Produkte
Products

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Prüfbericht-Nr.: *Test Report No.:*	**17051492 005**	**Auftrags-Nr.:** *Order No.:*	164042267	Seite 1 von 23 *Page 1 of 23*
Kunden-Referenz-Nr.: *Client Reference No.:*	N/A	**Auftragsdatum:** *Order date:*	30.07.2015	
Auftraggeber: *Client:*	Lightcomm Technology Co., Ltd. RM1708-10, 17/F, PROSPERITY CENTRE, 25 CHONG YIP STREET, KWUN TONG, HONG KONG			
Prüfgegenstand: *Test item:*	7" Wi-Fi Android™ Tablet			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	DL718M, DL718M-B, DL-718M-G, DL718M-P, DL718M-R, MID721-L			
Auftrags-Inhalt: *Order content:*	FCC Certification			
Prüfgrundlage: *Test specification:*	CFR Title 47 Part 2 Subpart J Section 2.1093 ANSI/IEEE C95.1-1992 IEEE 1528-2003 FCC OET Bulletin 65 Supplement C (Edition 01-01)			
Wareneingangsdatum: *Date of receipt:*	06.08.2015			
Prüfmuster-Nr.: *Test sample No.:*	A000243804-001			
Prüfzeitraum: *Testing period:*	10.08.2015 - 11.08.2015			
Ort der Prüfung: *Place of testing:*	Shenzhen EMTEK Co., Ltd.			
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: *Test result*:*	Pass			

geprüft von / *tested by*:

Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*
26.05.2015	Owen Tian/Senior Project Manager	

kontrolliert von / *reviewed by*:

Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*
28.08.2015	Sam Lin/Technical Certicier	

Sonstiges / *Other*:

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

V04

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STATEMENT OF COMPLIANCE

TEST ITEM	SPECIFICATION	RESULT
Specific Absorption Rate - Wi-Fi 802.11 b/g/n - 2.4GHz Band	OET Bulletin 65 Supplement C (Edition 01-01): *Evaluating compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*	PASS
Specific Absorption Rate - Wi-Fi 802.11 a - 5.2GHz Band	OET Bulletin 65 Supplement C (Edition 01-01): *Evaluating compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*	PASS
Specific Absorption Rate - Wi-Fi 802.11 a - 5.8GHz Band	OET Bulletin 65 Supplement C (Edition 01-01): *Evaluating compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*	PASS
Specific Absorption Rate – Bluetooth BDR - 2.4GHz Band	OET Bulletin 65 Supplement C (Edition 01-01): *Evaluating compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*	PASS

This device complies with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6W/kg) specified in CFR Title 47 Part 2 Subpart J Section 2.1093 and ANSI/IEEE C95.1-1992.

This device has been testd in accordance with the measurement methods and procedure specified in IEEE 1528-2003 and FCC OET Bulletin 65 Supplement C (edition 01-01).

Refer to the maximum results of Specific Absorption Rate (SAR) durning testing as below.

FREQUENCY BAND	EXPOSURE POSITION	EQUIPMENT CLASS	HIGHEST REPORTED SAR VALUE (W/KG)
802.11 b/g/n - 2.4GHz Band	Body	DTS	1.280
802.11 a - 5.8GHz Band	Body		1.348
802.11 a - 5.2GHz Band	Body	NII	0.714

Contents

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: System Performance Check
Appendix B: Test Plots of SAR Measurement
Appendix C: Calibration Certificate

2. Test Sites

2.1 Test Facilities

Shenzhen EMTEK Co., Ltd.

Bldg 69, Majialong Industry Zone, Nanshan District,
Shenzhen, Guangdong, P.R. China

The tests at the test site have been conducted under the supervision of a TÜV engineer.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal Date	Cal. Interval
Signal Generator	Agilent	N5181A	MY50145187	2015-05-16	1year
RF Power Meter. Dual Channel	BOONTON	4232A	10539	2015-05-16	1year
Power Sensor	BOONTON	51011EMC	34236/34238	2015-05-16	1year
Wideband Radio Communication Tester	R&S	CMW500	1201.0002K50 -140822zk	2015-05-16	1year
E-Field Probe	SPEAG	EX3DV4	3801	2015-07-10	1year
DAE	SPEAG	DAE4	918	2015-06-23	1year
Validation Kit 5GHz	SPEAG	D5GHzV2	1169	2014-01-13	2year
Validation Kit 2450MHz	SPEAG	D2450V2	927	2014-01-13	2year

3. General Product Information

3.1 Product Function and Intended Use

The EUTs are 7'' tablet with Wi-Fi, Bluetooth & GPS function.
These models are identical except the model name and color.
For details refer to the User Manual and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification

Device type:	Portable device				
EUT Name:	7" Wi-Fi Android™ Tablet				
Type Identification:	DL718M, DL718M-B, DL-718M-G, DL718M-P, DL718M-R, MID721-L				
Serial Number	A000243804-001				
FCC ID:	XMF-MID721				
Operating mode(s) / WiFi:	IEEE 802.11b	IEEE 802.11g	IEEE 802.11n (HT20)	IEEE 802.11n (HT40)	IEEE 802.11a
Test modulation	DSSS (DBPSK, DQPSK), CCK)	OFDM (DBPSK, DQPSK)	OFDM (BPSK, QPSK, 16-QAM, 64-QAM)	OFDM (BPSK, QPSK, 16-QAM, 64-QAM)	OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
Transmit Frequency Range (MHz):	2412 - 2472	2412 - 2472	2412 - 2472	2422 - 2462	5180 - 5240, 5745 - 5825
Maximum tune-up average output power (dBm):	16	15.5	15.5	15	14.5
Operating mode(s) / Bluetooth:	Bluetooth 4.0				
Test modulation	GFSK, π/4DQPSK, 8DPSK for BDR & EDR mode, GFSK for LE mode				
Transmit Frequency Range (MHz):	2402-2480				
Maximum tune-up average output power (dBm):	6.5				
Hardware version:	MID721-MT8127-86V VER1.1				
Software version:	3.10.72 lius@mid-compiler #1 tue Aug 25 21:13:24 CTS 2015				
Antenna type:	Integrated antenna				
Battery options:	DC 3.7V				

Table 3: List of WLAN Channel of 802.11b/g/n mode

802.11b		802.11g		802.11n (HT20)		802.11n (HT40)	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
1	2412	1	2412	1	2412	3	2422
2	2417	2	2417	2	2417	4	2427
3	2422	3	2422	3	2422	5	2432
4	2427	4	2427	4	2427	6	2437
5	2432	5	2432	5	2432	7	2442
6	2437	6	2437	6	2437	8	2447
7	2442	7	2442	7	2442	9	2452
8	2447	8	2447	8	2447	10	2457
9	2452	9	2452	9	2452	11	2462
10	2457	10	2457	10	2457		
11	2462	11	2462	11	2462		

Table 4: List of WLAN Channel of 802.11a mode

802.11a	
Channel Number	Frequency (MHz)
36	5180
40	5200
44	5220
48	5240
149	5745
153	5765
157	5785
161	5805
165	5825

Table 5: List of Bluetooth Channel

Bluetooth (BDR & EDR)		Bluetooth (LE)	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
0	2402	0	2402
39	2441	19	2440
78	2480	39	2480

3.3 Independent Operation Modes

The basic operation modes are:

A. On, transmitting
   1. 802.11b
      a) CH1
      b) CH6
      c) CH11
   2. 802.11g
      a) CH1
      b) CH6
      c) CH11
   3. 802.11n (HT20)
      a) CH1
      b) CH6
      c) CH11
   4. 802.11n (HT40)
      a) CH3
      b) CH7
      c) CH11
   5. 802.11a
      a) CH40
      b) CH44
      c) CH149
      d) CH157
      e) CH165
   6. Bluetooth BDR
      a) CH0
      b) CH39
      c) CH78

B. Off

3.4 Submitted Documents

- Bill of Material
- Constructional Drawing
- PCB Layout
- Photo Document
- Circuit Diagram
- Instruction Manual
- Rating Label

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The EUT is commanded to operate at maximum transmitting power. The EUT shall use its internal transmitter. The antenna, battery and accessories shall be those specified by the manufacturer. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output.

Table 6: Configuration of EUT

Operation mode	Frequency Range (MHz)	Modulation	Default Test Channel			Power Control Level
			Low	Middle	High	
802.11b/g/n(HT20)	2412-2462	DSSS, OFDM	CH1	CH6	CH11	Test software was used to configure the EUT to transmit at maximum output power
802.11n(HT40)	2422-2462	OFDM	CH3	CH7	CH11	
802.11a	5180-5240	OFDM	CH40	---	CH44	
	5745-5825	OFDM	CH149	CH157	CH165	
Bluetooth (BDR & EDR)	2402-2480	FHSS	CH0	CH39	CH78	
Bluetooth (LE)	2402-2480	GFSK	CH0	CH19	CH39	

5. Tissue Simulating Liquid Ingredients

The liquid is consisted of Water, Salt, Glycol and DGBE. The liquid has previously been proven to be suited for worst-case. The following table shows the detail solution.

Table 7: Composition of Tissue Simulating Liquid

MIXTURE%(Weight)	FREQUENCY (Body) 2450MHz
Water	73.2
Glycol	26.7
Salt	0.1
Dielectric Parameters Target Value	f=2450MHz ε=52.70 σ=1.95

MIXTURE%(Weight)	FREQUENCY (Body) 5GHz
Water	75.68
DGBE	4.42
Triton X-100	19.47
Salt	0.43
Dielectric Parameters Target Value	f=5200MHz ε=49.00 σ=5.30 f=5300MHz ε=48.90 σ=5.42 f=5500MHz ε=48.60 σ=5.65 f=5600MHz ε=48.50 σ=5.77 f=5800MHz ε=48.20 σ=6.00

5.1 Specific Absorption Rate (SAR) System Check

Dielectric parameters of the tissue simulating liquid were verified prior to the SAR evaluation using the dielectric proble kit and the network analyzer.

A system check measurement was made following the determination of the dielectric parameters of the tissue simulating liquid, using the dipole validation kit. A power level of 250 mW for 2.4GHz band or 100mW for 5GHz band as supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the following table.

