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 0.286 W/kg

SAR(1 g) = 0.211 W/kg; SAR(10 g) = 0.156 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.221 W/kg

Configuration_Body_435-470MHz/Right Side, d=0mm, Pin=1W, EX-Probe/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.238 W/kg



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File #: TEK-737QR-SAR3
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- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

6.4.2.1. Body – Right Facing Phantom, 458 MHz, UHF 30% Duty Cycle; #15

Test Laboratory: Ultratech Group of Labs
File Name: [458MHz_Right Side.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 458.32 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 458.32$ MHz; $\sigma = 0.987$ S/m; $\epsilon_r = 56.34$; $\rho = 1000$ kg/m
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_435-470 MHz/Right Side, d=0mm, Pin=1W, EX-Probe/FindMax (11x71x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0529 W/kg

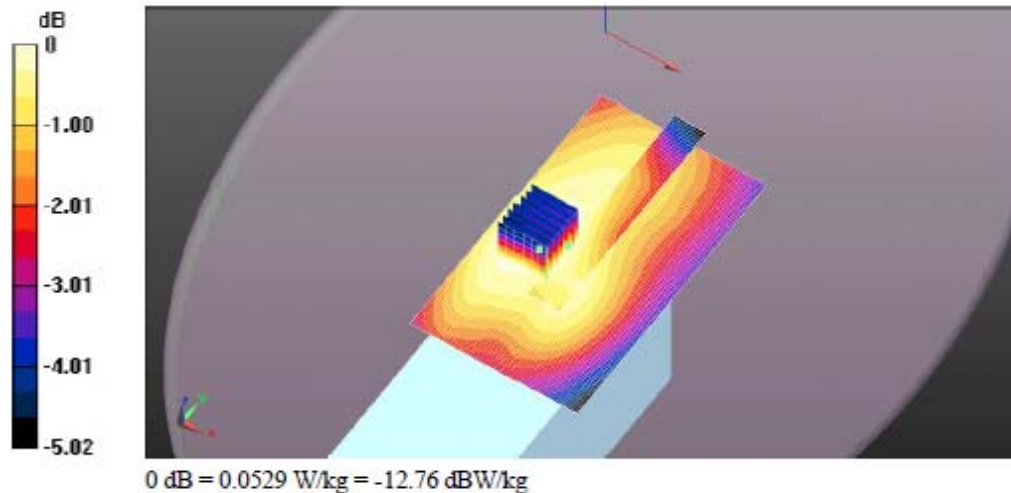
Configuration_Body_435-470 MHz/Right Side, d=0mm, Pin=1W, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.861 V/m; Power Drift = 0.10 dB Peak SAR (extrapolated) = 0.0810 W/kg
SAR(1 g) = 0.056 W/kg; SAR(10 g) = 0.041 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0593 W/kg

Configuration_Body_435-470 MHz/Right Side, d=0mm, Pin=1W, EX-Probe/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0642 W/kg



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File #: TEK-737QR-SAR3
September 17, 2014

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6.4.2.1. Body – Right Facing Phantom, 470 MHz, UHF 30% Duty Cycle; #16

Test Laboratory: Ultratech Group of Labs
File Name: [470MHz_Right Side.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 470 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 470$ MHz; $\sigma = 0.997$ S/m; $\epsilon_r = 56.237$; $\rho = 1000$ kg/m

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_435-470 MHz/Right Side, d=0mm, Pin=1W, EX-Probe/FindMax (11x71x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Maximum value of SAR (interpolated) = 0.0319 W/kg

Configuration_Body_435-470 MHz/Right Side, d=0mm, Pin=1W, EX-Probe/Zoom Scan (7x7x7) (7x8x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm

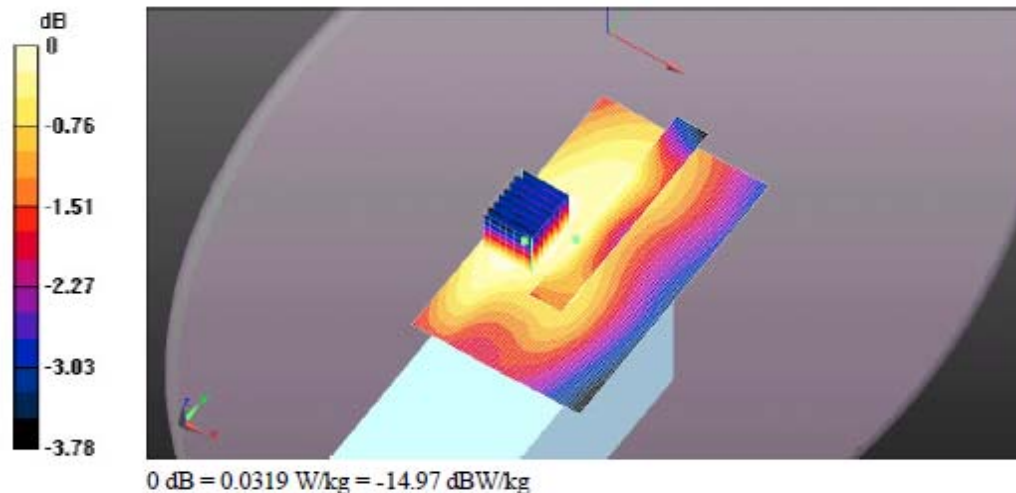
Reference Value = 6.057 V/m; Power Drift = 0.11 dB Peak SAR (extrapolated) = 0.0540 W/kg

SAR(1 g) = 0.038 W/kg; SAR(10 g) = 0.028 W/kg (SAR corrected for target medium) Maximum value of SAR (measured) = 0.0407 W/kg

Configuration_Body_435-470 MHz/Right Side, d=0mm, Pin=1W, EX-Probe/Area Scan (71x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0449 W/kg



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File #: **TEK-737QR-SAR3**
September 17, 2014

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6.4.2.1. Body – Front Facing Phantom, 2412 MHz, 100% Duty Cycle; #17

Test Laboratory: Ultratech Group of Labs
File Name: [TEK-737Q_Body_2.412 Area_FrontPosition.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2412.5$ MHz; $\sigma = 1.924$ S/m; $\epsilon_r = 52.94$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

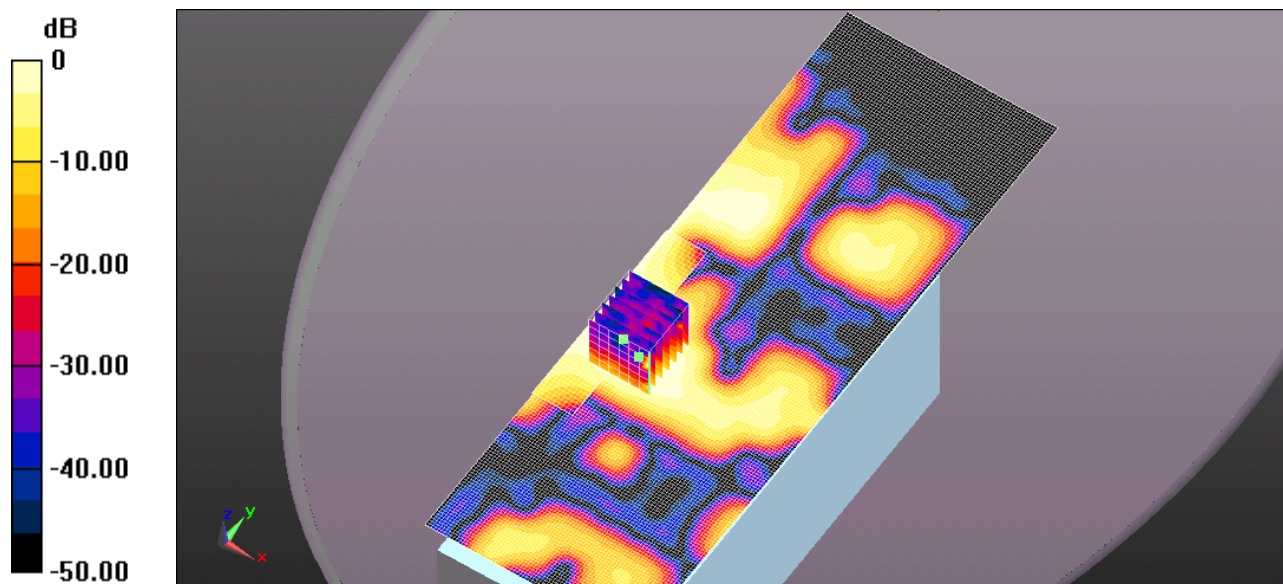
DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(6.97, 6.97, 6.97); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm
Maximum value of SAR (interpolated) = 0.0457 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.130 V/m; Power Drift = 0.09 dB Peak SAR (extrapolated) = 0.0750 W/kg
SAR(1 g) = 0.038 W/kg; SAR(10 g) = 0.023 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.0753 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x211x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0577 W/kg



0 dB = 0.0457 W/kg = -13.40 dBW/kg

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File #: TEK-737QR-SAR3
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- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

6.4.2.2. Body – Front Facing Phantom, 2412 MHz, 100% Duty Cycle; #18

Test Laboratory: Ultratech Group of Labs
File Name: [TEK-737Q_Body_2.437_Area_FrontPosition_bmode.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

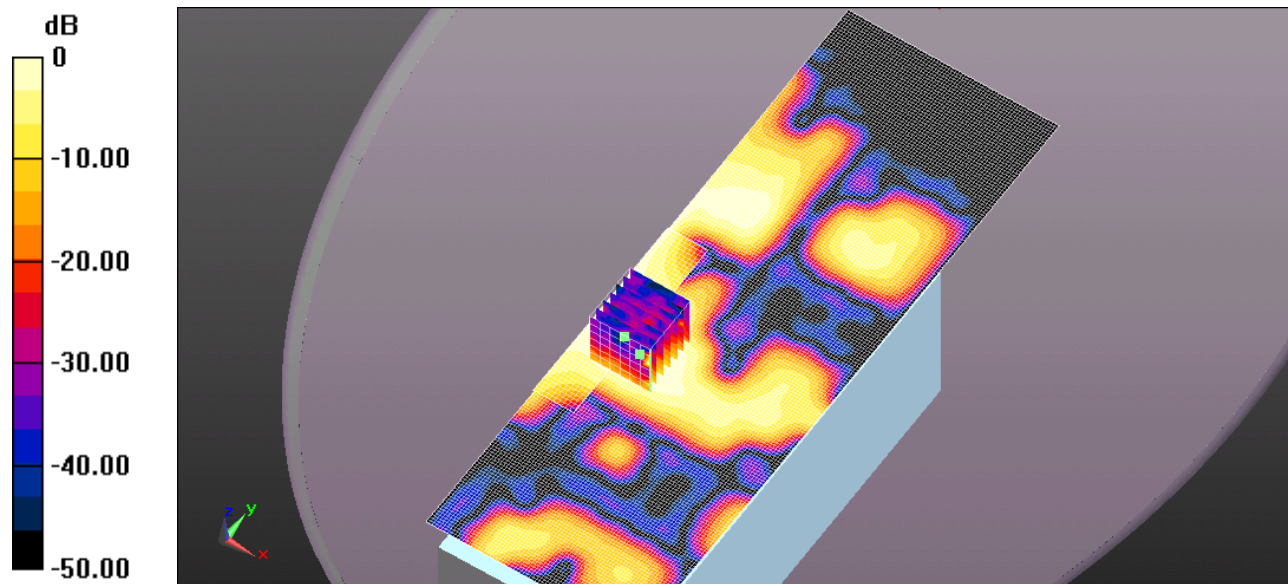
Communication System: UID 0, CW; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2437.5$ MHz; $\sigma = 1.954$ S/m; $\epsilon_r = 52.825$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3673; ConvF(6.97, 6.97, 6.97); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm
Maximum value of SAR (interpolated) = 0.0468 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.151 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.0770 W/kg
SAR(1 g) = 0.039 W/kg; SAR(10 g) = 0.023 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.0771 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x211x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0591 W/kg



0 dB = 0.0468 W/kg = -13.30 dBW/kg

6.4.2.3. Body – Front Facing Phantom, 2462 MHz, 100% Duty Cycle; #19

Test Laboratory: Ultratech Group of Labs
File Name: [TEK-737Q_Body_2.462 Area_FrontPosition_bmode.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

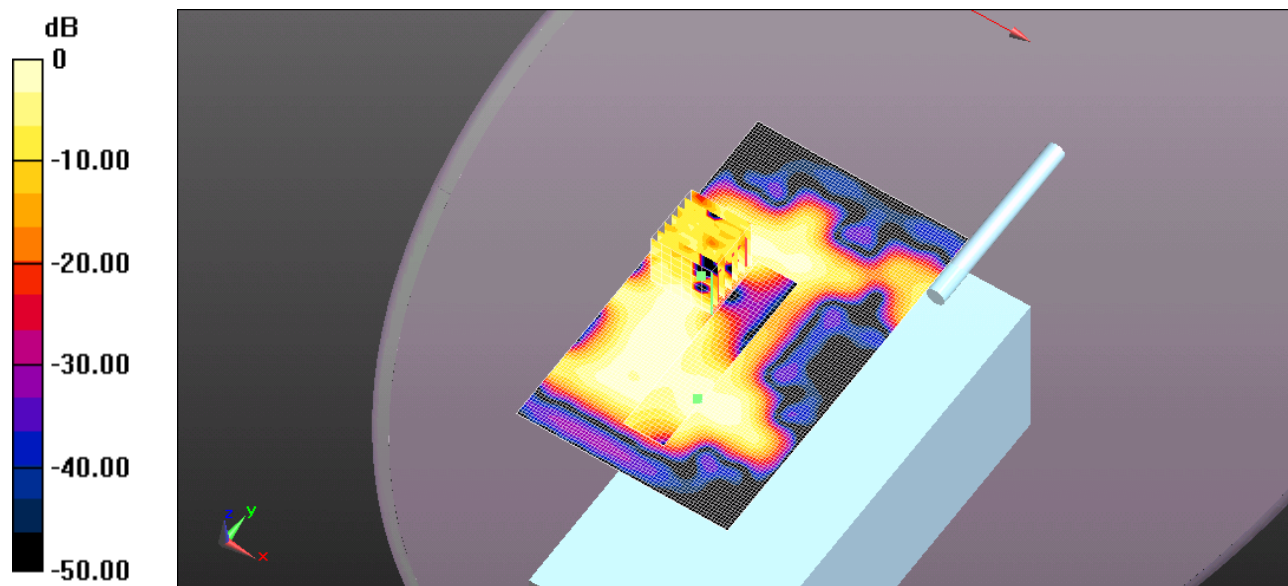
Communication System: UID 0, CW; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2462.5 \text{ MHz}$; $\sigma = 1.98 \text{ S/m}$; $\epsilon_r = 52.727$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3673; ConvF(6.97, 6.97, 6.97); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm
Maximum value of SAR (interpolated) = 0.0188 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.771 V/m; Power Drift = -0.162 dB
Peak SAR (extrapolated) = 0.0160 W/kg
SAR(1 g) = 0.0097 W/kg; SAR(10 g) = 0.00587 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.0110 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0244 W/kg