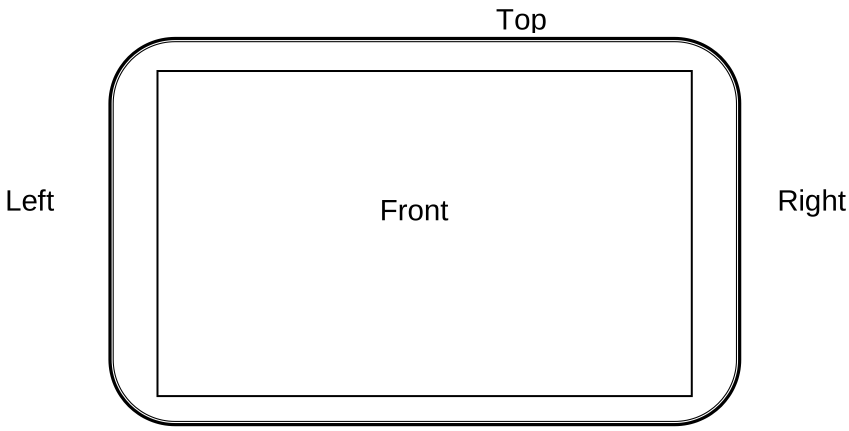
Table 8: System Check Results of Tissue Simulating Liquid

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
2450	Body	22.6	1.999	52.351	1.95	52.70	2.51	-0.66	±5	2015-8-10
5200	Body	22.8	5.279	49.196	5.30	49.00	-0.40	0.40	±5	2015-8-11
5800	Body	22.8	6.141	47.955	6.00	48.20	2.35	-0.51	±5	2015-8-11

Table 9: System Validation

Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2450	Body	250	927	3970	1418	12.84	50.40	51.36	1.90
5200	Body	100	1169	3970	1418	7.59	73.80	75.9	2.85
5800	Body	100	1169	3970	1418	7.32	74.30	73.2	-1.48

5.2 Exposure Positions Consideration



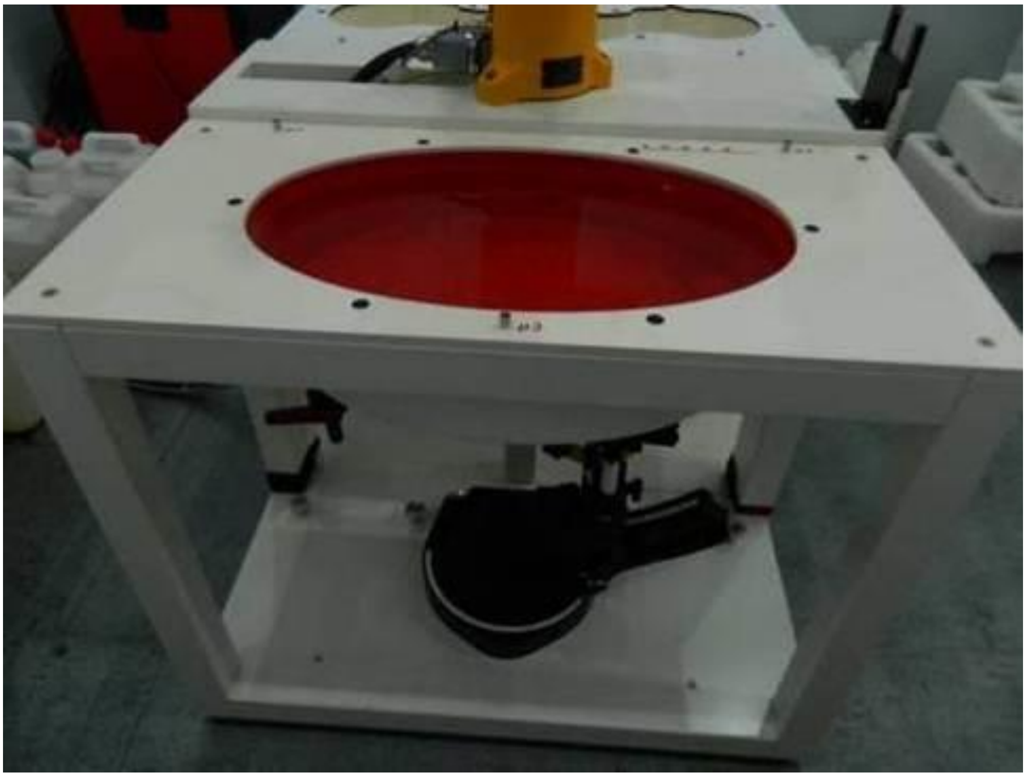
5.3 Phantom Description

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

Shell Thickness 2±0.2 mm

Filling Volume Approx. 30 liters

Dimensions 190×600×0 mm (H x L x W)



Picture of ELI Phantom

5.4 Scanning Procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5%.

The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid spacing is set according to FCC KDB Publication 865664. During scan the distance of the probe to the phantom remains unchanged. After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

Zoom Scan

After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm.

Spatial Peak Detection

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses. The DASY5 system allows evaluations that combine measured data and robot positions, such as:

• maximum search

• extrapolation

• boundary correction

• peak search for averaged SAR

During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic

Shepard’s method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space.

They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard’s method for extrapolation.

A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

5.5 Test Operation and Test Software

Test operation refers to test setup in chapter 5.

A communication link is set up with the test mode software for WiFi mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode.

802.11b/g/n operating modes are tested independently according to the service requirements in each frquency band.802.11b/g/n modes are tested on channel 1, 6, 11. However, if output power reduction is necessary for channels 1 and/or 11 to meet restricted band requirements the highest output channel closest to each of these channels must be tested instead.

802.11a is tested for UNII operations on channel 40 and 44 in 5.18 - 5.24GHz band. Also 5.8GHz band is alos available for §15.247, hence channels 149, 157 and 165 should be tested instead of the UNII channels.

SAR is not required for 802.11g/n when the maximum average output power is less than ¼ dB higher than that measured on the corresponding 802.11b channels.

Each channel should be tested at the lowest data rate, and repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg.

For each frequency band testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than ¼ dB higher than those measured at the lowest data rate.

5.6 Special Accessories and Auxiliary Equipment

None.

6. Test Results

6.1 Huaman Exposure to Radiofrequency Electromagnetic Fields

RESULT: **Passed**

Date of testing	:	2015-08-10 to 2015-08-11
Test standard	:	CFR Title 47 Part 2 Subpart J Section 2.1093 ANSI/IEEE C95.1-1992 IEEE 1528-2003 FCC OET Bulletin 65 Suppplement C (Edition 01-01)
FCC KDB Publication	:	KDB 447498 D01 v05r01 KDB 248227 D01 v01r02 KDB 616217 D04 v01r01 KDB 865664 D01 v01r01
Limits	:	1.6W/kg

Test setup

Operation mode	:	A.1, A.3, A.4, A.5, A.6
Ambient temperature	:	23℃
Relative humidity	:	50%
Atmospheric pressure	:	101.0kPa

Table 10: Conducted Power of 802.11b

Channel	Frequency (MHz)	Average power (dBm)				Power Setting	Tune-Up Limit	Duty Cycle %
		Data Rate						99.64
		1Mbps	2Mbps	5.5Mbps	11Mbps			Max
CH 1	2412	15.08	15.25	15.14	15.24	17	16	15.61
CH 6	2437	15.28	15.19	15.32	15.4	17	16	
CH 11	2462	15.31	15.61	15.56	15.47	17	16	

Table 11: Conducted Power of 802.11g

Channel	Frequency (MHz)	Average power (dBm)								Power Setting	Tune-Up Limit	Duty Cycle %
		Data Rate										97.49
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps			Max
CH 1	2412	12.96	13.39	13.36	13.7	13.19	13.31	13.93	13.42	17	14	15.3
CH 6	2437	14.95	15.05	15.3	15.25	15.13	15.21	14.98	15.06	17	15.5	
CH 11	2462	13.37	12.99	13.49	13.47	13.54	13.29	13.91	13.92	17	14	

Table 12: Conducted Power of 802.11n (HT20)

Channel	Frequency (MHz)	Average power (dBm)								Power Setting	Tune-Up Limit	Duty Cycle %
		Data Rate										97.49
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps			Max
CH 1	2412	12.96	13.39	13.36	13.7	13.19	13.31	13.93	13.42	17	14	15.3
CH 6	2437	14.95	15.05	15.3	15.25	15.13	15.21	14.98	15.06	17	15.5	
CH 11	2462	13.37	12.99	13.49	13.47	13.54	13.29	13.91	13.92	17	14	

Table 13: Conducted Power of 802.11n (HT40)

Channel	Frequency (MHz)	Average power (dBm)								Power Setting	Tune-up Limit	Duty Cycle %
		MCS Index										94.92
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7			Max
CH 3	2422	11.21	11.05	11.04	11.09	11.15	11.12	11.39	11.13	16.5	12	14.49
CH 6	2437	14.44	14.37	14.37	14.47	14.49	13.34	13.12	13.36	16.5	15	
CH 9	2452	11.42	11.03	11.57	11.11	11.48	10.99	11.36	11.28	16.5	12	

Table 14: Conducted Power of 802.11a

Channel	Frequency (MHz)	Average Power (dBm)								Power Setting	Tune-up Limit	Duty Cycle %
		Data Rate										97.5
		6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps			Max
CH 36	5180	14.11	14.15	14.17	14.23	14.06	14.19	14.43	14.42	17	15	14.43
CH 40	5200	13.94	14.06	13.99	14.10	13.52	13.79	13.92	14.01	17	15	
CH 44	5220	13.39	13.43	13.60	13.72	13.68	13.55	13.64	13.71	17	15	
CH 48	5240	13.00	12.95	12.99	13.01	13.11	12.89	12.97	13.02	17	14	
CH 149	5745	11.69	11.71	11.67	11.80	11.59	11.70	11.67	11.83	16	12.5	12.15
CH 165	5825	12.01	12.15	11.02	11.97	12.00	11.86	12.03	11.79	16	12.5	

Table 15: Conducted Power of Bluetooth (BDR & EDR)

Channel	Frequency (MHz)	Bluetooth Average power (dBm)			Tune-up Limit
		1Mbps	2Mbps	3Mbps	
CH 00	2402	5.69	4.82	4.80	6.5
CH 39	2441	6.12	5.25	5.25	
CH 78	2480	6.00	5.17	5.20	

Table 16: Conducted Power of Bluetooth (LE)

Channel	Frequency (MHz)	Bluetooth Average power (dBm)	Tune-up Limit
		GFSK	
CH 00	2402	-2.14	-1
CH 19	2440	-1.84	
CH 39	2480	-1.75	

Table 17: Test result of SAR Values

Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Setting	configure	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Date	Note
WLAN2.4G	802.11b	Bottom Face	0	11	2462	17	1Mbps	15.31	16.00	1.172	99.64	1.004	-0.06	1.04	1.224	2015-08-10	
WLAN2.4G	802.11b	Edge 3	0	11	2462	17	1Mbps	15.31	16.00	1.172	99.64	1.004	0.09	1.06	1.247	2015-08-10	
WLAN2.4G	802.11b	Edge 4	0	11	2462	17	1Mbps	15.31	16.00	1.172	99.64	1.004	-0.03	0.138	0.162	2015-08-10	
WLAN2.4G	802.11b	Bottom Face	0	1	2412	17	1Mbps	15.08	16.00	1.236	99.64	1.004	-0.02	0.957	1.188	2015-08-10	
WLAN2.4G	802.11b	Bottom Face	0	6	2437	17	1Mbps	15.28	16.00	1.180	99.64	1.004	-0.06	0.976	1.157	2015-08-10	
WLAN2.4G	802.11b	Edge 3	0	1	2412	17	1Mbps	15.08	16.00	1.236	99.64	1.004	-0.04	1.01	1.253	2015-08-10	
WLAN2.4G	802.11b	Edge 3	0	6	2437	17	1Mbps	15.28	16.00	1.180	99.64	1.004	-0.1	1.08	**1.280**	2015-08-10	
WLAN2.4G	802.11b	Edge 3	0	6	2437	17	1Mbps	15.28	16.00	1.180	99.64	1.004	-0.05	1.02	1.209	2015-08-10	Repeat SAR
WLAN5G Band 1	802.11a	Bottom Face	0	36	5180	17	6Mbps	14.11	14.50	1.094	97.5	1.026	-0.06	0.636	**0.714**	2015-08-11	
WLAN5G Band 1	802.11a	Edge 3	0	36	5180	17	6Mbps	14.11	14.50	1.094	97.5	1.026	0.12	0.345	0.387	2015-08-11	
WLAN5G Band 1	802.11a	Edge 4	0	36	5180	17	6Mbps	14.11	14.50	1.094	97.5	1.026	-0.01	0.203	0.228	2015-08-11	
WLAN5G Band 4	802.11a	Bottom Face	0	165	5825	16	6Mbps	12.01	12.50	1.119	97.5	1.026	-0.05	0.992	1.139	2015-08-11	
WLAN5G Band 4	802.11a	Edge 3	0	165	5825	16	6Mbps	12.01	12.50	1.119	97.5	1.026	0.04	0.441	0.507	2015-08-11	
WLAN5G Band 4	802.11a	Edge 4	0	165	5825	16	6Mbps	12.01	12.50	1.119	97.5	1.026	-0.05	0.357	0.410	2015-08-11	
WLAN5G Band 4	802.11a	Bottom Face	0	149	5745	16	6Mbps	11.69	12.50	1.205	97.5	1.026	-0.05	1.09	**1.348**	2015-08-11	
WLAN5G Band 4	802.11a	Bottom Face	0	149	5745	16	6Mbps	11.69	12.50	1.205	97.5	1.026	-0.04	1.08	1.335	2015-08-11	Repeat SAR

Refer to attached Appendix B for details of test results.

6.2 Measurement Uncertainty

6.2.1 Measurement uncertainty evaluation

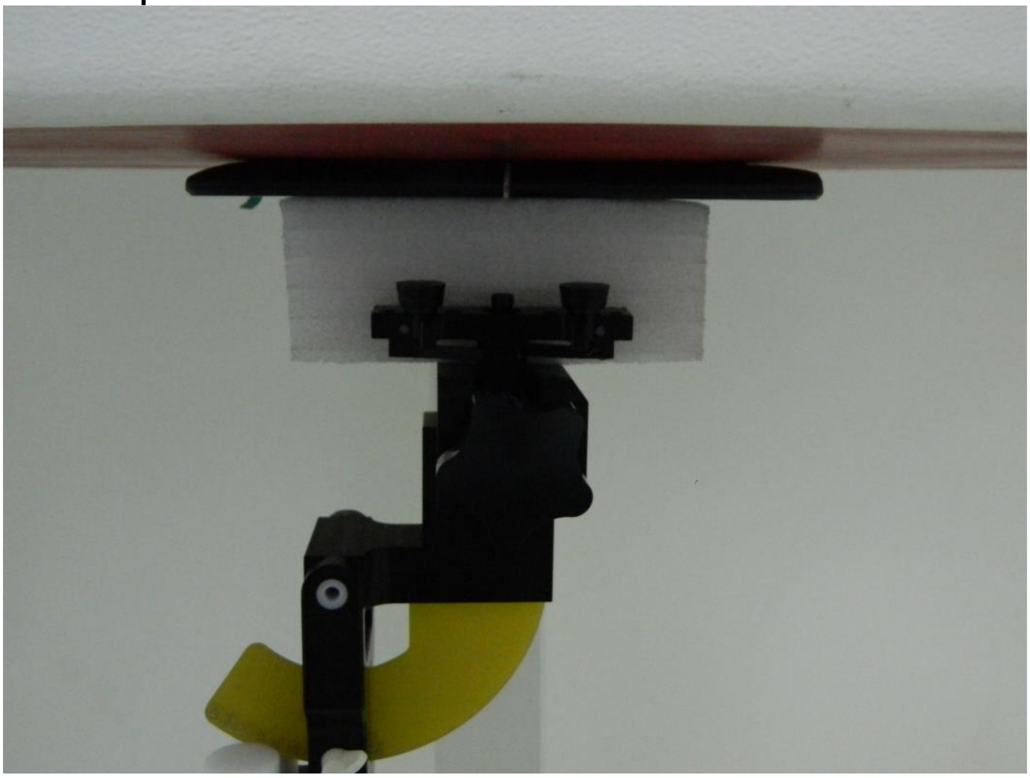
This measurement uncertainty budget is suggested by IEEE P1528. The breakdown of the individual uncertainties is as follows:

Table 18: Measurement Uncertainties

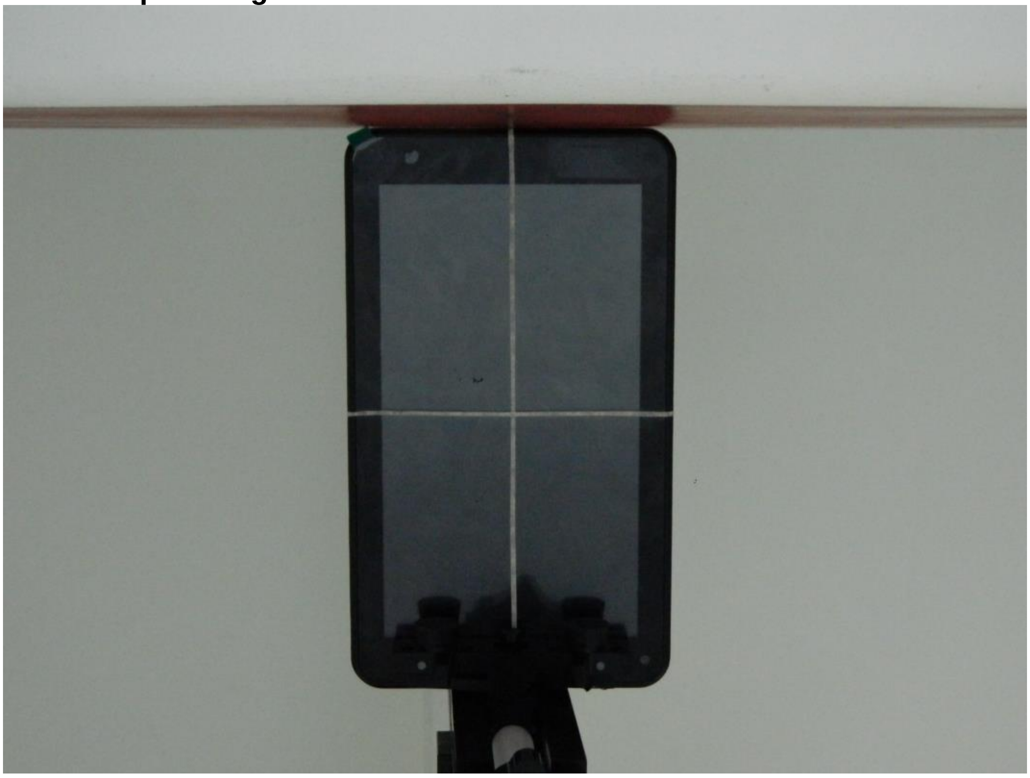
No.	Description	Type	Uncertainty Value (%)	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	5.5	N	1	1	1	5.5	5.5	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	N	1	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						9.25	9.12	257
Expanded uncertainty (Confidence interval of 95%)		$u_e = 2u_c$						18.5	18.2	\

7. Photographs of the Test Set-Up

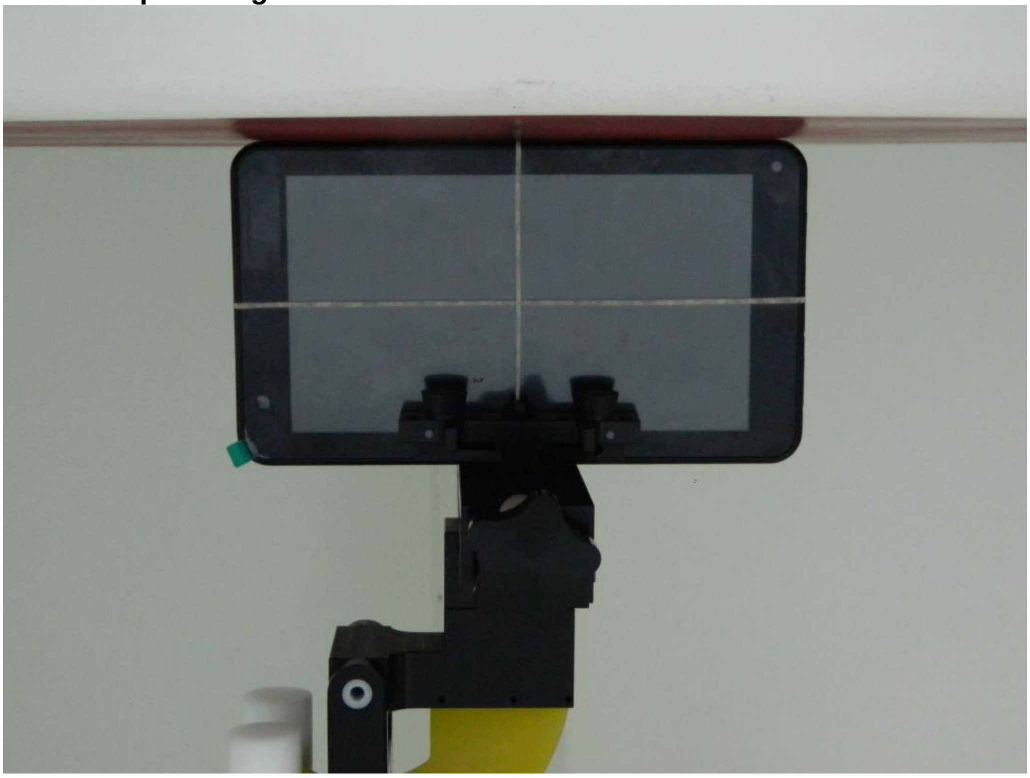
Photograph 1: Set-up for Bottom Face



Photograph 2: Set-up for Edge 3



Photograph 3: Set-up for Edge 4



8. List of Tables

9. List of Photographs

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 10.08.2015

SystemPerformanceCheck-D2450V2-MSL-150810

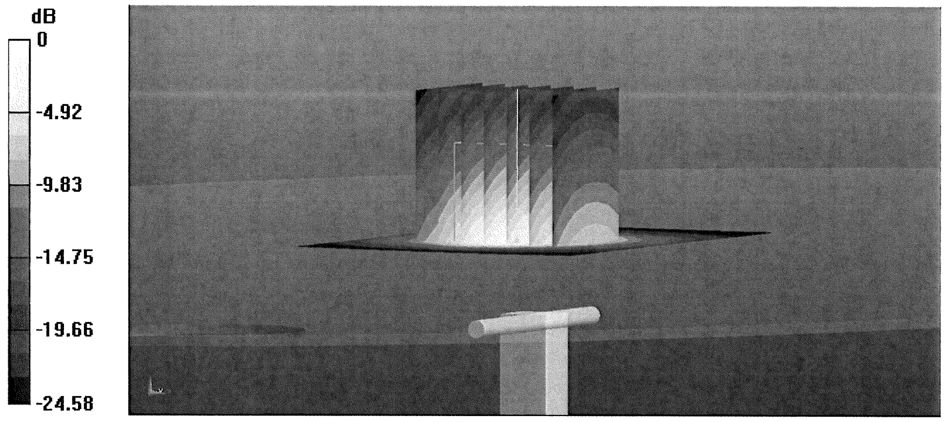
DUT: Dipole 2450 MHz D2450V2 SN:927
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_150810
Medium parameters used: f = 2450 MHz; σ = 1.999 S/m; ε_r = 52.351; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.66, 7.66, 7.66); Calibrated: 10.07.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency at 2450MHz/d=10mm, Pin=250mW, dist=2.0mm (EX-Probe)/Area Scan (41x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 17.2 W/kg