0 dB = 0.0188 W/kg = -17.25 dBW/kg

6.4.2.4. Body – Left Facing Phantom, 2412 MHz, 100% Duty Cycle; #20

Test Laboratory: Ultratech Group of Labs
File Name: [TEK-737Q_Body_2.412 Area_SidePosition_bmode.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

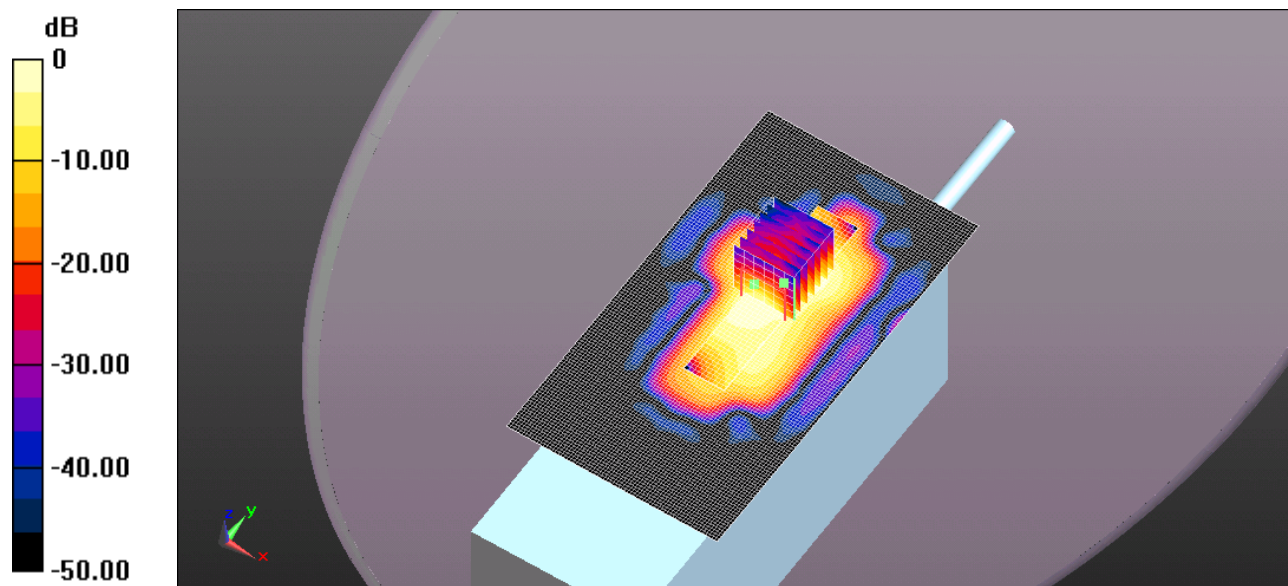
Communication System: UID 0, CW; Frequency: 2412 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2412.5$ MHz; $\sigma = 1.924$ S/m; $\epsilon_r = 52.94$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3673; ConvF(6.97, 6.97, 6.97); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm
Maximum value of SAR (interpolated) = 0.0768 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.537 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.192 W/kg
SAR(1 g) = 0.107 W/kg; SAR(10 g) = 0.054 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.122 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.165 W/kg



0 dB = 0.0768 W/kg = -11.15 dBW/kg

6.4.2.5. Body – Left Facing Phantom, 2437 MHz, 100% Duty Cycle; #21

Test Laboratory: Ultratech Group of Labs
File Name: [TEK-737Q_Body_2.437 Area_SidePosition_bmode.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

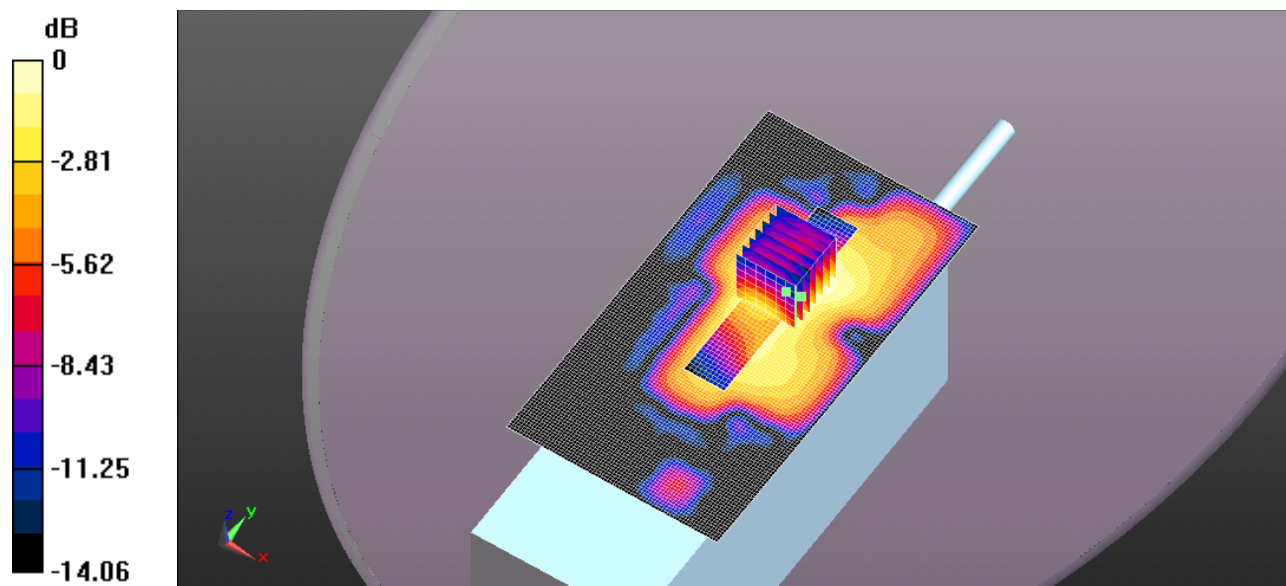
Communication System: UID 0, CW; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2437.5$ MHz; $\sigma = 1.954$ S/m; $\epsilon_r = 52.825$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3673; ConvF(6.97, 6.97, 6.97); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm
Maximum value of SAR (interpolated) = 0.165 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.213 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.354 W/kg
SAR(1 g) = 0.196 W/kg; SAR(10 g) = 0.098 W/kg (SAR corrected for target medium) Maximum value of SAR (measured) = 0.224 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.285 W/kg



0 dB = 0.165 W/kg = -7.84 dBW/kg

6.4.2.6. Body – Left Facing Phantom, 2462 MHz, 100% Duty Cycle; #21

Test Laboratory: Ultratech Group of Labs
File Name: [TEK-737Q_Body_2.462 Area_SidePosition_bmode.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

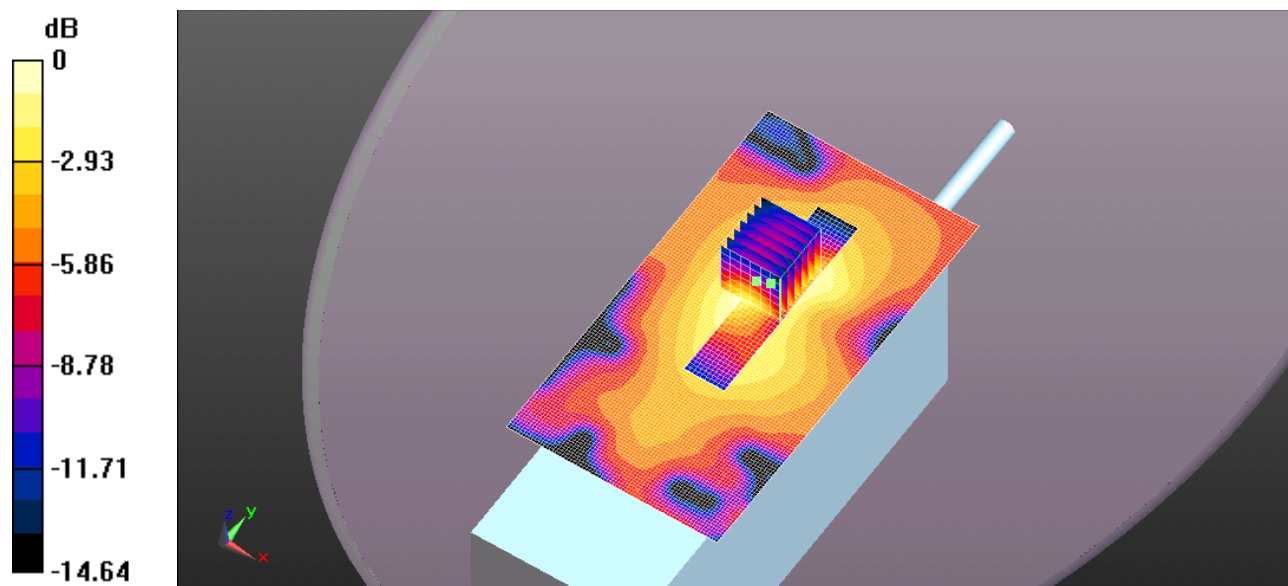
Communication System: UID 0, CW; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2462.5$ MHz; $\sigma = 1.98$ S/m; $\epsilon_r = 52.727$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3673; ConvF(6.97, 6.97, 6.97); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm
Maximum value of SAR (interpolated) = 0.697 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.014 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.703 W/kg; SAR(10 g) = 0.351 W/kg (SAR corrected for target medium) Maximum value of SAR (measured) = 0.794 W/kg

Configuration_Body_2.45G/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.977 W/kg



0 dB = 0.697 W/kg = -1.57 dBW/kg

6.4.2.7. Body – Front Facing Phantom, 5180 MHz, 100% Duty Cycle; #21

Test Laboratory: Ultratech Group of Labs
File Name: [5180MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5200 MHz

Communication System: UID 0, CW (0); Frequency: 5180 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5180 \text{ MHz}$; $\sigma = 5.227 \text{ S/m}$; $\epsilon_r = 47.542$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(4.51, 4.51, 4.51); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0375 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.655 V/m; Power Drift = -0.14 dB

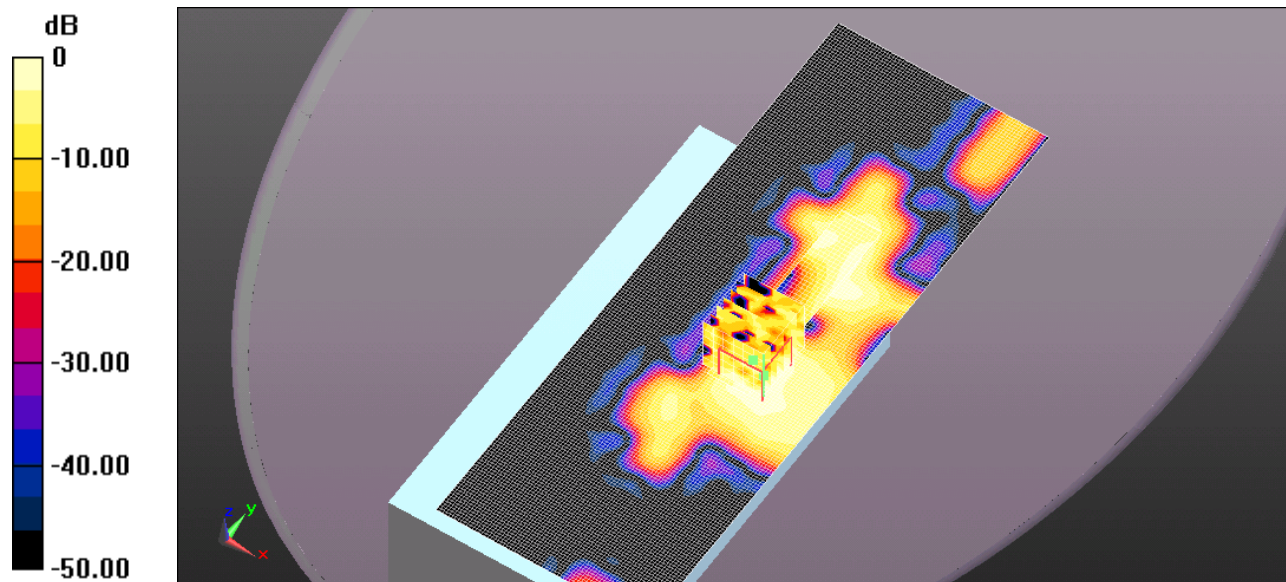
Peak SAR (extrapolated) = 0.188 W/kg

SAR(1 g) = 0.041 W/kg; SAR(10 g) = 0.017 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0364 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x201x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.102 W/kg



0 dB = 0.0375 W/kg = -14.26 dBW/kg

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File #: TEK-737QR-SAR3
September 17, 2014

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6.4.2.8. Body – Front Facing Phantom, 5240 MHz, 100% Duty Cycle; #22

Test Laboratory: Ultratech Group of Labs
File Name: [5240MHz_2_da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5200 MHz

Communication System: UID 0, CW (0); Frequency: 5240 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5240$ MHz; $\sigma = 5.331$ S/m; $\epsilon_r = 47.361$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(4.51, 4.51, 4.51); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0497 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.365 V/m; Power Drift = 0.140 dB

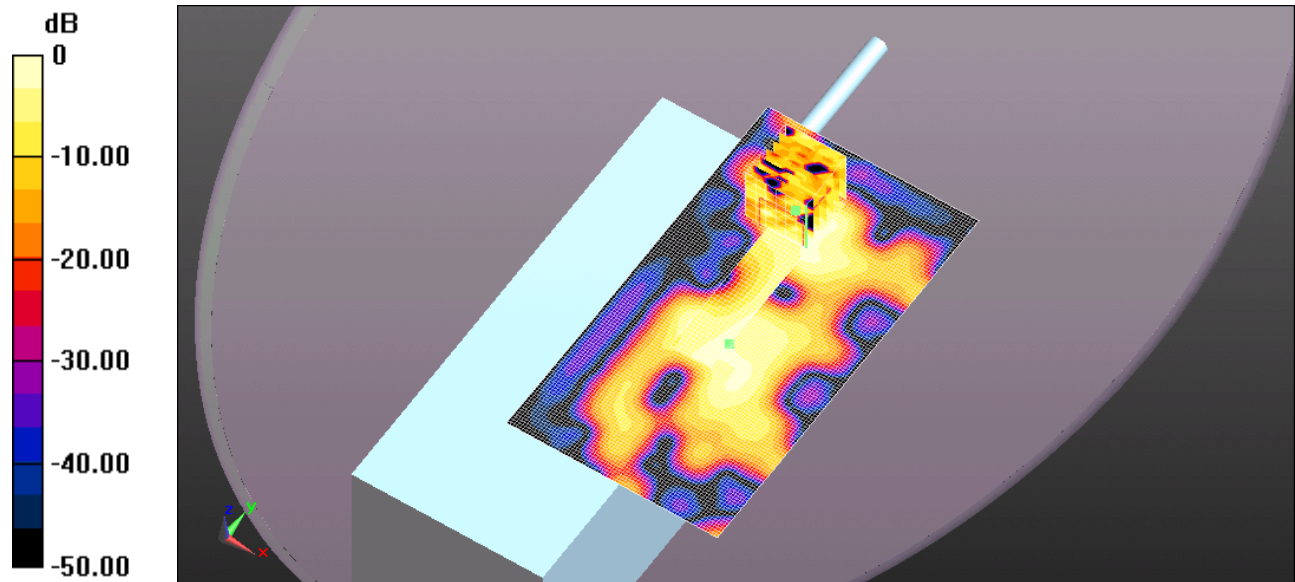
Peak SAR (extrapolated) = 0.172 W/kg

SAR(1 g) = 0.038 W/kg; SAR(10 g) = 0.016 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0483 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.110 W/kg



0 dB = 0.0497 W/kg = -13.03 dBW/kg

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File #: TEK-737QR-SAR3
September 17, 2014

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6.4.2.9. Body – Front Facing Phantom, 5280 MHz, 100% Duty Cycle; #23

Test Laboratory: Ultratech Group of Labs
File Name: [5260MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5200 MHz

Communication System: UID 0, CW (0); Frequency: 5280 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5280$ MHz; $\sigma = 5.398$ S/m; $\epsilon_r = 47.246$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(4.23, 4.23, 4.23); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0526 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.517 V/m; Power Drift = -0.14 dB

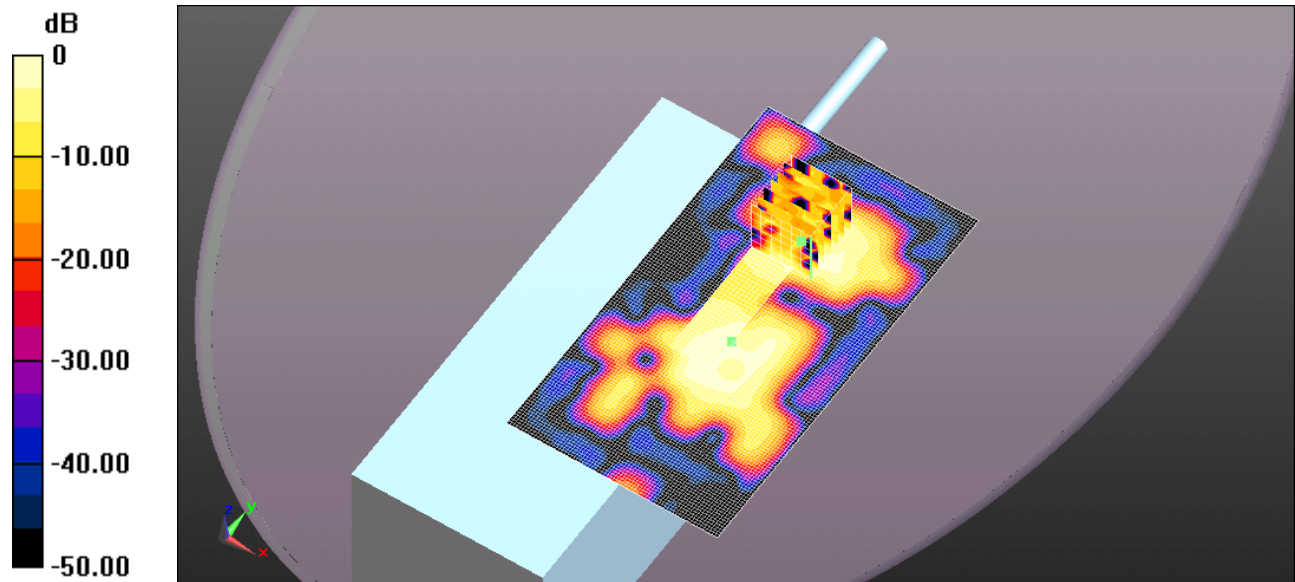
Peak SAR (extrapolated) = 0.185 W/kg

SAR(1 g) = 0.047 W/kg; SAR(10 g) = 0.018 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0647 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.122 W/kg



0 dB = 0.0526 W/kg = -12.79 dBW/kg

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File #: TEK-737QR-SAR3
September 17, 2014

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6.4.2.10. Body – Front Facing Phantom, 5320 MHz, 100% Duty Cycle; #24

Test Laboratory: Ultratech Group of Labs
File Name: [5320MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5200 MHz

Communication System: UID 0, CW (0); Frequency: 5320 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5320$ MHz; $\sigma = 5.453$ S/m; $\epsilon_r = 47.102$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(4.23, 4.23, 4.23); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0437 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.089 V/m; Power Drift = 0.21 dB

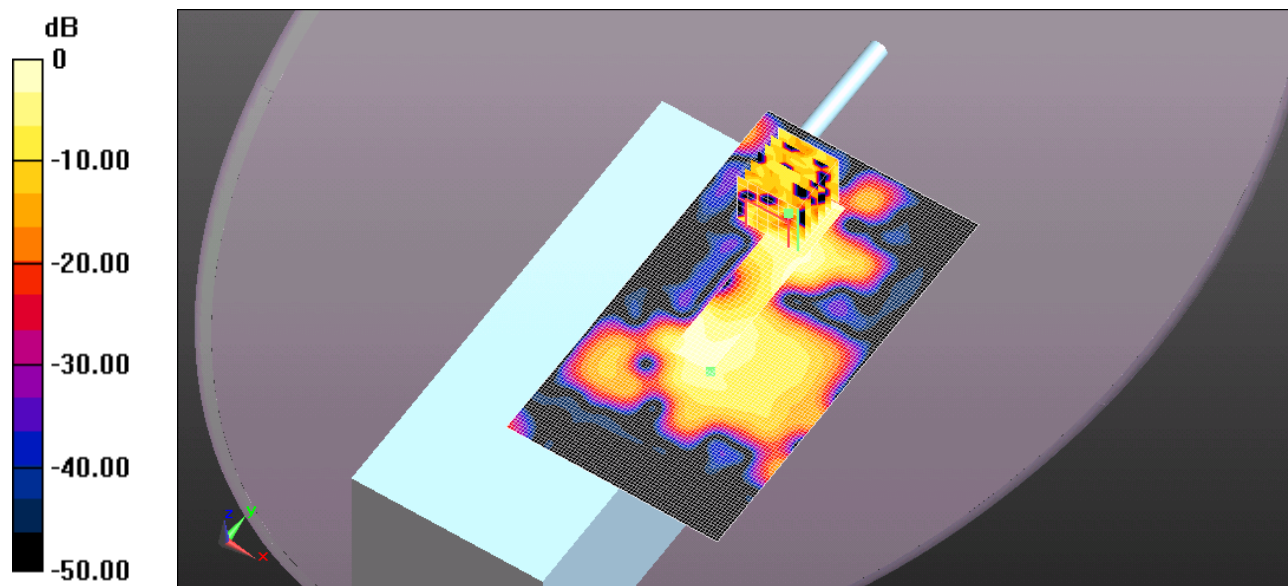
Peak SAR (extrapolated) = 0.204 W/kg

SAR(1 g) = 0.050 W/kg; SAR(10 g) = 0.016 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0636 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.173 W/kg



0 dB = 0.0437 W/kg = -13.60 dBW/kg

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File #: TEK-737QR-SAR3
September 17, 2014

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6.4.2.11. Body – Front Facing Phantom, 5520 MHz, 100% Duty Cycle; #24

Test Laboratory: Ultratech Group of Labs
File Name: [5520MHz_2_da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5200 MHz

Communication System: UID 0, CW (0); Frequency: 5520 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5520$ MHz; $\sigma = 5.786$ S/m; $\epsilon_r = 46.554$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(4.3, 4.3, 4.3); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0354 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.486 V/m; Power Drift = -0.20 dB

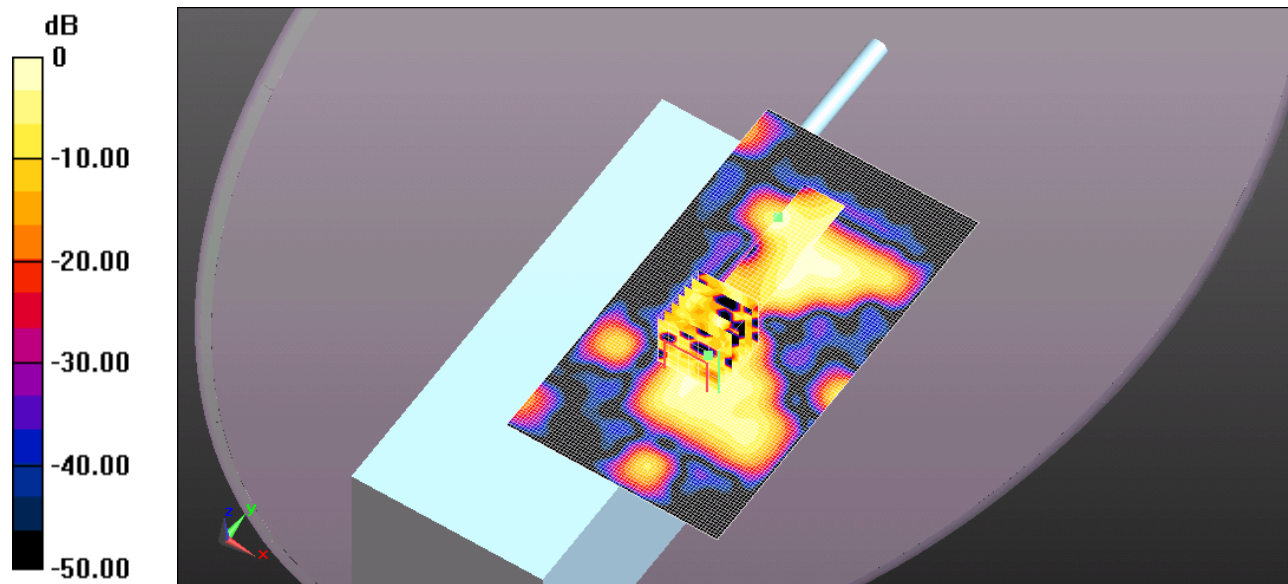
Peak SAR (extrapolated) = 0.126 W/kg

SAR(1 g) = 0.024 W/kg; SAR(10 g) = 0.00981 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0296 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0792 W/kg



0 dB = 0.0354 W/kg = -14.51 dBW/kg

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File #: TEK-737QR-SAR3
September 17, 2014

- All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)

6.4.2.12. Body – Front Facing Phantom, 5280 MHz, 100% Duty Cycle; #25

Test Laboratory: Ultratech Group of Labs
File Name: [5580MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5200 MHz

Communication System: UID 0, CW (0); Frequency: 5580 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5580 \text{ MHz}$; $\sigma = 5.87 \text{ S/m}$; $\epsilon_r = 46.406$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(3.93, 3.93, 3.93); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: $dx=2.000 \text{ mm}$, $dy=2.000 \text{ mm}$

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0239 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 2.861 V/m; Power Drift = 0.14 dB

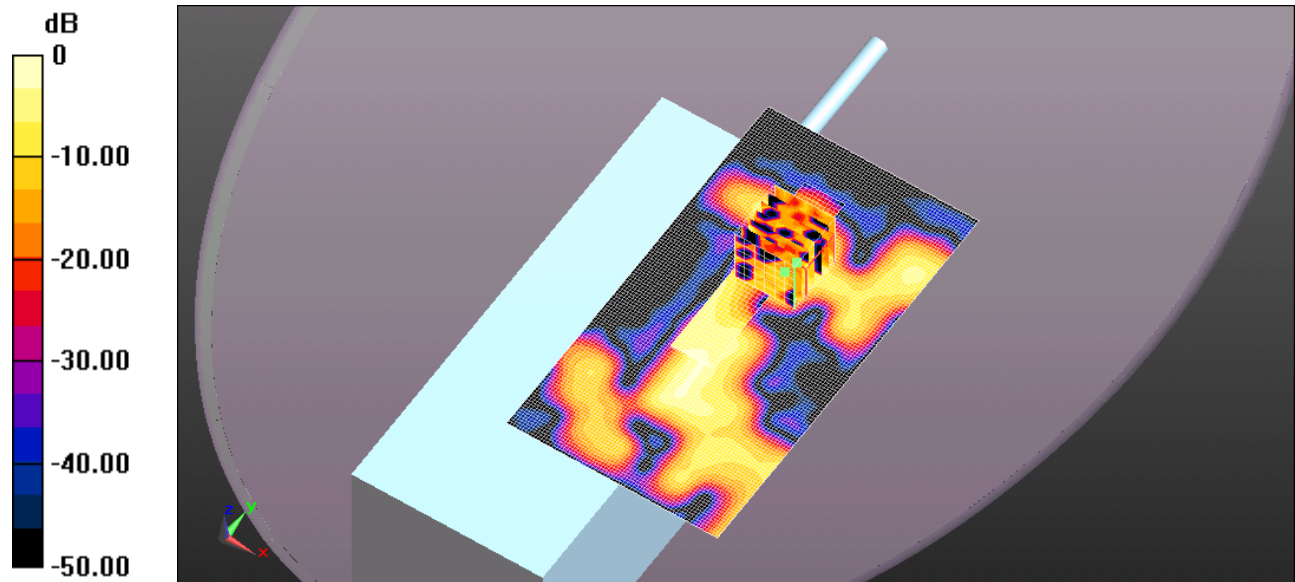
Peak SAR (extrapolated) = 0.126 W/kg

SAR(1 g) = 0.024 W/kg; SAR(10 g) = 0.0085 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.127 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0967 W/kg



0 dB = 0.0239 W/kg = -16.22 dBW/kg

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6.4.2.13. Body – Front Facing Phantom, 5620 MHz, 100% Duty Cycle; #26

Test Laboratory: Ultratech Group of Labs
File Name: [5620MHz_2_da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5800 MHz

Communication System: UID 0, CW (0); Frequency: 5620 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5620$ MHz; $\sigma = 5.935$ S/m; $\epsilon_r = 46.277$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(3.93, 3.93, 3.93); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0295 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.597 V/m; Power Drift = -0.19 dB