System Performance Check at Frequency at 2450MHz/d=10mm, Pin=250mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.505 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.9 W/kg
SAR(1 g) = 12.84 W/kg; SAR(10 g) = 5.91 W/kg
Maximum value of SAR (measured) = 17.1 W/kg



0 dB = 17.1 W/kg = 12.33 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 11.08.2015

SystemPerformanceCheck-D5GHzV2-5200MHz-MSL-150811

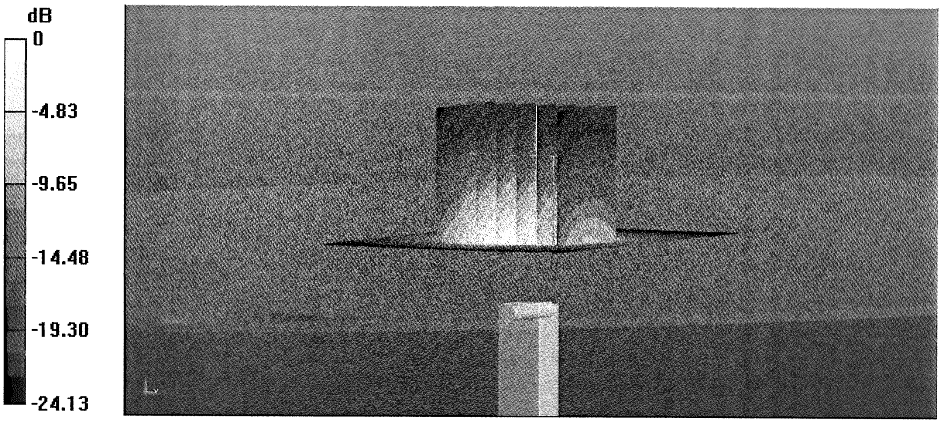
DUT: Dipole D5GHzV2 SN:1169
Communication System: UID 0, CW (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: MSL_5G_150811
Medium parameters used: f = 5200 MHz; σ = 5.279 S/m; ε_r = 49.196; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(5.08, 5.08, 5.08); Calibrated: 10.07.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency at 5200MHz/d=10mm, Pin=100mW, dist=2.0mm (EX-Probe)/Area Scan (91x91x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.1 W/kg

System Performance Check at Frequency at 5200MHz/d=10mm, Pin=100mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 63.9 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 29.0 W/kg
SAR(1 g) = 7.59 W/kg; SAR(10 g) = 2.19 W/kg
Maximum value of SAR (measured) = 16.3 W/kg



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

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 11.08.2015

SystemPerformanceCheck-D5GHzV2-5800MHz-MSL-150811

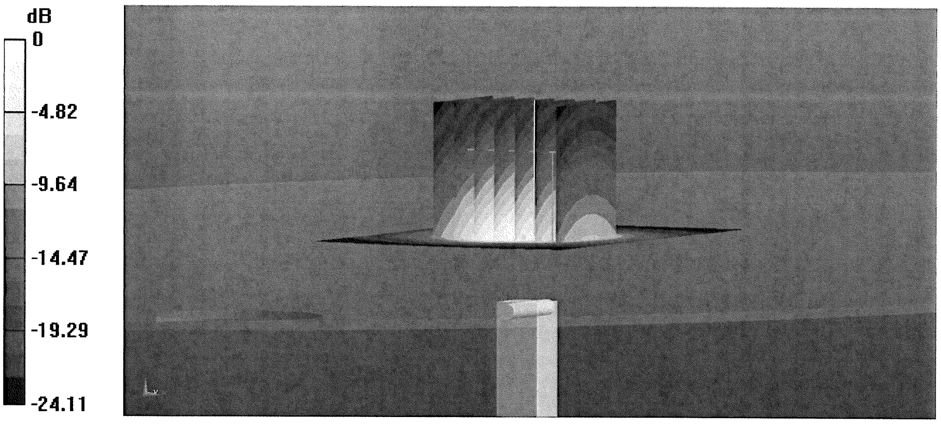
DUT: Dipole D5GHzV2 SN:1169
Communication System: UID 0, CW (0); Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: MSL_5G_150811
Medium parameters used: f = 5800 MHz; σ = 6.141 S/m; ε_r = 47.955; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(4.69, 4.69, 4.69); Calibrated: 10.07.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequency at 5800MHz/d=10mm, Pin=100mW, dist=2.0mm (EX-Probe)/Area Scan (91x91x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 15.8 W/kg

System Performance Check at Frequency at 5800MHz/d=10mm, Pin=100mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 57.6 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 29.2 W/kg
SAR(1 g) = 7.32 W/kg; SAR(10 g) = 2.05 W/kg
Maximum value of SAR (measured) = 16.2 W/kg



0 dB = 16.2 W/kg = 12.10 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 10.08.2015

01-WLAN2.4GHz-802.11b 1Mbps-Bottom Face-0cm-Ch11

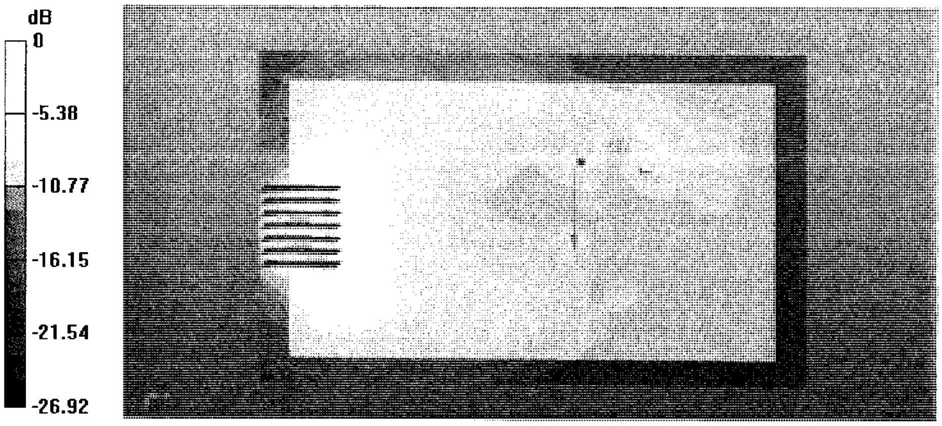
Communication System: UID 0, WIFI (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: MSL_2450_150810
Medium parameters used: f = 2462 MHz; σ = 2.016 S/m; ε_r = 52.306; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.66, 7.66, 7.66); Calibrated: 10.07.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch11/Area Scan (111x181x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.66 W/kg

Configuration/Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.062 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 2.43 W/kg
SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.442 W/kg
Maximum value of SAR (measured) = 1.67 W/kg



0 dB = 1.67 W/kg = 2.23 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 10.08.2015

02-WLAN2.4GHz-802.11b 1Mbps-Edge 3-0cm-Ch11

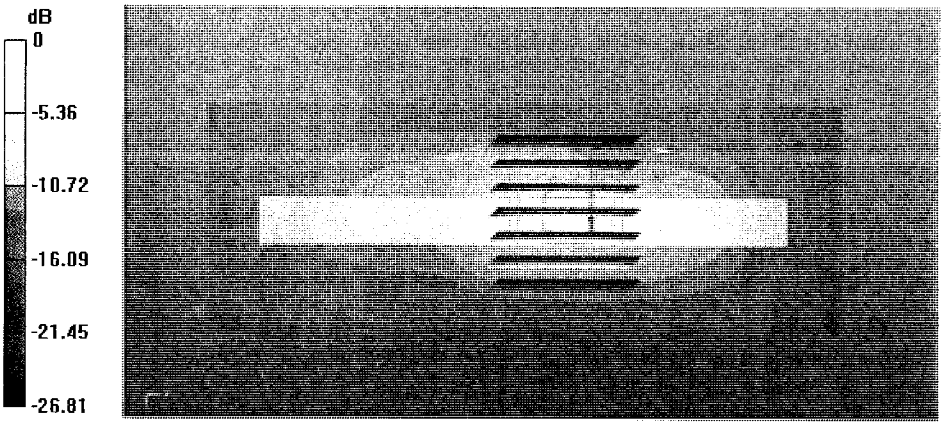
Communication System: UID 0, WIFI (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: MSL_2450_150810
Medium parameters used: f = 2462 MHz; σ = 2.016 S/m; ε_r = 52.306; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.66, 7.66, 7.66); Calibrated: 10.07.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch11/Area Scan (41x111x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.76 W/kg

Configuration/Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.982 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 2.60 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.407 W/kg
Maximum value of SAR (measured) = 1.78 W/kg



0 dB = 1.78 W/kg = 2.50 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 10.08.2015

03-WLAN2.4GHz-802.11b 1Mbps-Edge 4-0cm-Ch11

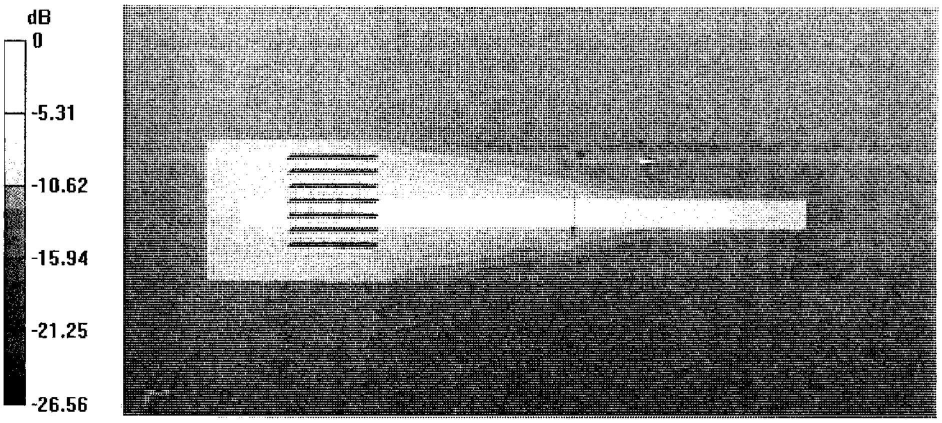
Communication System: UID 0, WIFI (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: MSL_2450_150810
Medium parameters used: f = 2462 MHz; σ = 2.016 S/m; ε_r = 52.306; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.66, 7.66, 7.66); Calibrated: 10.07.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch11/Area Scan (41x181x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.205 W/kg