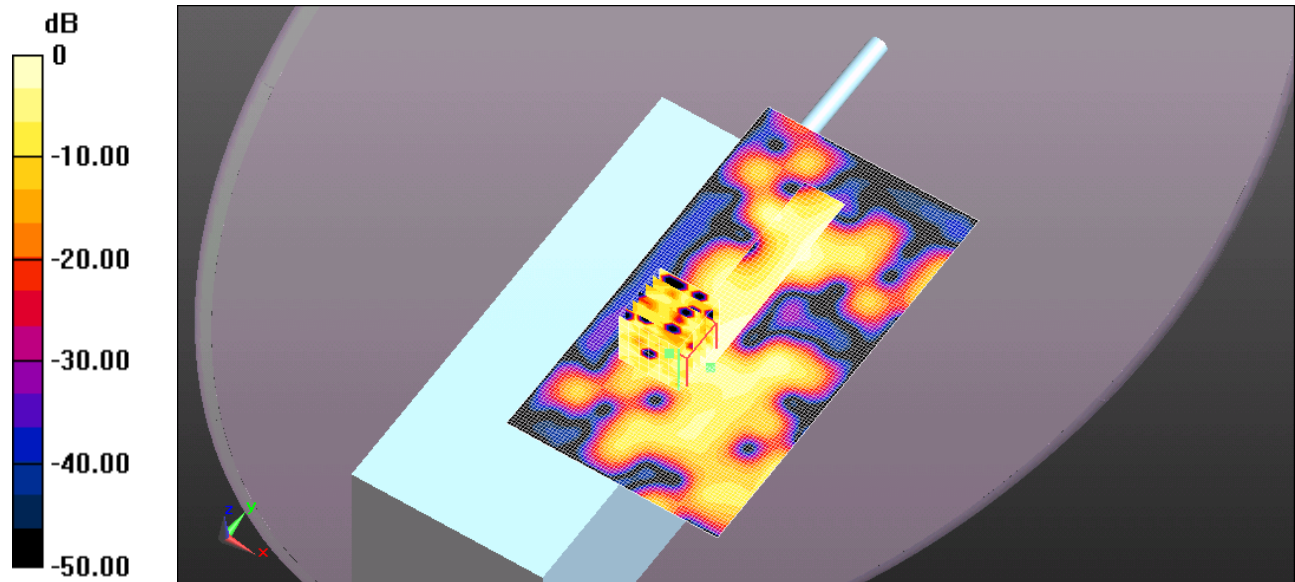
Peak SAR (extrapolated) = 0.135 W/kg

SAR(1 g) = 0.029 W/kg; SAR(10 g) = 0.00908 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0327 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0985 W/kg



0 dB = 0.0295 W/kg = -15.30 dBW/kg

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6.4.2.14. Body – Front Facing Phantom, 5680 MHz, 100% Duty Cycle; #27

Test Laboratory: Ultratech Group of Labs
File Name: [5680MHz_2_da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5800 MHz

Communication System: UID 0, CW (0); Frequency: 5680 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5680$ MHz; $\sigma = 6.043$ S/m; $\epsilon_r = 46.205$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(3.93, 3.93, 3.93); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0209 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.764 V/m; Power Drift = -0.16 dB

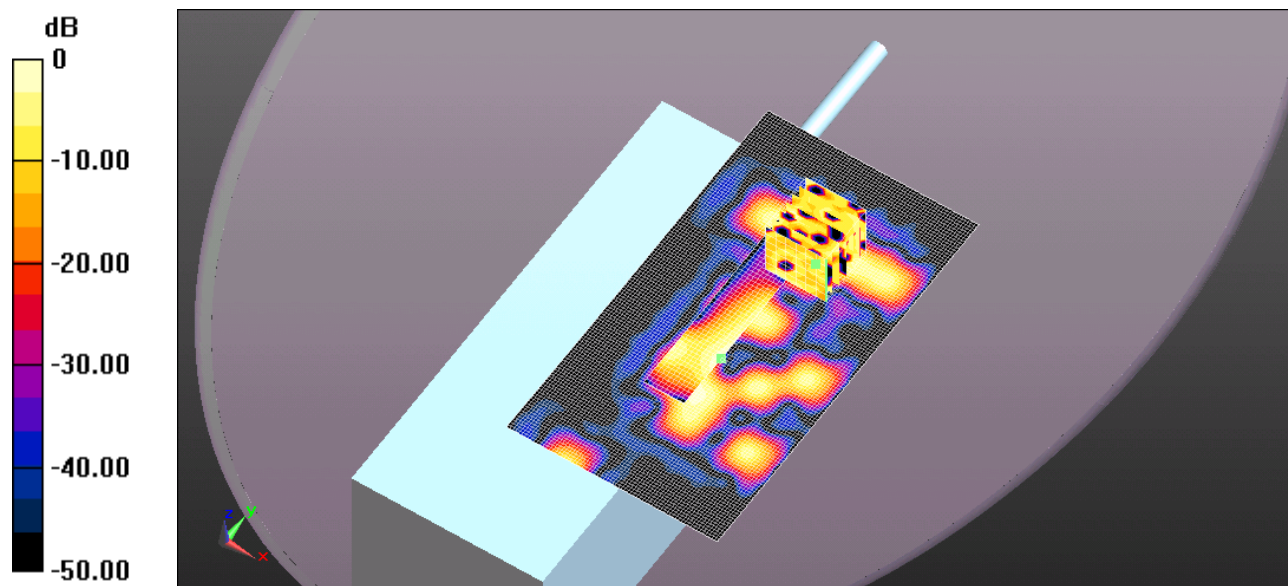
Peak SAR (extrapolated) = 0.100 W/kg

SAR(1 g) = 0.017 W/kg; SAR(10 g) = 0.00481 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0358 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0409 W/kg



0 dB = 0.0209 W/kg = -16.79 dBW/kg

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File #: TEK-737QR-SAR3
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6.4.2.15. Body – Front Facing Phantom, 5745 MHz, 100% Duty Cycle; #27

Test Laboratory: Ultratech Group of Labs
File Name: [5745MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5800 MHz

Communication System: UID 0, CW (0); Frequency: 5745 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5745$ MHz; $\sigma = 6.114$ S/m; $\epsilon_r = 46.026$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(3.98, 3.98, 3.98); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0117 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.163 V/m; Power Drift = 0.13 dB

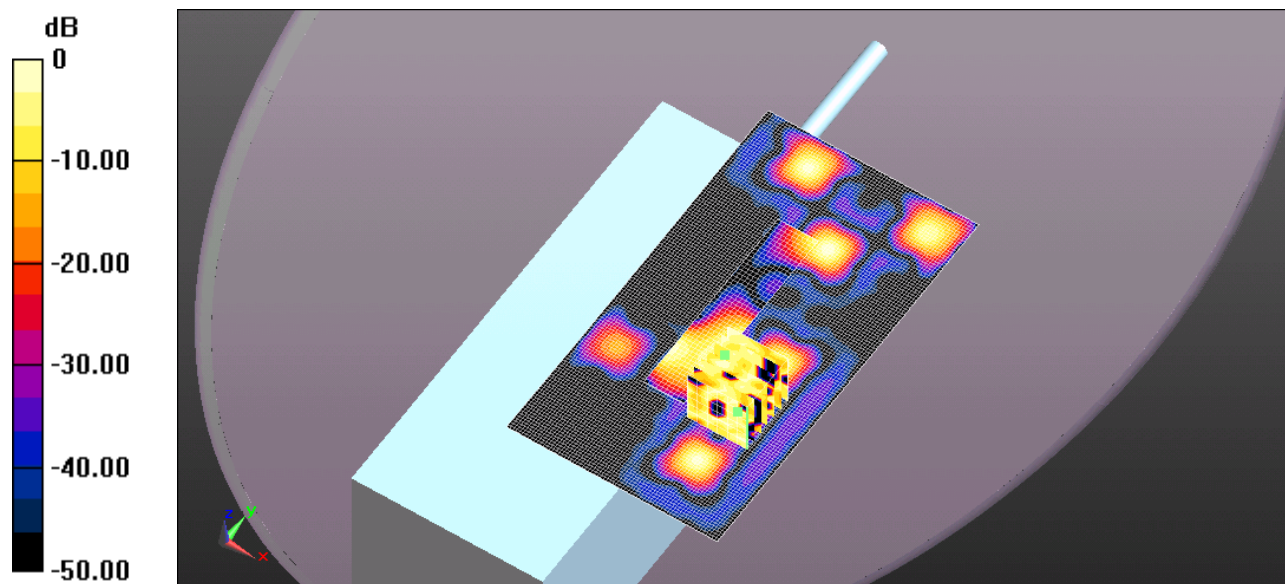
Peak SAR (extrapolated) = 0.0310 W/kg

SAR(1 g) = 0.00341 W/kg; SAR(10 g) = 0.000801 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0231 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0164 W/kg



0 dB = 0.0117 W/kg = -19.33 dBW/kg

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6.4.2.16. Body – Front Facing Phantom, 5805 MHz, 100% Duty Cycle; #27

Test Laboratory: Ultratech Group of Labs
File Name: [5805MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5800 MHz

Communication System: UID 0, CW (0); Frequency: 5805 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5805$ MHz; $\sigma = 6.183$ S/m; $\epsilon_r = 45.726$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(3.98, 3.98, 3.98); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.00976 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.781 V/m; Power Drift = 0.18 dB

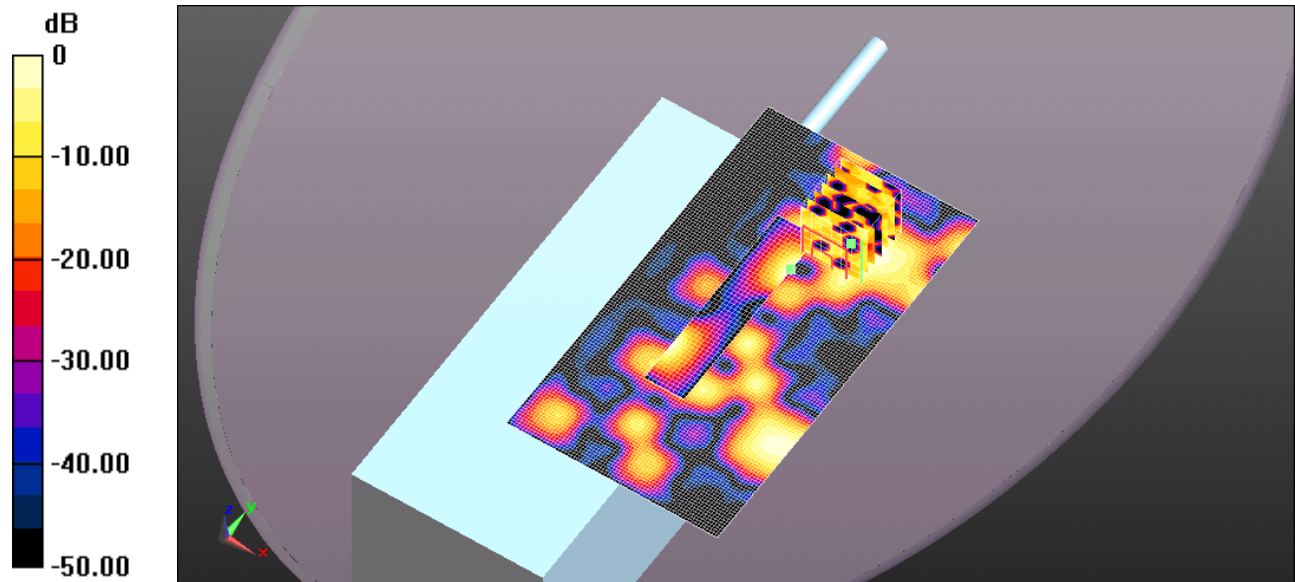
Peak SAR (extrapolated) = 0.0720 W/kg

SAR(1 g) = 0.014 W/kg; SAR(10 g) = 0.00332 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.0673 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.0446 W/kg



0 dB = 0.00976 W/kg = -20.11 dBW/kg

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6.4.2.17. Body – Right Facing Phantom, 5180 MHz, 100% Duty Cycle; #28

Test Laboratory: Ultratech Group of Labs
File Name: [5180MHz_2_da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5200 MHz

Communication System: UID 0, CW (0); Frequency: 5180 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5180$ MHz; $\sigma = 5.227$ S/m; $\epsilon_r = 47.542$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(4.51, 4.51, 4.51); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.184 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.087 V/m; Power Drift = -0.04 dB

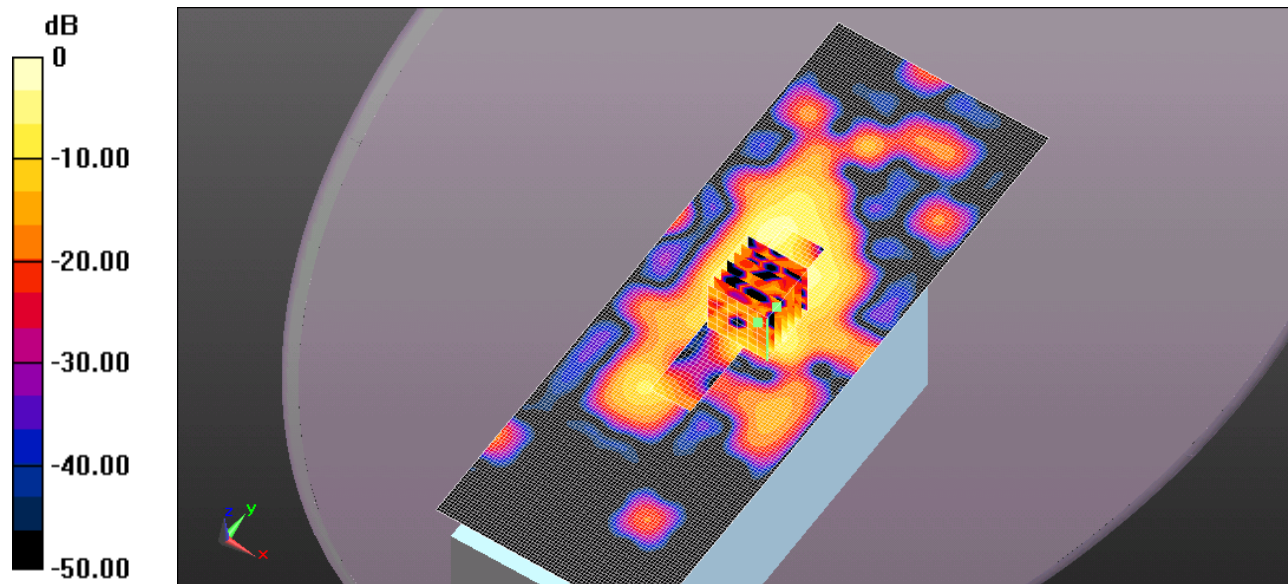
Peak SAR (extrapolated) = 0.987 W/kg

SAR(1 g) = 0.218 W/kg; SAR(10 g) = 0.072 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.239 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x201x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.478 W/kg



0 dB = 0.184 W/kg = -7.34 dBW/kg

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6.4.2.18. Body – Right Facing Phantom, 5240 MHz, 100% Duty Cycle; #29

Test Laboratory: Ultratech Group of Labs
File Name: [5240MHz_2_da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5200 MHz

Communication System: UID 0, CW (0); Frequency: 5240 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5240$ MHz; $\sigma = 5.331$ S/m; $\epsilon_r = 47.361$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(4.51, 4.51, 4.51); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.150 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.411 V/m; Power Drift = -0.01 dB