Configuration/Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.338 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.287 W/kg
SAR(1 g) = 0.138 W/kg; SAR(10 g) = 0.066 W/kg
Maximum value of SAR (measured) = 0.213 W/kg



0 dB = 0.213 W/kg = -6.72 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 10.08.2015

04-WLAN2.4GHz-802.11b 1Mbps-Bottom Face-0cm-Ch1

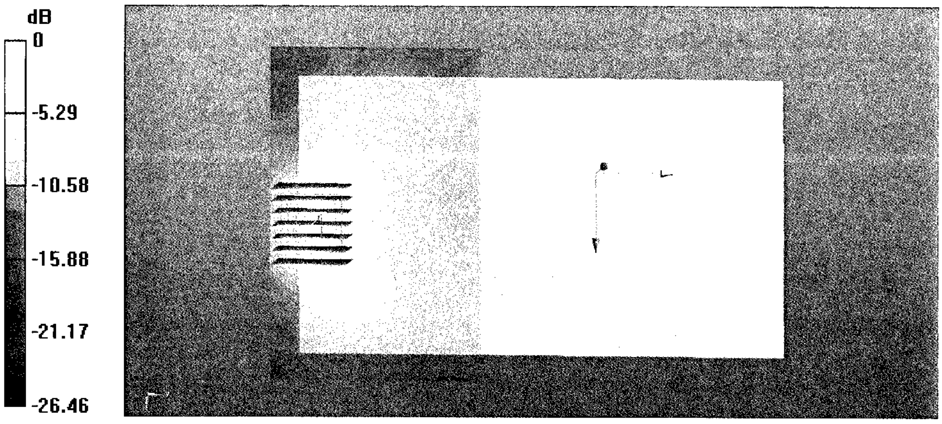
Communication System: UID 0, WIFI (0); Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: MSL_2450_150810
Medium parameters used: f = 2412 MHz; σ = 1.946 S/m; ε_r = 52.449; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.66, 7.66, 7.66); Calibrated: 10.07.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch1/Area Scan (111x71x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.54 W/kg

Configuration/Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.892 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 2.19 W/kg
SAR(1 g) = 0.957 W/kg; SAR(10 g) = 0.412 W/kg
Maximum value of SAR (measured) = 1.55 W/kg



0 dB = 1.55 W/kg = 1.90 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 10.08.2015

05-WLAN2.4GHz-802.11b 1Mbps-Bottom Face-0cm-Ch6

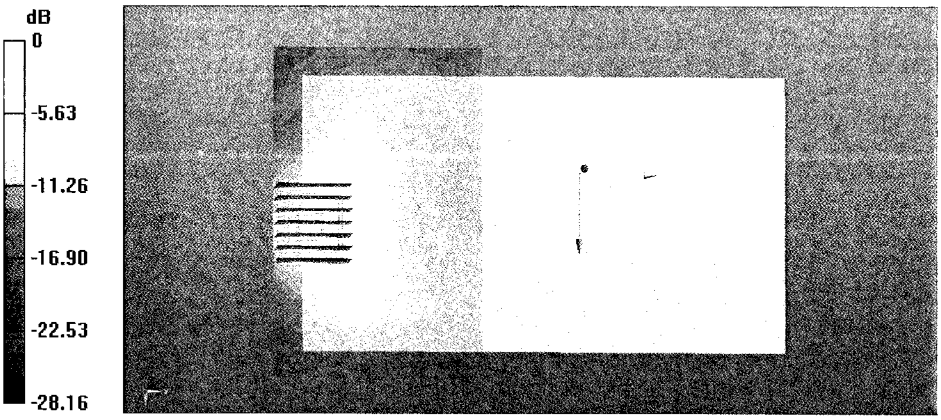
Communication System: UID 0, WIFI (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: MSL_2450_150810
Medium parameters used: f = 2437 MHz; σ = 1.98 S/m; ε_r = 52.399; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.66, 7.66, 7.66); Calibrated: 10.07.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch6/Area Scan (111x71x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.61 W/kg

Configuration/Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.867 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 2.26 W/kg
SAR(1 g) = 0.976 W/kg; SAR(10 g) = 0.418 W/kg
Maximum value of SAR (measured) = 1.59 W/kg



0 dB = 1.59 W/kg = 2.01 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 10.08.2015

06-WLAN2.4GHz-802.11b 1Mbps-Edge 3-0cm-Ch1

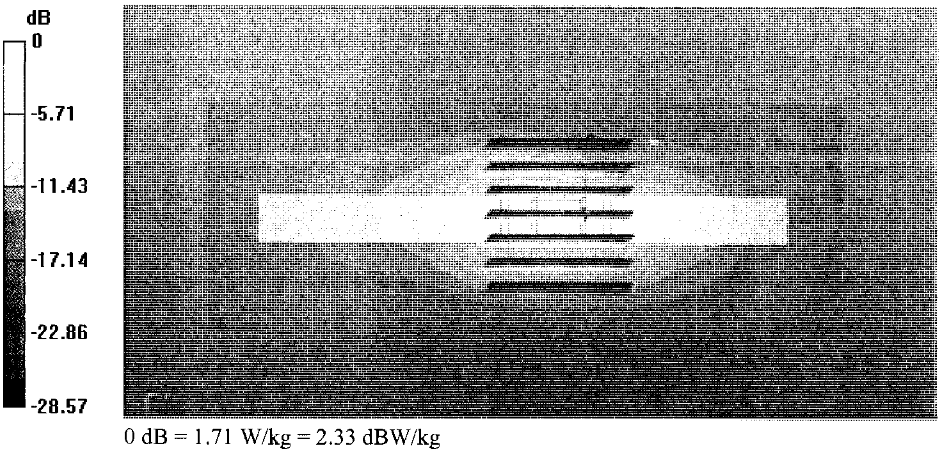
Communication System: UID 0, WIFI (0); Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: MSL_2450_150810
Medium parameters used: f = 2412 MHz; σ = 1.946 S/m; ε_r = 52.449; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.66, 7.66, 7.66); Calibrated: 10.07.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch1/Area Scan (41x111x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.70 W/kg

Configuration/Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.967 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 2.46 W/kg
SAR(1 g) = 1.01 W/kg; SAR(10 g) = 0.395 W/kg
Maximum value of SAR (measured) = 1.71 W/kg



0 dB = 1.71 W/kg = 2.33 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 10.08.2015

07-WLAN2.4GHz-802.11b 1Mbps-Edge 3-0cm-Ch6

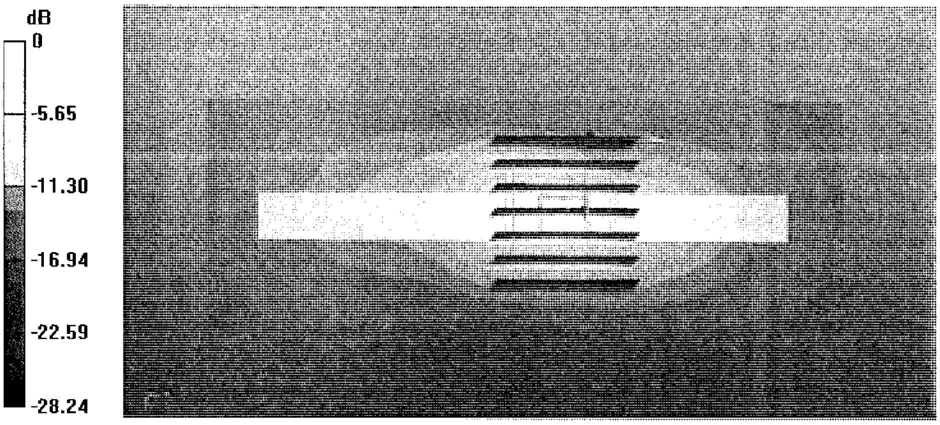
Communication System: UID 0, WIFI (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: MSL_2450_150810
Medium parameters used: f = 2437 MHz; σ = 1.98 S/m; ε_r = 52.399; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.66, 7.66, 7.66); Calibrated: 10.07.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch6/Area Scan (41x111x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.79 W/kg

Configuration/Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.030 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 2.65 W/kg
SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.417 W/kg
Maximum value of SAR (measured) = 1.83 W/kg



0 dB = 1.83 W/kg = 2.62 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 10.08.2015

08-WLAN2.4GHz-802.11b 1Mbps-Edge 3-0cm-Ch6-Repeat SAR

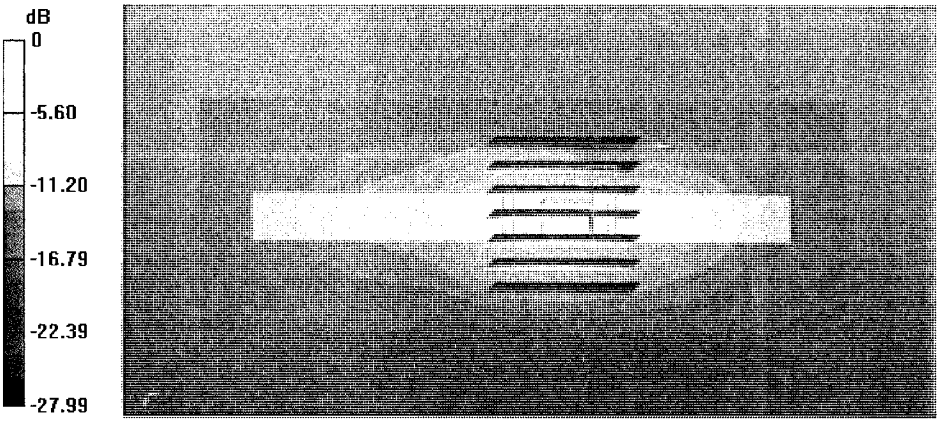
Communication System: UID 0, WIFI (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: MSL_2450_150810
Medium parameters used: f = 2437 MHz; σ = 1.98 S/m; ε_r = 52.399; ρ = 1000 kg/m^3
Ambient Temperature: 23.4 ℃; Liquid Temperature: 22.6 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(7.66, 7.66, 7.66); Calibrated: 10.07.2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch6/Area Scan (41x111x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.66 W/kg

Configuration/Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.906 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.52 W/kg
SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.396 W/kg
Maximum value of SAR (measured) = 1.72 W/kg