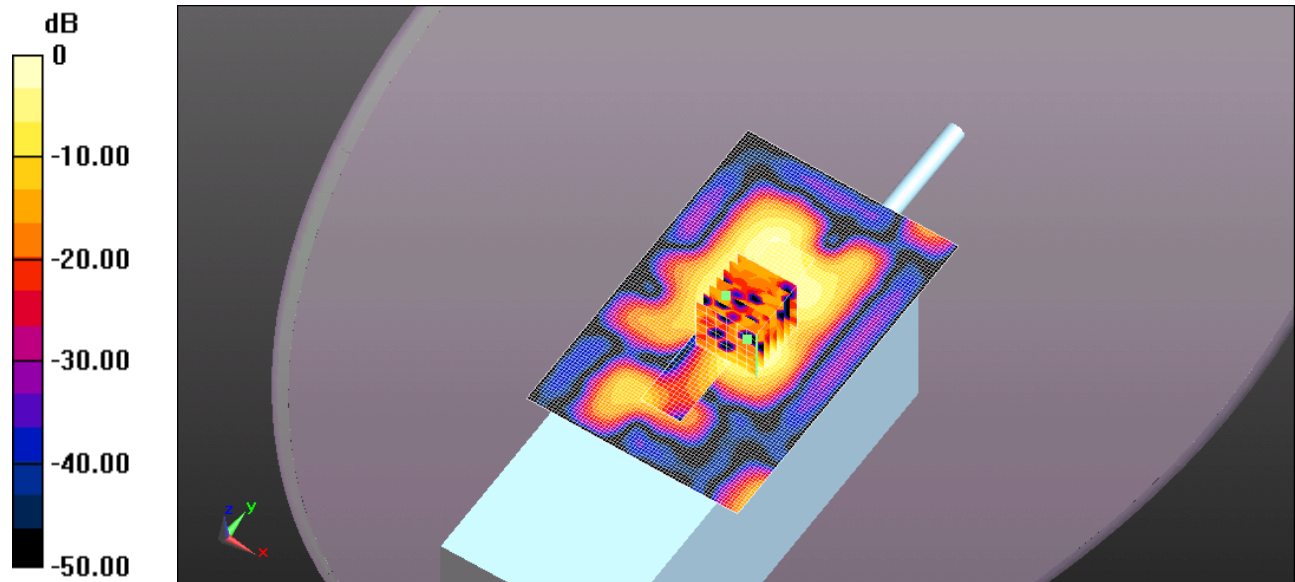
Peak SAR (extrapolated) = 0.669 W/kg

SAR(1 g) = 0.200 W/kg; SAR(10 g) = 0.066 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.238 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.408 W/kg



0 dB = 0.150 W/kg = -8.25 dBW/kg

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6.4.2.19. Body – Right Facing Phantom, 5260 MHz, 100% Duty Cycle; #30

Test Laboratory: Ultratech Group of Labs
File Name: [5260MHz_2_da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5200 MHz

Communication System: UID 0, CW (0); Frequency: 5260 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5260$ MHz; $\sigma = 5.365$ S/m; $\epsilon_r = 47.301$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(4.23, 4.23, 4.23); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.221 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.020 V/m; Power Drift = -0.05 dB

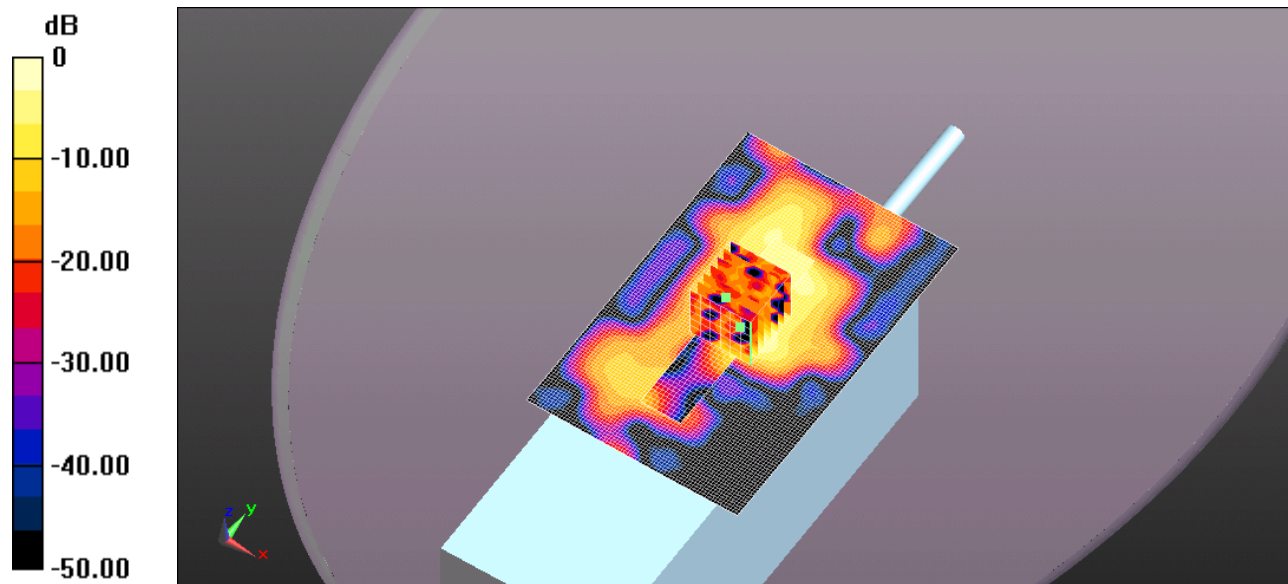
Peak SAR (extrapolated) = 1.48 W/kg

SAR(1 g) = 0.256 W/kg; SAR(10 g) = 0.093 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.292 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.597 W/kg



0 dB = 0.221 W/kg = -6.56 dBW/kg

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6.4.2.20. Body – Right Facing Phantom, 5320 MHz, 100% Duty Cycle; #31

Test Laboratory: Ultratech Group of Labs
File Name: [5320MHz_2_da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5200 MHz

Communication System: UID 0, CW (0); Frequency: 5320 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5320$ MHz; $\sigma = 5.453$ S/m; $\epsilon_r = 47.102$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(4.23, 4.23, 4.23); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.189 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.829 V/m; Power Drift = 0.05 dB

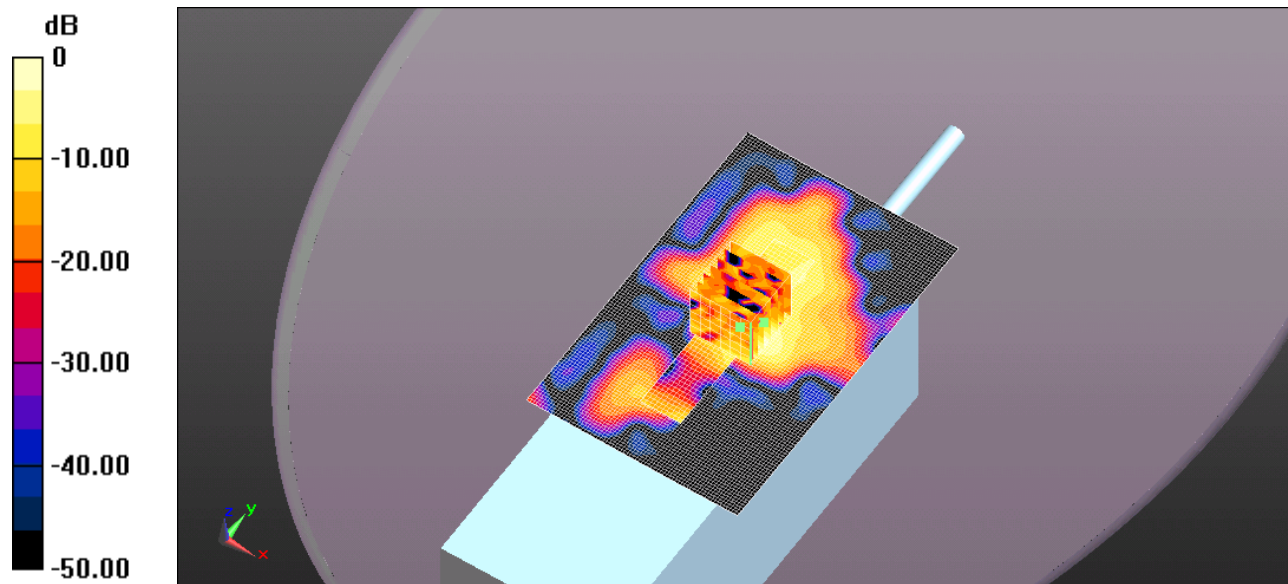
Peak SAR (extrapolated) = 0.441 W/kg

SAR(1 g) = 0.182 W/kg; SAR(10 g) = 0.061 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.223 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.538 W/kg



0 dB = 0.189 W/kg = -7.23 dBW/kg

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6.4.2.21. Body – Right Facing Phantom, 5580 MHz, 100% Duty Cycle; #32

Test Laboratory: Ultratech Group of Labs
File Name: [5580MHz_2_da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5800 MHz

Communication System: UID 0, CW (0); Frequency: 5580 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5580$ MHz; $\sigma = 5.87$ S/m; $\epsilon_r = 46.406$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(3.93, 3.93, 3.93); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.242 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.191 V/m; Power Drift = 0.11 dB

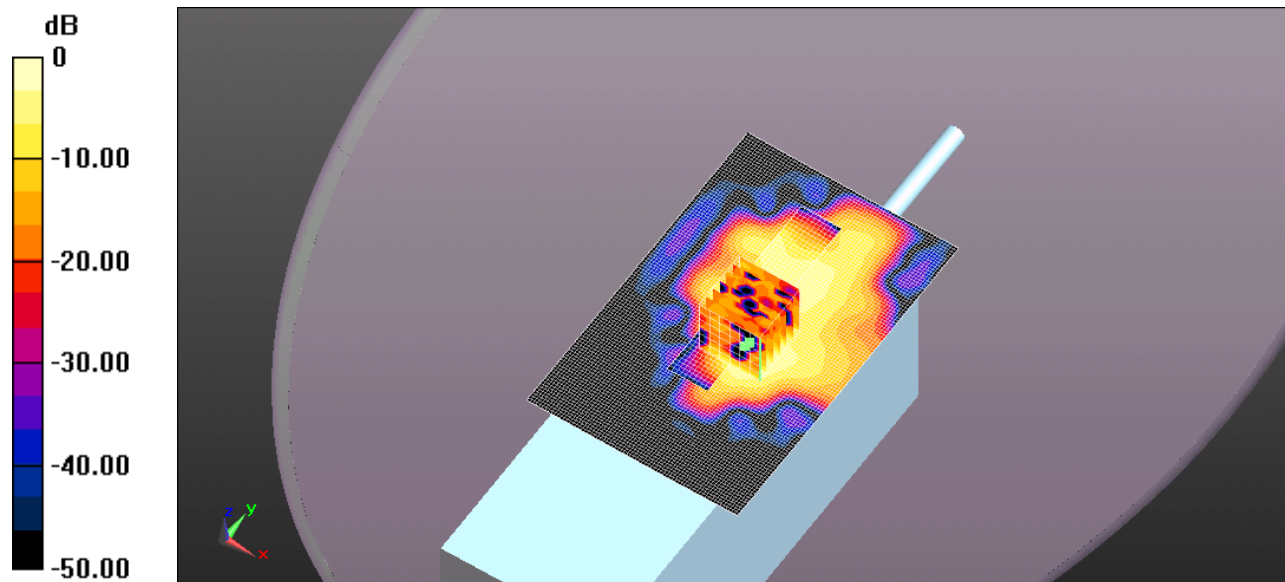
Peak SAR (extrapolated) = 0.609 W/kg

SAR(1 g) = 0.244 W/kg; SAR(10 g) = 0.088 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.300 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.513 W/kg



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6.4.2.22. Body – Right Facing Phantom, 5620 MHz, 100% Duty Cycle; #33

Test Laboratory: Ultratech Group of Labs
File Name: [5620MHz_2_da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 5620 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5620$ MHz; $\sigma = 5.935$ S/m; $\epsilon_r = 46.277$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(3.93, 3.93, 3.93); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.319 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.897 V/m; Power Drift = 0.22 dB

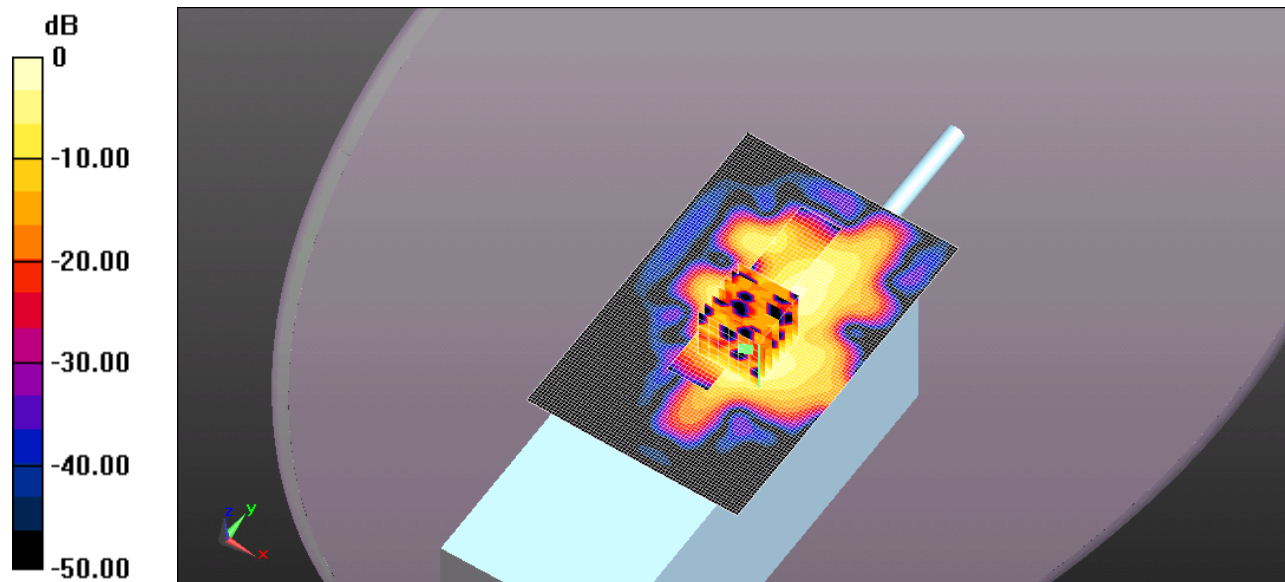
Peak SAR (extrapolated) = 0.643 W/kg

SAR(1 g) = 0.245 W/kg; SAR(10 g) = 0.089 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.287 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.506 W/kg



0 dB = 0.319 W/kg = -4.96 dBW/kg

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6.4.2.23. Body – Right Facing Phantom, 5680 MHz, 100% Duty Cycle; #34

Test Laboratory: Ultratech Group of Labs
File Name: [5680MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 5800 MHz

Communication System: UID 0, CW (0); Frequency: 5680 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5680$ MHz; $\sigma = 6.043$ S/m; $\epsilon_r = 46.205$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(3.93, 3.93, 3.93); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.186 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.598 V/m; Power Drift = 0.20 dB

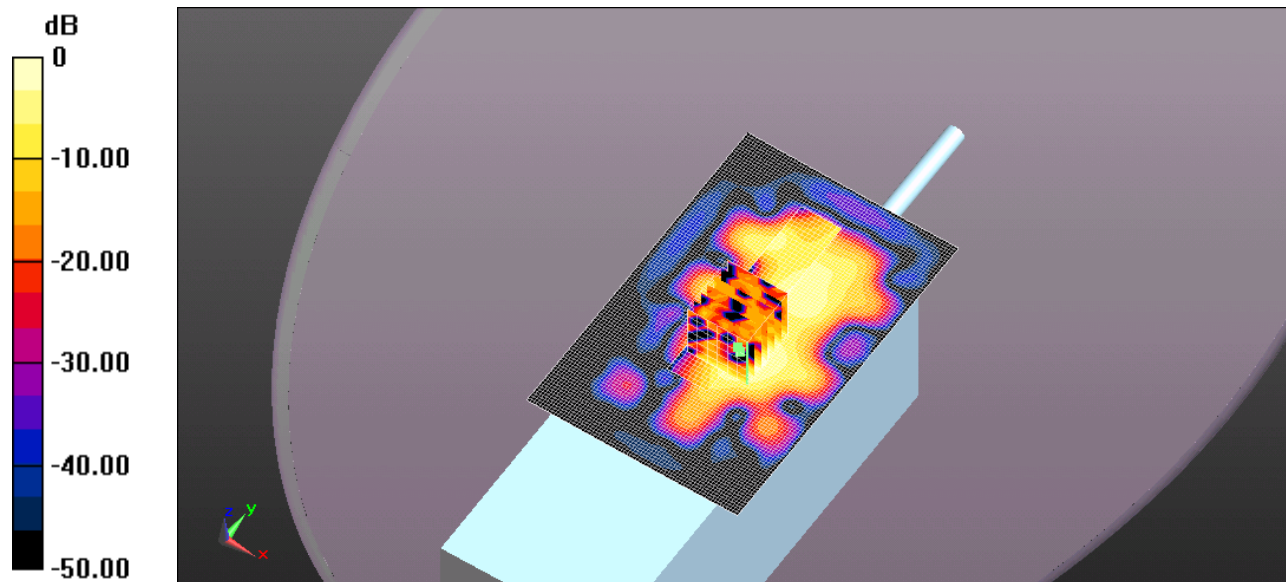
Peak SAR (extrapolated) = 0.544 W/kg

SAR(1 g) = 0.211 W/kg; SAR(10 g) = 0.076 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.246 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.460 W/kg



0 dB = 0.186 W/kg = -7.30 dBW/kg

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6.4.2.24. Body – Right Facing Phantom, 5745 MHz, 100% Duty Cycle; #35

Test Laboratory: Ultratech Group of Labs
File Name: [5745MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 5745 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5745$ MHz; $\sigma = 6.114$ S/m; $\epsilon_r = 46.026$; $\rho = 1000$ kg/m³ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(3.98, 3.98, 3.98); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.174 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.342 V/m; Power Drift = 0.06 dB

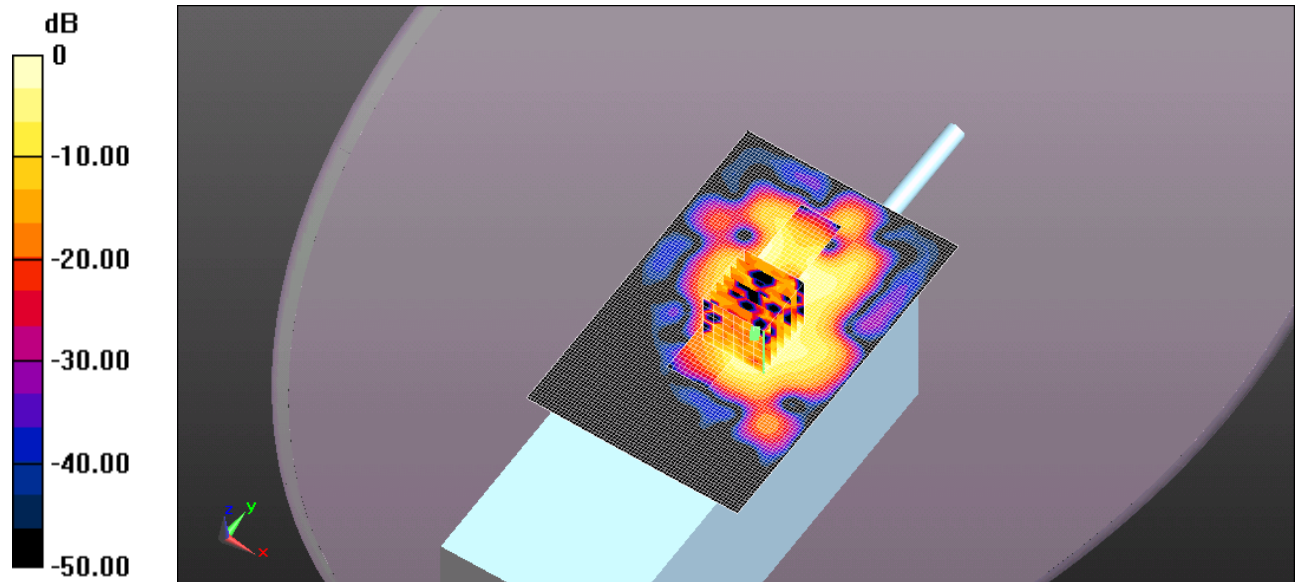
Peak SAR (extrapolated) = 0.499 W/kg

SAR(1 g) = 0.160 W/kg; SAR(10 g) = 0.055 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.228 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.315 W/kg



0 dB = 0.174 W/kg = -7.59 dBW/kg

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6.4.2.25. Body – Right Facing Phantom, 5745 MHz, 100% Duty Cycle; #36

Test Laboratory: Ultratech Group of Labs
File Name: [5805MHz.da52:0](#)

DUT: DUT Sample Brick w. Antenna; Type: Sample; Serial: IMEI Number
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 5805 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5805 \text{ MHz}$; $\sigma = 6.183 \text{ S/m}$; $\epsilon_r = 45.726$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(3.98, 3.98, 3.98); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/FindMax (11x51x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.181 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.027 V/m; Power Drift = 0.21 dB

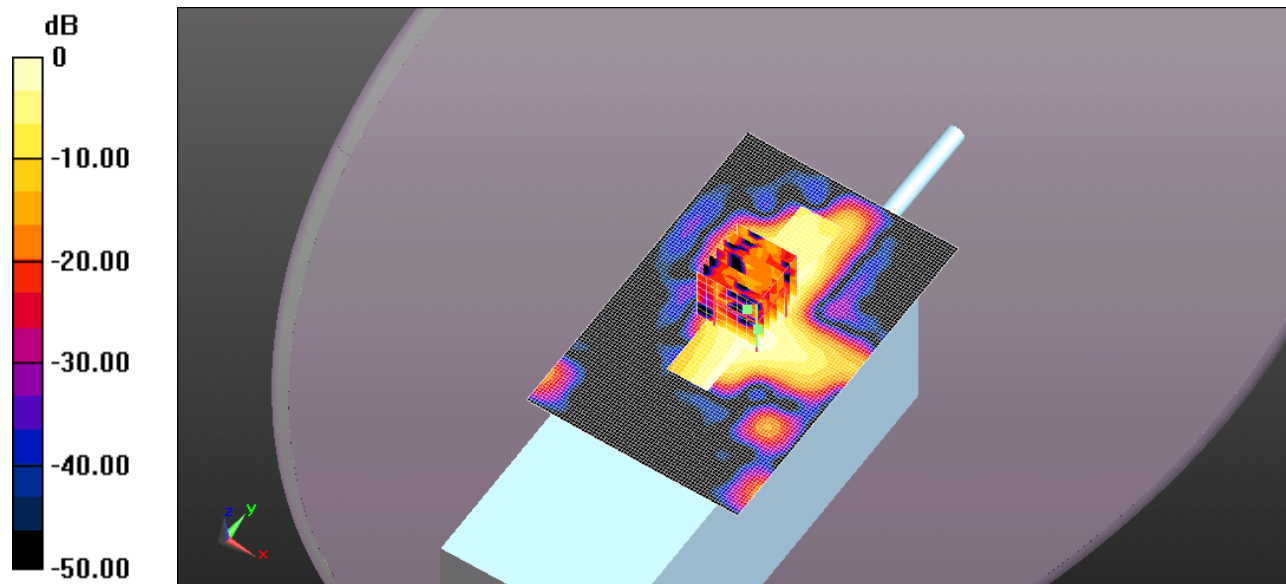
Peak SAR (extrapolated) = 0.506 W/kg

SAR(1 g) = 0.120 W/kg; SAR(10 g) = 0.049 W/kg (SAR corrected for target medium)

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (measured) = 0.323 W/kg

Configuration_Body_5.5GHz/Front Position_d=0mm, Pin=18dBm, EX-Probe/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation. Maximum value of SAR (interpolated) = 0.335 W/kg



0 dB = 0.181 W/kg = -7.42 dBW/kg

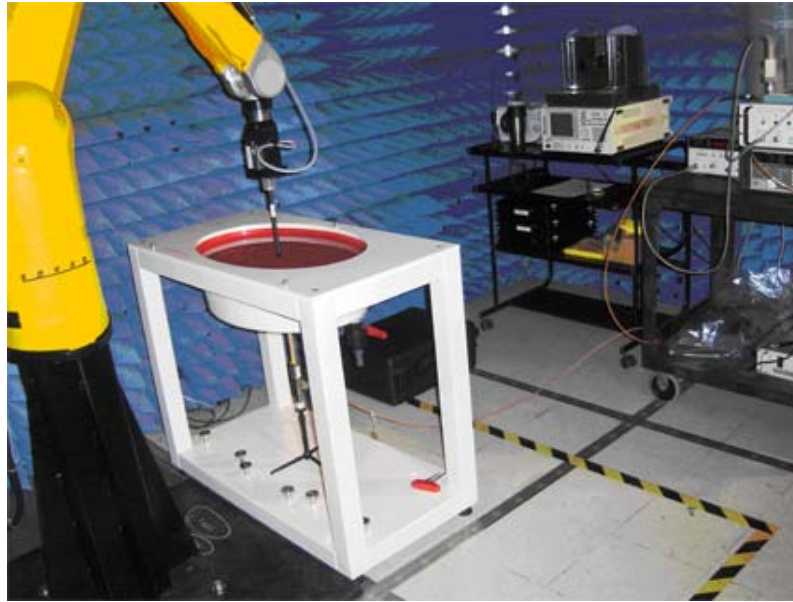
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EXHIBIT 7. SAR MEASUREMENT SYSTEM VERIFICATION



7.1. STANDARD SOURCE

A half-wave dipole is positioned below the bottom of the phantom and centered with its axis parallel to the longest side of the phantom. The distance between the liquid filled phantom bottom surface and the center of the dipole axis, s , is chosen as specified IEEE 1528 at the specific test frequency (i.e. 15 mm at 835 MHz). A low loss and low dielectric constant spacer is used to establish the correct distance between the top surface of the dipole and the bottom surface of the phantom.



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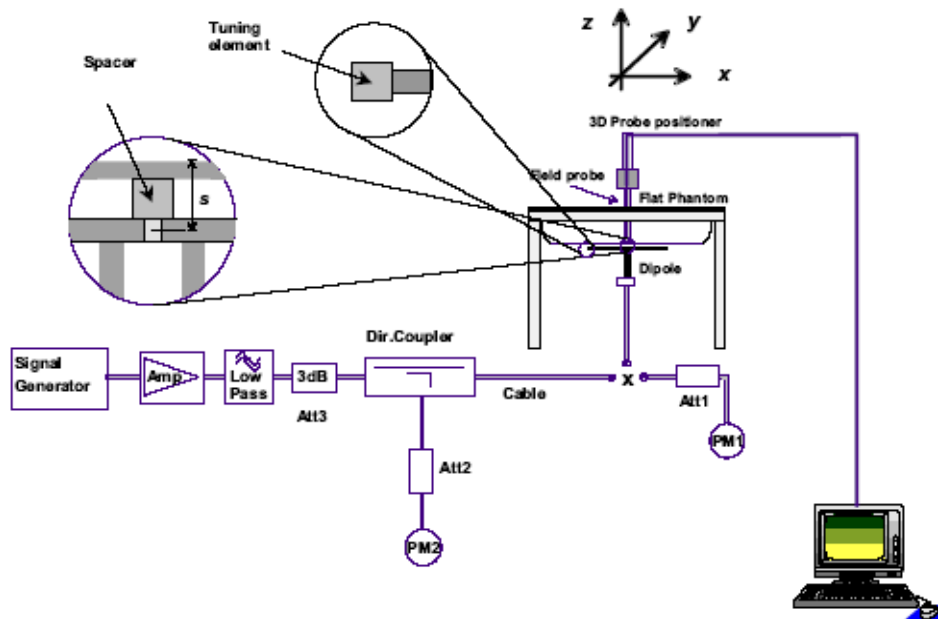
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7.2. STANDARD SOURCE INPUT POWER MEASUREMENT

The system validation is performed as shown below or in Figure 7.1 in IEEE 1528.



First the power meter PM1 (including attenuator Att1) is connected to the cable to measure the forward power at the location of the dipole connector (X). The signal generator is adjusted for the desired forward power at the dipole connector (taking into account the attenuation of Att1) as read by power meter PM2. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2. If the signal generator does not allow adjustment in 0.01dB steps, the remaining difference at PM2 must be taken into consideration. PM3 records the reflected power from the dipole to ensure that the value is not changed from the previous value. The reflected power was verified to be at least 20dB below the forward power.

7.3. SYSTEM VALIDATION PROCEDURE

A complete 1g-averaged SAR measurement is performed. The measured 1g-averaged SAR value is normalized to a forward power of 1W to a half-wave dipole and compared with the reference SAR value for the reference dipole and flat phantom shown in columns 2 and 3 of Table 7.1 in IEEE 1528.

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7.4. VERIFICATION RESULTS

7.4.1. Reference SAR values*

Frequency (MHz)	SAR1g			SAR10g		
	Reference	Measured	Delta	Reference	Measured	Delta
	(mw/g)		%	(mw/g)		%
450	4.52	4.68	-3.5%	3.01	3.12	-3.7%
2450	51.3	53.2	-3.7%	24.1	25.12	-4.2%
5200	73.2	71.1	2.9%	20.6	19.9	3.4%
5800	72.5	72.3	0.3%	20.1	19.3	4.0%

* SAR values in 7.4.1 are normalized to a forward power of 1 W.