0 dB = 1.72 W/kg = 2.36 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 11.08.2015

14-WLAN5GHz Band 1-802.11a 6Mbps-Bottom Face-0cm-Ch36

Communication System: UID 0, WIFI (0); Frequency: 5180 MHz;Duty Cycle: 1:1
Medium: MSL_5G_150811
Medium parameters used: f = 5180 MHz; σ = 5.261 S/m; ε_r = 49.301; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

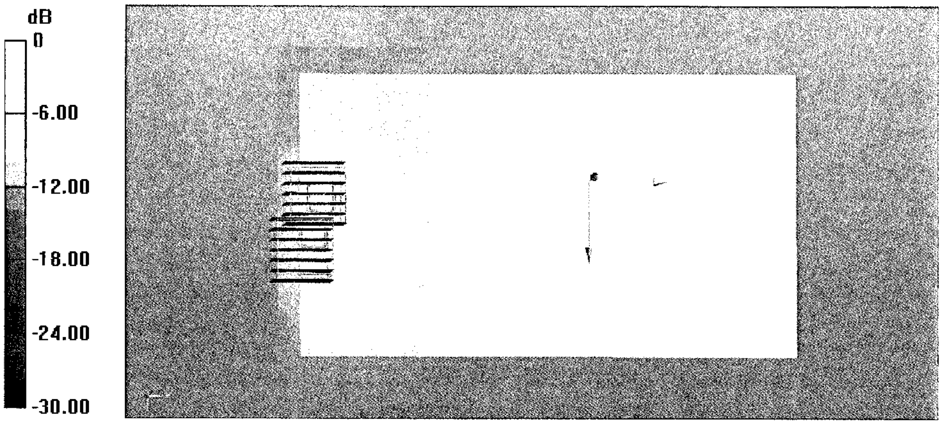
DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(5.08, 5.08, 5.08); Calibrated: 10.07.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch36/Area Scan (131x61x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.21 W/kg

Configuration/Ch36/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0.845 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 3.02 W/kg
SAR(1 g) = 0.636 W/kg; SAR(10 g) = 0.195 W/kg
Maximum value of SAR (measured) = 1.70 W/kg

Configuration/Ch36/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0.845 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 2.24 W/kg
SAR(1 g) = 0.444 W/kg; SAR(10 g) = 0.132 W/kg
Maximum value of SAR (measured) = 1.25 W/kg



0 dB = 1.25 W/kg = 0.97 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 11.08.2015

15-WLAN5GHz Band 1-802.11a 6Mbps-Edge 3-0cm-Ch36

Communication System: UID 0, WIFI (0); Frequency: 5180 MHz;Duty Cycle: 1:1
Medium: MSL_5G_150811
Medium parameters used: f = 5180 MHz; σ = 5.261 S/m; ε_r = 49.301; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

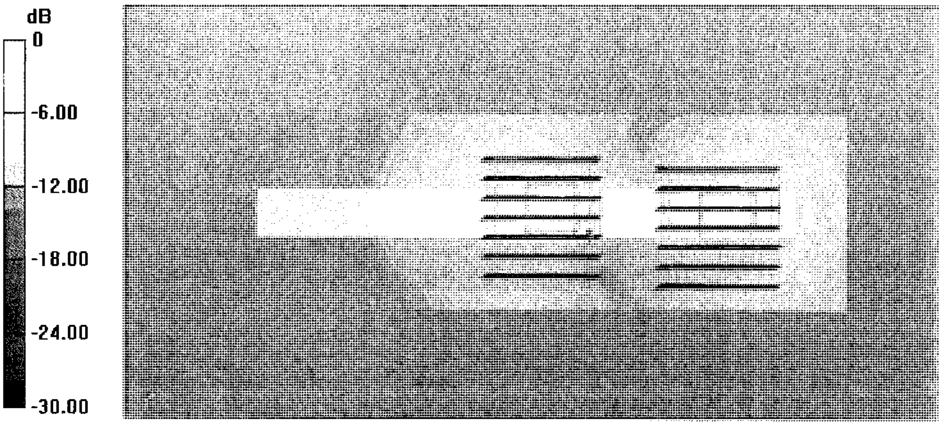
DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(5.08, 5.08, 5.08); Calibrated: 10.07.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch36/Area Scan (41x131x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.727 W/kg

Configuration/Ch36/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 7.487 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.59 W/kg
SAR(1 g) = 0.345 W/kg; SAR(10 g) = 0.108 W/kg
Maximum value of SAR (measured) = 0.853 W/kg

Configuration/Ch36/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 7.487 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.326 W/kg; SAR(10 g) = 0.108 W/kg
Maximum value of SAR (measured) = 0.784 W/kg



0 dB = 0.784 W/kg = -1.06 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 11.08.2015

16-WLAN5GHz Band 1-802.11a 6Mbps-Edge 4-0cm-Ch36

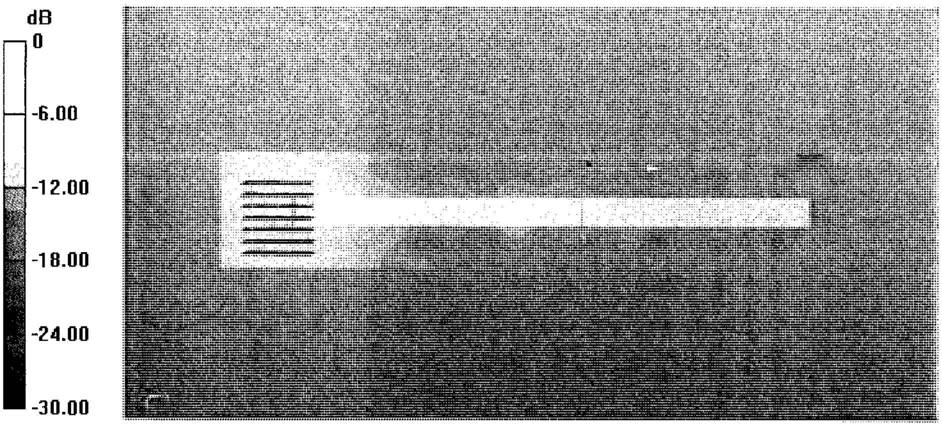
Communication System: UID 0, WIFI (0); Frequency: 5180 MHz;Duty Cycle: 1:1
Medium: MSL_5G_150811
Medium parameters used: f = 5180 MHz; σ = 5.261 S/m; ε_r = 49.301; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(5.08, 5.08, 5.08); Calibrated: 10.07.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch36/Area Scan (41x211x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.394 W/kg

Configuration/Ch36/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 2.218 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.938 W/kg
SAR(1 g) = 0.203 W/kg; SAR(10 g) = 0.074 W/kg
Maximum value of SAR (measured) = 0.505 W/kg



0 dB = 0.505 W/kg = -2.97 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 11.08.2015

09-WLAN5GHz Band 4-802.11a 6Mbps-Bottom Face-0cm-Ch165

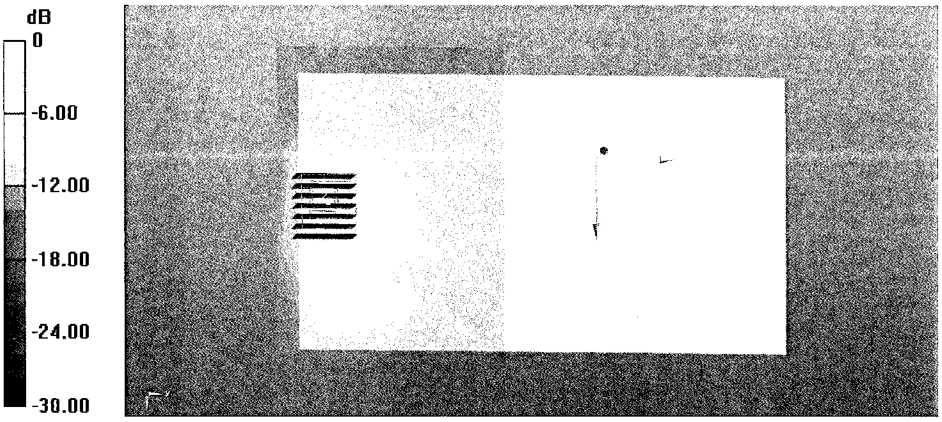
Communication System: UID 0, WIFI (0); Frequency: 5825 MHz;Duty Cycle: 1:1
Medium: MSL_5G_150811
Medium parameters used: f = 5825 MHz; σ = 6.219 S/m; ε_r = 48.029; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(4.69, 4.69, 4.69); Calibrated: 10.07.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch165/Area Scan (131x91x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.98 W/kg

Configuration/Ch165/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.444 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 5.18 W/kg
SAR(1 g) = 0.992 W/kg; SAR(10 g) = 0.304 W/kg
Maximum value of SAR (measured) = 2.67 W/kg



0 dB = 2.67 W/kg = 4.27 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 11.08.2015

10-WLAN5GHz Band 4-802.11a 6Mbps-Edge 3-0cm-Ch165

Communication System: UID 0, WIFI (0); Frequency: 5825 MHz;Duty Cycle: 1:1
Medium: MSL_5G_150811
Medium parameters used: f = 5825 MHz; σ = 6.219 S/m; ε_r = 48.029; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

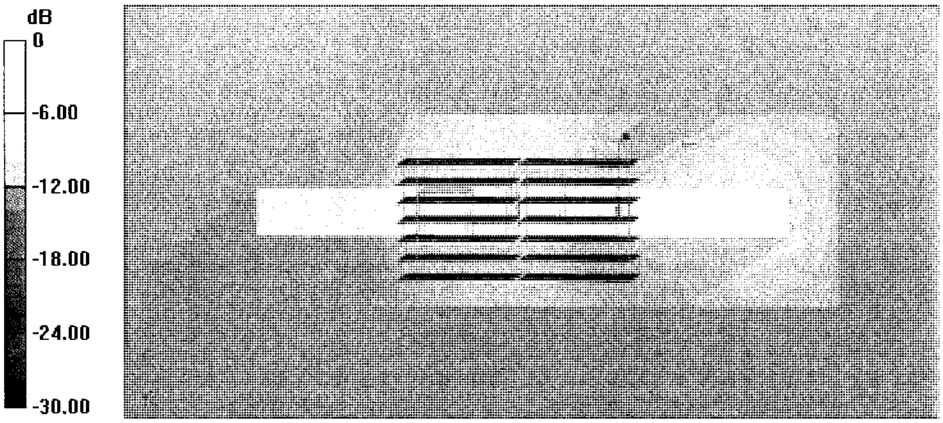
DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(4.69, 4.69, 4.69); Calibrated: 10.07.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch165/Area Scan (41x131x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.808 W/kg

Configuration/Ch165/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 7.570 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 2.18 W/kg
SAR(1 g) = 0.340 W/kg; SAR(10 g) = 0.117 W/kg
Maximum value of SAR (measured) = 0.975 W/kg