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Verification at 450 MHz

7.4.1.1. 450MHz Body Tissue:

Test Laboratory: Ultratech Group of Labs

File Name: [Sys.Ver.Check-D450MHz_Tek-737QR_Body_2.da52:0](#)

DUT: Dipole 450 MHz D450V3; Type: SA AAD 045 CA; Serial: 1063

Program Name: System Performance Check at 450 MHz

Communication System: UID 10000, CW; Frequency: 450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 450$ MHz; $\sigma = 0.98$ S/m; $\epsilon_r = 56.436$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3208; ConvF(7.08, 7.08, 7.08); Calibrated: 3/13/2013;
- Sensor-Surface: 3.4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

System Verification Configuration for 450MHz_Body/d=15mm, Pin=250mW, dist=3.4mm (ES-Probe)/Area Scan (61x81x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.38 W/kg

System Verification Configuration for 450MHz_Body/d=15mm, Pin=250mW, dist=3.4mm (ES-Probe)/Zoom Scan (7x7x7)

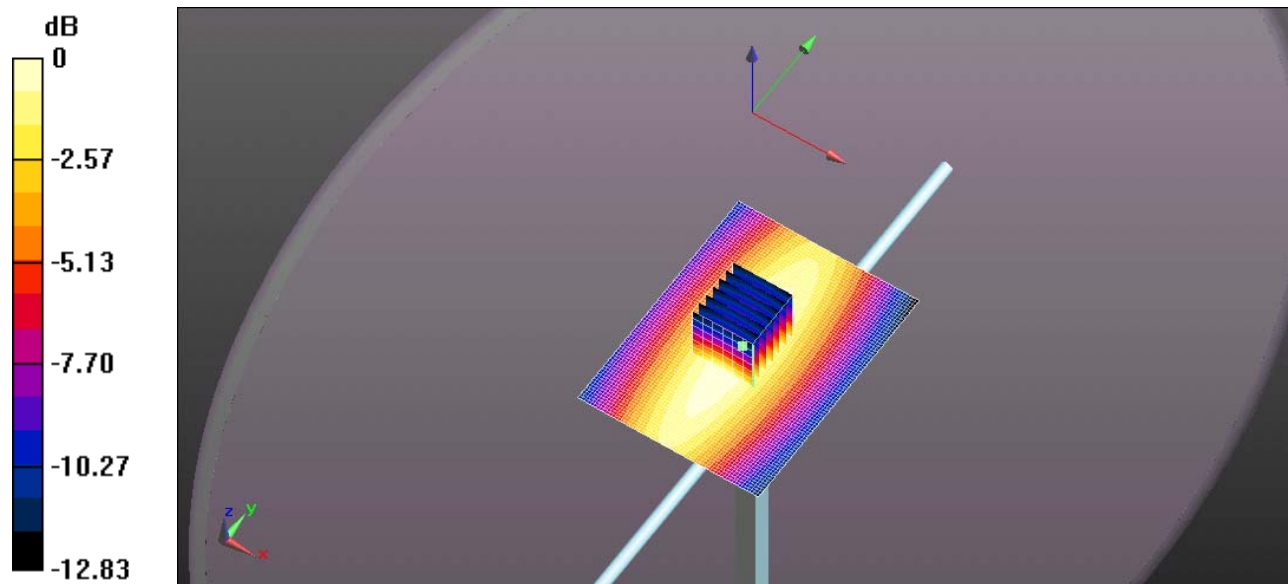
(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 35.360 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.89 W/kg

SAR(1 g) = 1.17 W/kg; SAR(10 g) = 0.780 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 1.30 W/kg



0 dB = 1.38 W/kg = 1.40 dBW/kg

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7.4.2. Verification at 2450 MHz

7.4.2.1. 2450MHz Body Tissue:

Test Laboratory: Ultratech Group of Labs
File Name: [SystemCheck-D2450MHz_Body1.da52:0](#)

DUT: D2450V2; Type: SA AAD 245BB; Serial: 821
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2450$ MHz; $\sigma = 1.968$ S/m; $\epsilon_r = 52.737$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

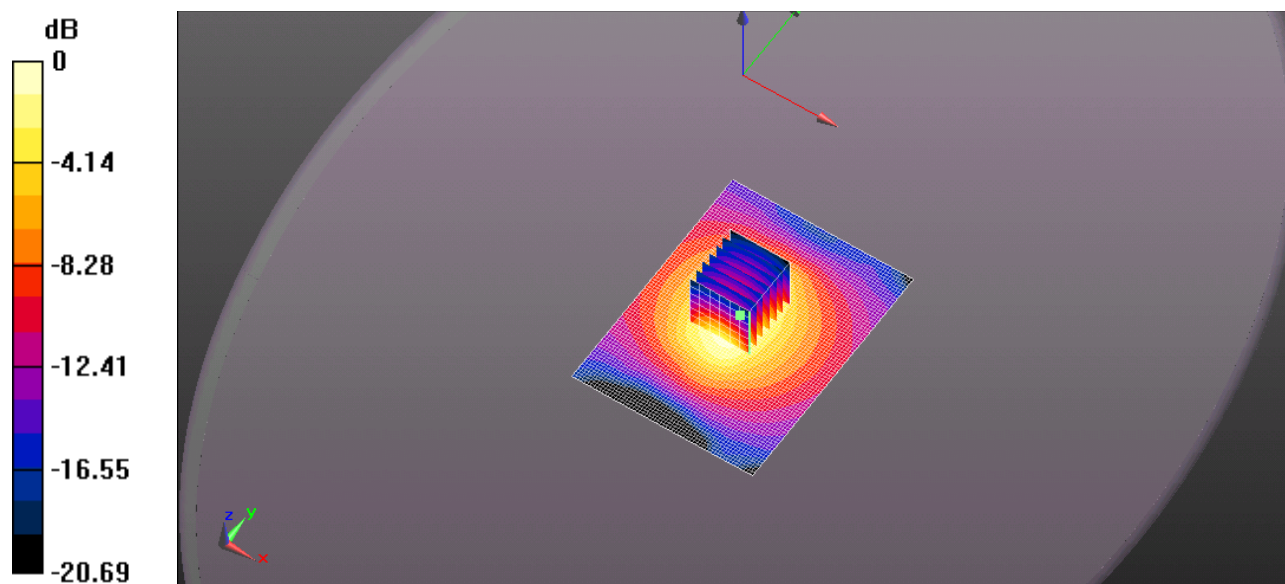
- Probe: EX3DV4 - SN3673; ConvF(6.95, 6.95, 6.95); Calibrated: 8/24/2011;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/9/2012
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

System Verification at 2.45GHz_Body/d=10mm, Pin=250mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.434 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 25.9 W/kg
SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.28 W/kg
Maximum value of SAR (measured) = 15.2 W/kg

System Verification at 2.45GHz_Body/d=10mm, Pin=250mW, dist=2.0mm (EX-Probe)/Area Scan (61x81x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 20.8 W/kg



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

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7.4.3. Verification at 5200 MHz

7.4.3.1. 5200MHz Body Tissue:

Test Laboratory: Ultratech Group of Labs

File Name: [SystemCheck-D5200MHz_Body3.da52:0](#)

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:xxx
Program Name: System Performance Check at 2450 MHz

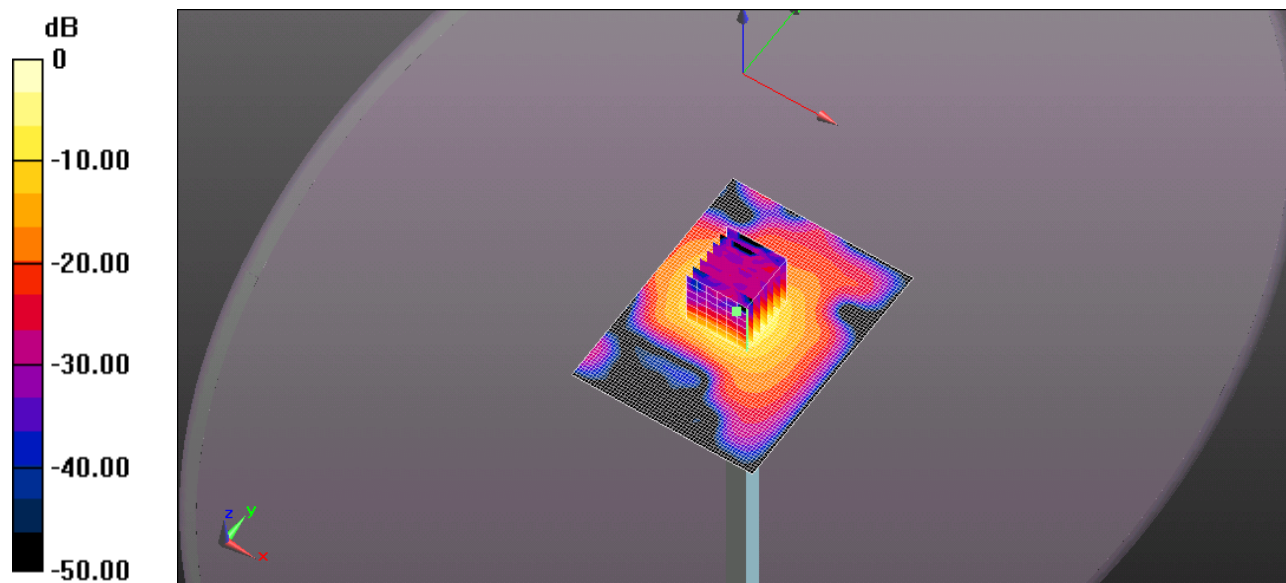
Communication System: UID 0, CW (0); Frequency: 5200 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5200$ MHz; $\sigma = 5.262$ S/m; $\epsilon_r = 47.48$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(4.51, 4.51, 4.51); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

System Verification at 5.2GHz_Body/d=10mm, Pin=100mW (EX-Probe)/Zoom Scan (8x8x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 38.728 V/m; Power Drift = 0.30 dB
Peak SAR (extrapolated) = 33.8 W/kg
SAR(1 g) = 7.11 W/kg; SAR(10 g) = 1.99 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 7.57 W/kg

System Verification at 5.2GHz_Body/d=10mm, Pin=100mW (EX-Probe)/Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 9.51 W/kg



0 dB = 7.57 W/kg = 8.79 dBW/kg

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7.4.4. Verification at 5800 MHz

7.4.4.1. 5800MHz Body Tissue:

Test Laboratory: Ultratech Group of Labs
File Name: [SystemCheck-D5800MHz_Body2.da52:0](#)

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:xxx
Program Name: System Performance Check at 2450 MHz

Communication System: UID 0, CW (0); Frequency: 5800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5800$ MHz; $\sigma = 6.18$ S/m; $\epsilon_r = 45.756$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3673; ConvF(3.98, 3.98, 3.98); Calibrated: 8/19/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn874; Calibrated: 3/24/2014
- Phantom: ELI 4.0; Type: QD OVA 001 BB; Serial: 1057
- ; SEMCAD X Version 14.6.10 (7164)

System Verification at 5.2GHz_Body/d=10mm, Pin=100mW (EX-Probe)/Zoom Scan (8x8x7) (7x7x7)/Cube 0: Measurement grid:

$dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 35.638 V/m; Power Drift = 0.35 dB

Peak SAR (extrapolated) = 46.6 W/kg

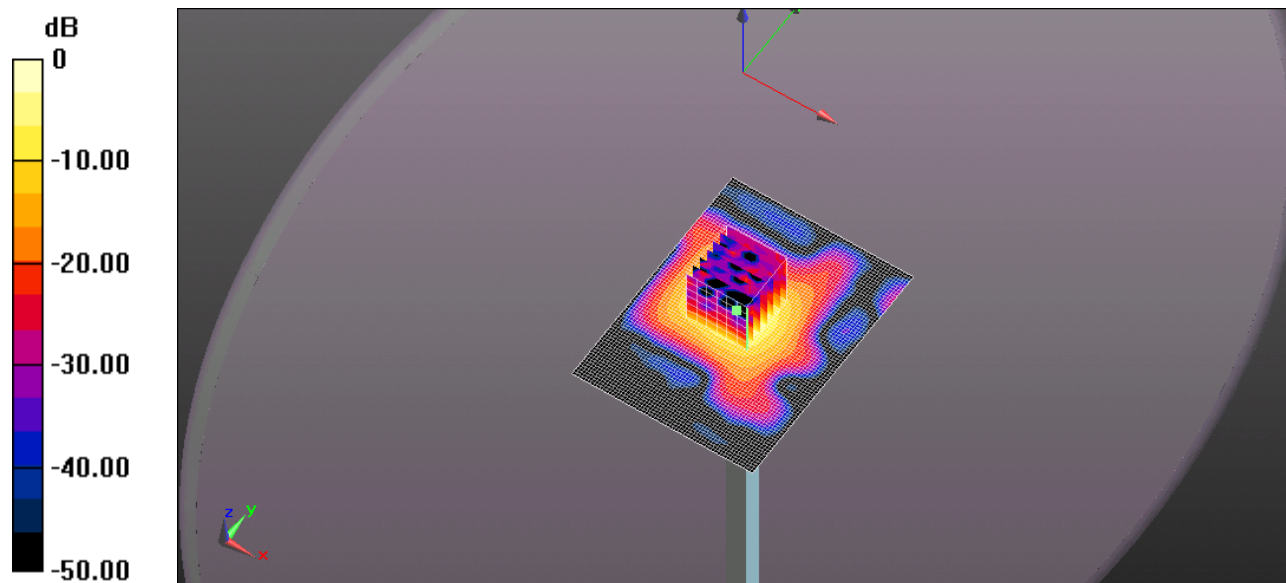
SAR(1 g) = 7.23 W/kg; SAR(10 g) = 1.93 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 6.64 W/kg

System Verification at 5.2GHz_Body/d=10mm, Pin=100mW (EX-Probe)/Area Scan (61x81x1): Interpolated grid: $dx=1.500$ mm,

$dy=1.500$ mm

Maximum value of SAR (interpolated) = 9.40 W/kg



0 dB = 6.64 W/kg = 8.22 dBW/kg

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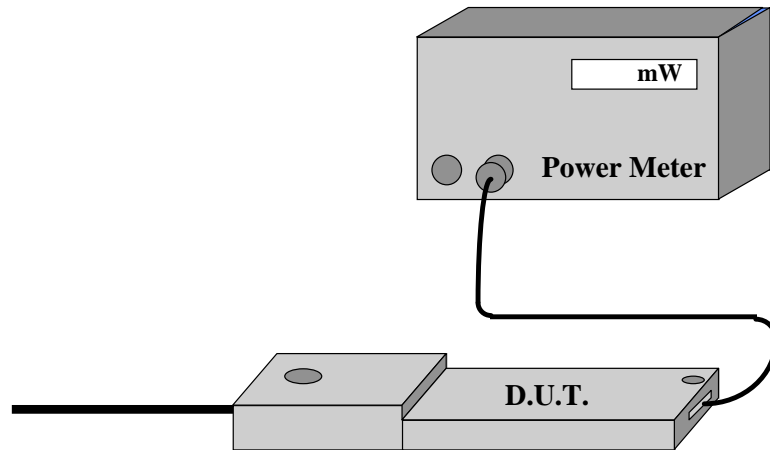
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EXHIBIT 8. D.U.T. POWER MEASUREMENT

Whenever possible, a conducted power measurement is performed. To accomplish this, we utilize a fully charged battery, a calibrated power meter and a cable adapter provided by the manufacturer. The data of the cable and related circuit losses are also provided by the manufacturer. The power measurement is then performed across the operational band and the channel with the highest output power is recorded.



Power measurement is performed before and after the SAR to verify if the battery was delivering full power at the time of testing. A difference in output power would determine a need for battery replacement and to repeat the SAR test.

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8.1.1. RF Conducted output power measurement

Scaling Factors user to obtain Reported SAR data are derived from the maximum tune-up power divided by the measured average conducted power. The measured SAR is only scaled up to obtain the Reported SAR.

Frequency	Average Power	
	Watts	dBm
435	1.15	30.6
447	1.13	30.5
458	1.09	30.4
470	1.1	30.4

Mode	GHz	Chan	Turbo Chan	Default Test Channels										
				15.247				UNII						
				802.11b		802.11g		802.11n		802.11a		802.11n		
				Rated	Meas	Rated	Meas	Rated	Meas	Rated	Meas	Rated	Meas	
802.11 b/g	2412	1		18/16	17.5	16	15.7	16	15.8	N/A	N/A	N/A	N/A	
	2437	6	6	18/16	17.5	16	15.7	16	15.6	N/A	N/A	N/A	N/A	
	2462	11		18/16	17.0	16	15.7	16	15.9	N/A	N/A	N/A	N/A	
802.11a	5180	36		N/A	N/A	N/A	N/A	N/A	N/A	13	13.4	12	13.5	
	5200	40	42(5.21GHz)	N/A	N/A	N/A	N/A	N/A	N/A	13	13.6	12	13.7	
	5220	44		N/A	N/A	N/A	N/A	N/A	N/A	13	13.7	12	13.8	
	5240	48	50(5.25GHz)	N/A	N/A	N/A	N/A	N/A	N/A	13	14.0	12	13.4	
	5260	52		N/A	N/A	N/A	N/A	N/A	N/A	13	13.9	12	13.9	
	5280	56	58(5.29GHz)	N/A	N/A	N/A	N/A	N/A	N/A	13	13.9	12	13.9	
	5300	60		N/A	N/A	N/A	N/A	N/A	N/A	13	13.9	12	13.9	
	5320	64		N/A	N/A	N/A	N/A	N/A	N/A	13	14.0	12	13.9	
	5500	100	Unknown	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	13.3	12	13.5
	5520	104		N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	13.3	12	13.5
	5540	108		N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	13.3	12	13.4
	5560	112		N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	13.0	12	13.3
	5580	116		N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	12.6	12	13.0
	5600	120		N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	13.1	12	13.2
	5620	124		N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	13.0	12	13.0
	5640	128		N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	12.9	12	13.1
	5660	132		N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	12.7	12	12.9
	5680	136		N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	12.7	12	12.9
	5700	140	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13	12.6	12	12.7	
	UNII	5745	149		N/A	N/A	N/A	N/A	N/A	N/A	13	12.3	12	12.5
15.247	5765	153	152(5.76GHz)	N/A	N/A	N/A	N/A	N/A	N/A	13	12.2	12	12.3	
	5785	157		N/A	N/A	N/A	N/A	N/A	N/A	13	12.3	12	12.4	
	5805	161	160(5.8GHz)	N/A	N/A	N/A	N/A	N/A	N/A	13	12.4	12	12.4	
15.247	5.825	165		N/A	N/A	N/A	N/A	N/A	N/A	13	12.2	12	12.3	

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8.1.2. SAR drift measurement

The local SAR was measured at the arbitrary location in the vicinity of the antenna fed point in the simulated body tissue at 2462 MHz during the period of 30 minute.

The power (SAR) drift after 30 minutes of the continuous transmission at the maximum power level was found to be less than $\pm 1\%$.

Rechargeable Battery(ST3003)

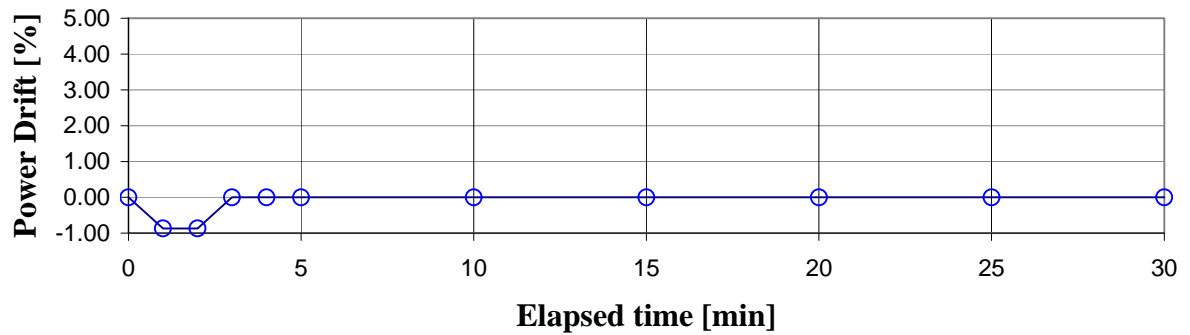


EXHIBIT 9. TISSUE DIELECTRIC PARAMETER CALIBRATION

9.1. SIMULATED TISSUE

Simulated Tissue: Suggested in a paper by George Hartsgrrove and colleagues in University of Ottawa Ref.: Bioelectromagnetics 8:29-36 (1987)

Ingredient	Quantity
Water	40.4 %
Sugar	56.0 %
Salt	2.5 %
HEC	1.0 %
Bactericide	0.1 %

Table 9.1 Example of composition of simulated tissue

This simulated tissue is mainly composed of water, sugar and salt. At higher frequencies, in order to achieve the proper conductivity, the solution does not contain salt. Also, at these frequencies, D.I. water and alcohol is preferred.

Target Frequency (MHz)	Head		Body	
	ϵ_r	σ (S/m)	ϵ_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(ϵ_r = relative permittivity, σ = conductivity and $\rho = 1000 \text{ Kg/m}^3$ *)

* The actual mass density of the equivalent tissue varies based on the composition of the tissue from 990 Kg/m^3 to $1,300 \text{ Kg/m}^3$.

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9.2. MEASUREMENT OF ELECTRICAL CHARACTERISTICS OF SIMULATED TISSUE

HP Dielectric Strength Probe System (open-ended coaxial transmission-line probe/sensor) was used.

9.2.1. Equipment set-up

The equipment consists of a probe connected to one port of a vector network analyzer. The probe is an open-ended coaxial line, as shown in Figure 9.2.1.1. Cylindrical coordinates (ρ , ϕ , z) are used where ρ is the radial distance from the axis, ϕ is the angular displacement around the axis, z is the displacement along the axis, a is the inner conductor radius, and b is the outer conductor inner radius.

The sample holder is a non-metallic container that is large compared with the size of the probe immersed in it. A probe with an outer diameter b of 2 to 4 mm is suitable for the measurement of tissue-equivalent materials in the 300 MHz to 3 GHz frequency range. This probe size is commensurate with sample volumes of 50 cc or higher. Larger probes of up to 7 mm outer diameter b may be used with larger sample volumes. A flange is typically included to better represent the infinite ground-plane assumption used in admittance calculations.

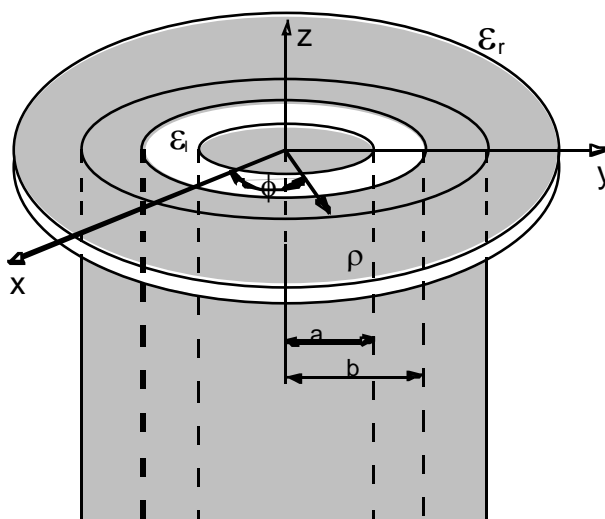


Figure 9.2.1. An open-ended coaxial probe with inner and outer radii a and b , respectively

The accuracy of the short-circuit measurement should be verified for each calibration at a number of frequencies. A short circuit can be achieved by gently pressing a piece of aluminum foil against the open end. For best electrical contact, the probe end should be flat and free of oxidation. Larger the sensors generally have better foil short-circuit repeatability. It is possible to obtain good contact with some commercial 4.6 mm probes using the metal-disk short-circuit supplied with the kit. For best repeatability, it may be necessary to press the disk by hand.

The network analyzer is configured to measure the magnitude and phase of the admittance. A one-port reflection calibration is performed at the plane of the probe by placing materials for which the reflection coefficient can be calculated in contact with the probe. Three standards are needed for the calibration, typically a short circuit, air, and de-ionized water at a well-defined temperature (other reference liquids such as methanol or ethanol may be used for calibration). The calibration is a key part of the measurement procedure, and it is therefore important to ensure that it has been performed correctly. It can be checked by re-measuring the short circuit to ensure that a reflection coefficient of $\Gamma = -1.0$ (linear units) is obtained consistently.

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9.2.2. Measurement procedure

- a) Configure and calibrate the network analyzer and probe system.
- b) Place the sample in a non-metallic container and immerse the probe. A fixture or clamp is recommended to stabilize the probe, mounted such that the probe face is at an angle with respect to the liquid surface to minimize trapped air bubbles beneath the flange.
- c) Measure the complex admittance with respect to the probe aperture.
- d) Compute the complex relative permittivity $\epsilon_r = \epsilon_r' - j\sigma/\omega\epsilon_0$.

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9.3. SIMULATED TISSUE MEASUREMENT RESULTS

Tissue calibration type	HP Dielectric Strength Probe System (M/N: 85070C)		
Tissue calibration date [MM/DD/YYYY]	06/23/2014	02/01/2012	02/03/2012
Tissue calibrated by	Max Kee	Steven Lu	Steven Lu
Room temperature [°C]	23.7	21	21
Room humidity [%]	30	40	40
Simulated tissue temperature (°C)	23.6	21	21
Tissue calibration frequency [MHz]	450	2450	5500
Tissue Type	Muscle	Muscle	Muscle
Target conductivity [S/m]	0.94	1.95	6.0
Target dielectric constant	56.7	52.7	48.2
Composition (by weight) [%]	DI Water (51.16 %) Sugar (46.78 %) Salt (1.49 %) HEC (0.13 %) Bactericide (0.44 %)	DGBE (13.80 %) Salt (0.19 %) Triton X-100 (13.59 %) DI Water (72.42 %)	DGBE (3.50 %) Salt (0.1 %) Triton X-100 (37 %) DI Water (64%)
Measured conductivity [S/m]	0.98(4.3%)	1.97 (0.9%)	5.75 (1.8 %)
Measured dielectric constant	56.4(-0.5 %)	52.7 (0.1 %)	46.60 (-4.1 %)
Penetration depth (plane wave excitation) [mm]	45.1	19.5	6.4

9.3.1. 450 MHz Muscle Tissue

Frequency [MHz]	Meas. after 5min			DI Water at 20°C			Init. Meas.		
	ϵ'	ϵ''	σ [S/m]	ϵ'	ϵ''	σ [S/m]	ϵ'	ϵ''	σ [S/m]
415.000	57.2380	41.2810	0.95	79.9035	1.8708	0.04	56.8597	38.6035	0.89
450.000	56.4362	39.1603	0.98	79.8547	2.0450	0.05	56.1834	36.7536	0.92
485.000	56.0220	37.4352	1.01	79.8554	2.2173	0.06	55.7013	35.1877	0.95

9.3.2. 2450 MHz Muscle Tissue

Frequency [MHz]	Meas. after 5min			DI Water at 20°C			Init. Meas.		
	ϵ'	ϵ''	σ [S/m]	ϵ'	ϵ''	σ [S/m]	ϵ'	ϵ''	σ [S/m]
2350.000	53.0643	14.1333	1.85	78.0052	9.9624	1.30	52.9338	13.7051	1.79
2450.000	52.7371	14.4407	1.97	77.8430	10.3546	1.41	52.6164	14.0553	1.92
2550.000	52.5194	14.7670	2.09	77.6736	10.7362	1.52	52.2822	14.3887	2.04

9.3.3. 5500 MHz Muscle Tissue

Frequency [MHz]	Meas. after 5min			DI Water at 20°C			Init. Meas.		
	ϵ'	ϵ''	σ [S/m]	ϵ'	ϵ''	σ [S/m]	ϵ'	ϵ''	σ [S/m]
5200.000	47.4802	18.1899	5.26	73.2289	19.8022	5.73	47.4802	18.1899	5.26
5500.000	46.5980	18.7903	5.75	72.6283	20.7017	6.33	46.5980	18.7903	5.75
5800.000	45.7562	19.1526	6.18	71.9839	21.6271	6.98	45.7562	19.1526	6.18

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EXHIBIT 10. SAR MEASUREMENT UNCERTAINTY

10.1. MEASUREMENT UNCERTAINTY EVALUATION FOR SAR TEST

Error Description	Uncertainty value	Prob. Dist.	Div.	(c _i) 1g	(c _i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v _i) v _{eff}
Measurement System								
Probe Calibration	±5.5 %	N	1	1	1	±5.5 %	±5.5 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Readout Electronics	±0.3 %	R	$\sqrt{3}$	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	N	1	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.4 %	R	$\sqrt{3}$	1	1	±0.2 %	±0.2 %	∞
Probe Positioning	±2.9 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Max. SAR Eval.	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Phantom and Setup								
Phantom Uncertainty	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Liquid Conductivity (target)	±5.0 %	R	$\sqrt{3}$	0.64	0.43	±1.8 %	±1.2 %	∞
Liquid Conductivity (meas.)	±2.5 %	N	1	0.64	0.43	±1.6 %	±1.1 %	∞
Liquid Permittivity (target)	±5.0 %	R	$\sqrt{3}$	0.6	0.49	±1.7 %	±1.4 %	∞
Liquid Permittivity (meas.)	±2.5 %	N	1	0.6	0.49	±1.5 %	±1.2 %	∞
Combined Std. Uncertainty						±10.7 %	±10.5 %	387
Expanded STD Uncertainty						±21.4 %	±21.0 %	

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EXHIBIT 11. ADDITIONAL TEST INSTRUMENTS LIST

Name	Type	Serial Number (SN)	Calibration Due Date
Signal Generator(Rohde & Schwartz)	SMIQ06B	DE26709	Apr 02, 2015
Dipole Antenna(Speag)	D450V3	1063	Aug 14, 2015
Dipole Antenna(Speag)	D2450V2	821	Aug 15, 2015
Dipole Antenna(Speag)	D5GHzV2	1069	Aug 19, 2015
SAR Probe(Speag)	EX3DV4	3673	Aug 19, 2015
SARProbe(Speag)	ES3DV3	3208	March 13, 2015
Power Meter(HP)	HP 438A	3008A06729	Apr 10, 2015
Directional Coupler (narda)	Model 3020A	35482	Cal on use
Network Analyzer (HP)	8753D	3410A06430	Feb 11, 2015
Wide Band Amplifier (Instrument for Industry)	Model 5300	-----	N/A

EXHIBIT 12. PROBE CALIBRATION CERTIFICATE

See Appendix 2.

EXHIBIT 13. VALIDATION DIPOLE CALIBRATION CERTIFICATE

See Appendix 3.

EXHIBIT 14. REPORT FROM SATISMO AND SAR REDUCTION

See Appendix 4. (from-Satimo) Report_SAR.pdf

See Appendix 5 (from-Satimo) Report SAR.pdf

See Appendix 6 (from-Motorola) SAR Test Proposal_SAR.pdf

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