Configuration/Ch165/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 7.570 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 2.84 W/kg
SAR(1 g) = 0.441 W/kg; SAR(10 g) = 0.144 W/kg
Maximum value of SAR (measured) = 1.16 W/kg



0 dB = 1.16 W/kg = 0.64 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 11.08.2015

11-WLAN5GHz Band 4-802.11a 6Mbps-Edge 4-0cm-Ch165

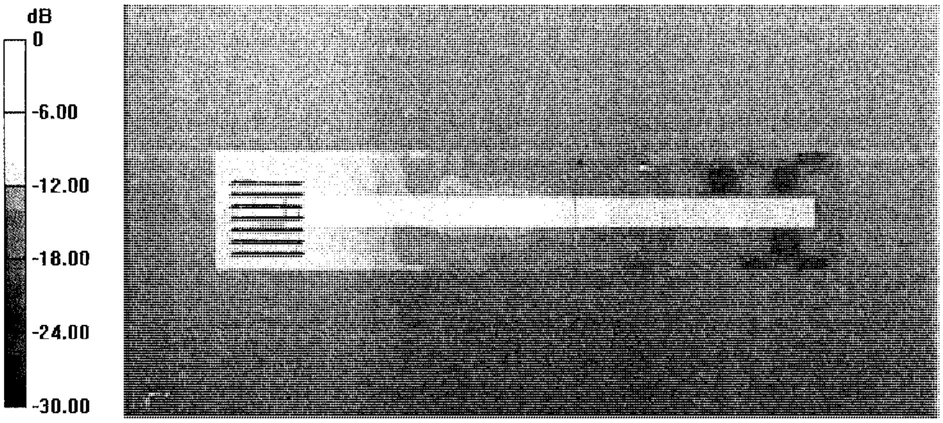
Communication System: UID 0, WIFI (0); Frequency: 5825 MHz;Duty Cycle: 1:1
Medium: MSL_5G_150811
Medium parameters used: f = 5825 MHz; σ = 6.219 S/m; ε_r = 48.029; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(4.69, 4.69, 4.69); Calibrated: 10.07.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch165/Area Scan (41x211x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.705 W/kg

Configuration/Ch165/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 2.719 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.92 W/kg
SAR(1 g) = 0.357 W/kg; SAR(10 g) = 0.133 W/kg
Maximum value of SAR (measured) = 0.912 W/kg



0 dB = 0.912 W/kg = -0.40 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 11.08.2015

12-WLAN5GHz Band 4-802.11a 6Mbps-Bottom Face-0cm-Ch149

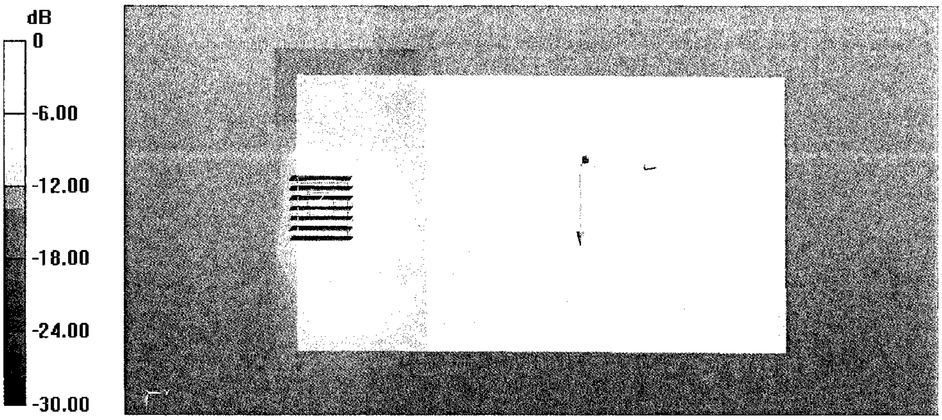
Communication System: UID 0, WIFI (0); Frequency: 5745 MHz;Duty Cycle: 1:1
Medium: MSL_5G_150811
Medium parameters used: f = 5745 MHz; σ = 6.042 S/m; ε_r = 48.318; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(4.69, 4.69, 4.69); Calibrated: 10.07.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch149/Area Scan (131x61x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.28 W/kg

Configuration/Ch149/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.328 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 5.58 W/kg
SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.333 W/kg
Maximum value of SAR (measured) = 2.85 W/kg



0 dB = 2.85 W/kg = 4.55 dBW/kg

Test Laboratory: Shenzhen EMTEK Co.,Ltd. Date/Time: 11.08.2015

13-WLAN5GHz Band 4-802.11a 6Mbps-Bottom Face-0cm-Ch149-Repeat SAR

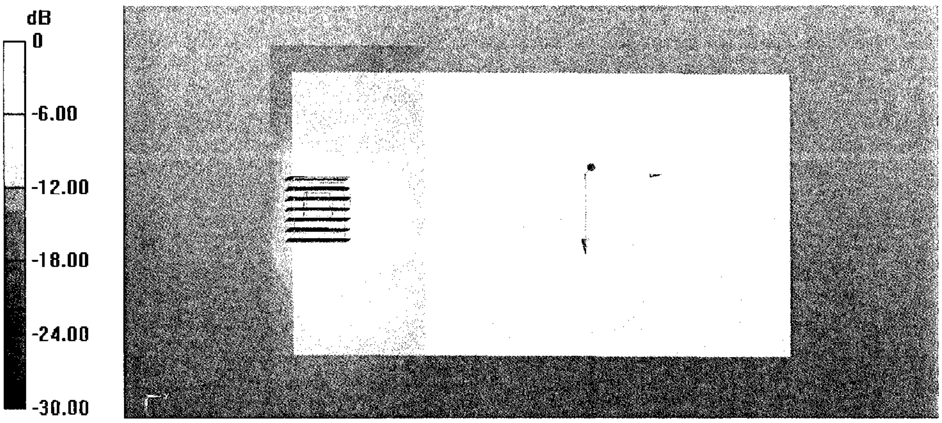
Communication System: UID 0, WIFI (0); Frequency: 5745 MHz;Duty Cycle: 1:1
Medium: MSL_5G_150811
Medium parameters used: f = 5745 MHz; σ = 6.042 S/m; ε_r = 48.318; ρ = 1000 kg/m^3
Ambient Temperature: 23.5 ℃; Liquid Temperature: 22.8 ℃

DASY Configuration:

- Probe: EX3DV4 - SN3970; ConvF(4.69, 4.69, 4.69); Calibrated: 10.07.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1418; Calibrated: 23.06.2015
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1231
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Configuration/Ch149/Area Scan (131x61x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.28 W/kg

Configuration/Ch149/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.067 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 5.50 W/kg
SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.332 W/kg
Maximum value of SAR (measured) = 2.86 W/kg



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

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

S Schweizerischer Kalibrierdienst
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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **MRT-CERT (Auden)**

Certificate No: D5GHzV2-1169_Jan14

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1169
Calibration procedure(s)	QA CAL-22.v2 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	January 07, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe EX3DV4	SN: 3503	30-Dec-13 (No. EX3-3503_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

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

Issued: January 8, 2014

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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S Swiss Calibration Service

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

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010
b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"
c) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5300 MHz ± 1 MHz 5500 MHz ± 1 MHz 5600 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.5 ± 6 %	4.43 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.00 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.9 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.3 ± 6 %	4.54 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5300 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.0 W / kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.1 ± 6 %	4.75 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.50 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**84.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.2 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.0 ± 6 %	4.84 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**85.0 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.2 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.7 ± 6 %	5.05 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.13 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.2 ± 6 %	5.38 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.43 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**73.8 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.08 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.6 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.42 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.0 ± 6 %	5.52 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5300 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.58 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.2 W/kg ± 19.9 % (k=2)**

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

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.7 ± 6 %	5.80 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.98 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**79.2 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.6 ± 6 %	5.92 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.03 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**79.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.23 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.1 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.2 ± 6 %	6.20 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.48 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**74.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.07 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.5 W/kg ± 19.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	49.7 Ω - 8.2 jΩ
Return Loss	- 21.7 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	49.5 Ω - 5.8 jΩ
Return Loss	- 24.7 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	52.7 Ω - 3.3 jΩ
Return Loss	- 27.6 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	54.7 Ω - 2.7 jΩ
Return Loss	- 25.8 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	55.7 Ω - 4.4 jΩ
Return Loss	- 23.4 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.6 Ω - 7.5 jΩ
Return Loss	- 22.5 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	49.7 Ω - 4.7 jΩ
Return Loss	- 26.5 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	53.2 Ω - 2.2 jΩ
Return Loss	- 28.5 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	55.2 Ω - 1.6 jΩ
Return Loss	- 25.8 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	55.9 Ω - 2.9 jΩ
Return Loss	- 24.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.207 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 09, 2013

DASY5 Validation Report for Head TSL

Date: 07.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1169

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5500 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.43 S/m; ε_r = 35.5; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 4.54 S/m; ε_r = 35.3; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 4.75 S/m; ε_r = 35.1; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 4.84 S/m; ε_r = 35; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.05 S/m; ε_r = 34.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.52, 5.52, 5.52); Calibrated: 30.12.2013, ConvF(5.2, 5.2, 5.2); Calibrated: 30.12.2013, ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2013, ConvF(4.86, 4.86, 4.86); Calibrated: 30.12.2013, ConvF(4.91, 4.91, 4.91); Calibrated: 30.12.2013;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

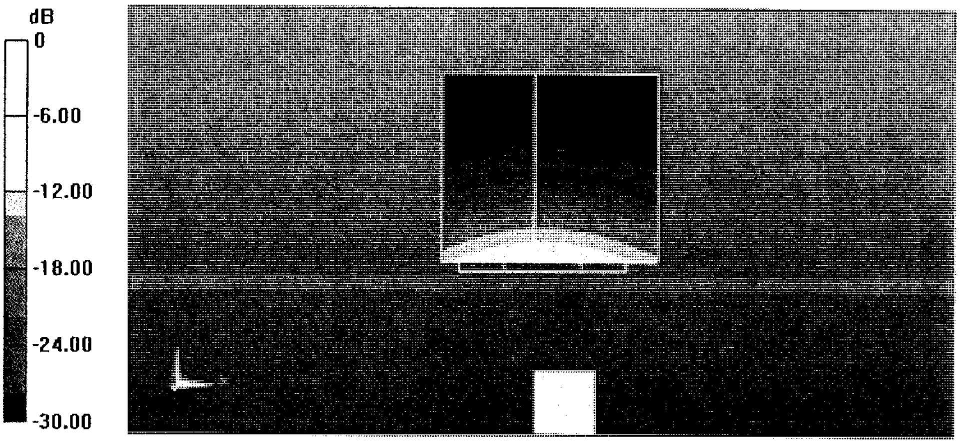
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.584 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 28.9 W/kg
SAR(1 g) = 8 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 18.6 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.034 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 31.5 W/kg
SAR(1 g) = 8.34 W/kg; SAR(10 g) = 2.4 W/kg
Maximum value of SAR (measured) = 19.5 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.164 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 33.6 W/kg
SAR(1 g) = 8.5 W/kg; SAR(10 g) = 2.43 W/kg
Maximum value of SAR (measured) = 20.5 W/kg

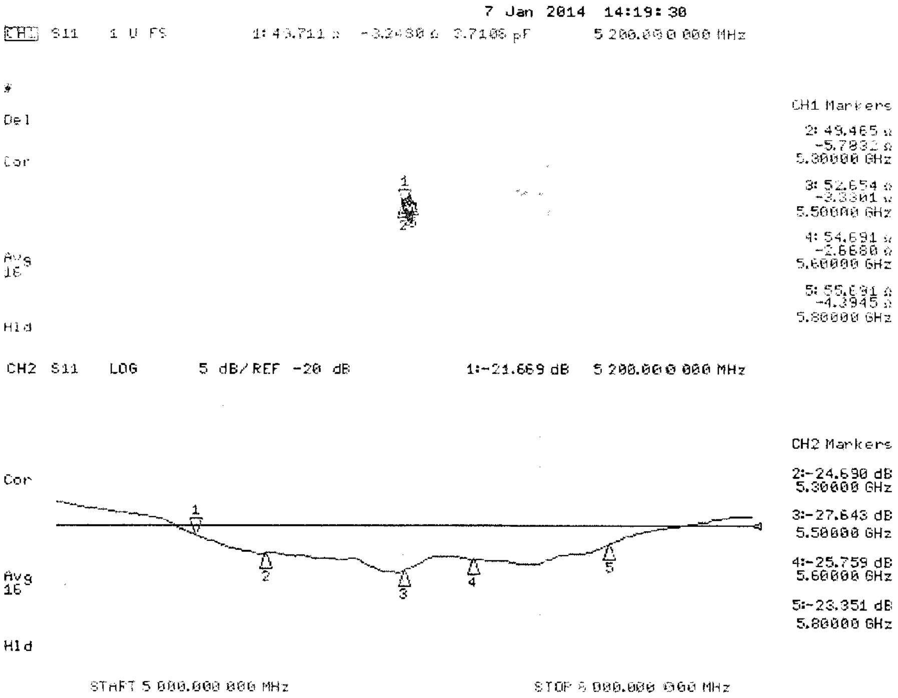
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.543 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 33.9 W/kg
SAR(1 g) = 8.54 W/kg; SAR(10 g) = 2.43 W/kg
Maximum value of SAR (measured) = 20.6 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 60.517 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 33.6 W/kg
SAR(1 g) = 8.13 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 19.9 W/kg



0 dB = 19.9 W/kg = 12.99 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1169

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5600 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 5.38 S/m; ε_r = 47.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 5.52 S/m; ε_r = 47; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 5.92 S/m; ε_r = 46.6; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 5.8 S/m; ε_r = 46.7; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 6.2 S/m; ε_r = 46.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2013, ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013, ConvF(4.3, 4.3, 4.3); Calibrated: 30.12.2013, ConvF(4.52, 4.52, 4.52); Calibrated: 30.12.2013, ConvF(4.47, 4.47, 4.47); Calibrated: 30.12.2013;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

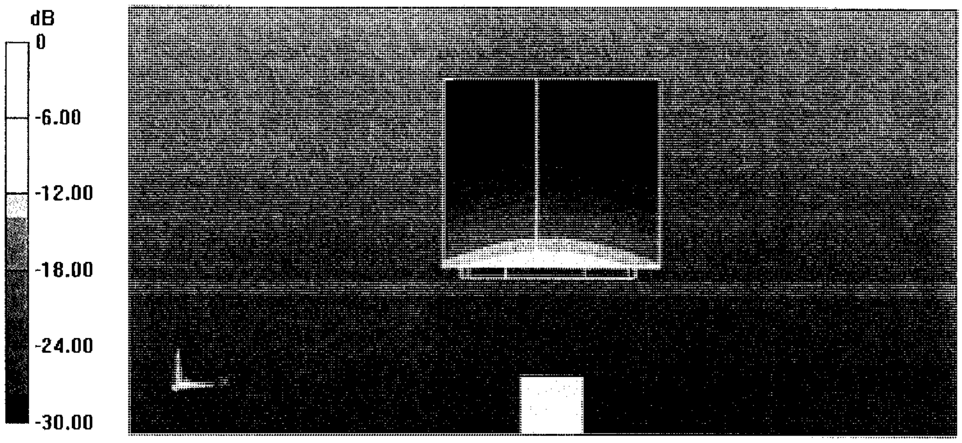
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.646 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 29.4 W/kg
SAR(1 g) = 7.43 W/kg; SAR(10 g) = 2.08 W/kg
Maximum value of SAR (measured) = 17.5 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.747 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 30.6 W/kg
SAR(1 g) = 7.58 W/kg; SAR(10 g) = 2.12 W/kg
Maximum value of SAR (measured) = 17.9 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.868 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 35.7 W/kg
SAR(1 g) = 8.03 W/kg; SAR(10 g) = 2.23 W/kg
Maximum value of SAR (measured) = 19.8 W/kg

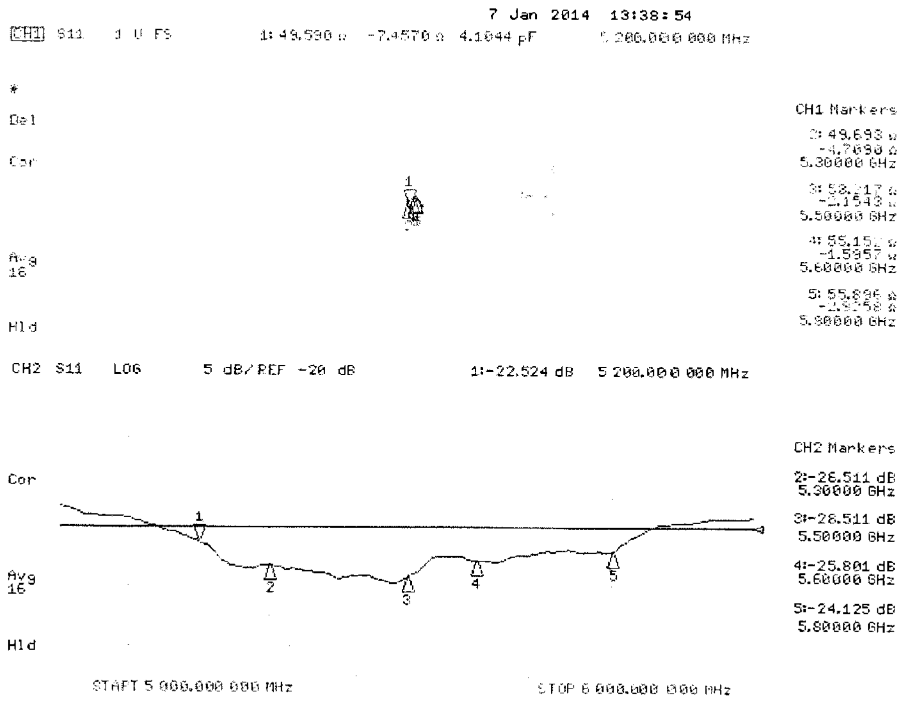
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 59.036 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 34.4 W/kg
SAR(1 g) = 7.98 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 19.3 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 55.673 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 35.0 W/kg
SAR(1 g) = 7.48 W/kg; SAR(10 g) = 2.07 W/kg
Maximum value of SAR (measured) = 18.7 W/kg



0 dB = 18.7 W/kg = 12.72 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **MRT-CERT (Auden)**

Certificate No: **D2450V2-927_Jan14**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 927
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	January 13, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Israe ElNaouq
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 13, 2014

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

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.3 ± 6 %	1.83 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.22 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.8 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	2.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.8 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.89 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.3 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.2 Ω + 2.9 jΩ
Return Loss	- 24.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.4 Ω + 4.7 jΩ
Return Loss	- 26.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.158 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 26, 2013

DASY5 Validation Report for Head TSL

Date: 13.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

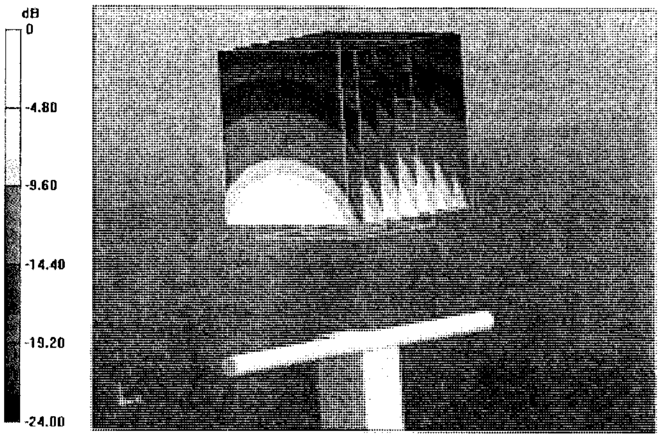
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 927

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.83 S/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.3 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 27.9 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.22 W/kg
Maximum value of SAR (measured) = 17.1 W/kg



0 dB = 17.1 W/kg = 12.33 dBW/kg

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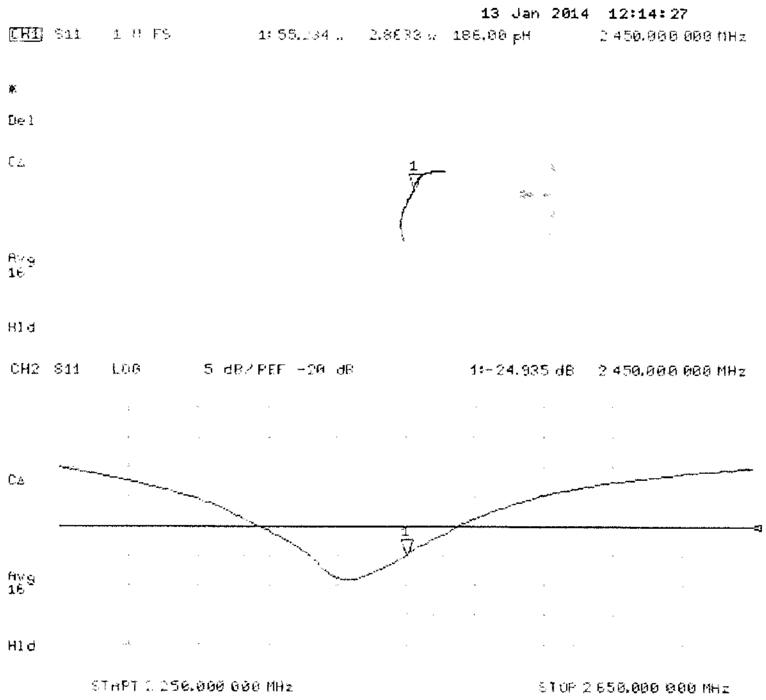
Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 13.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

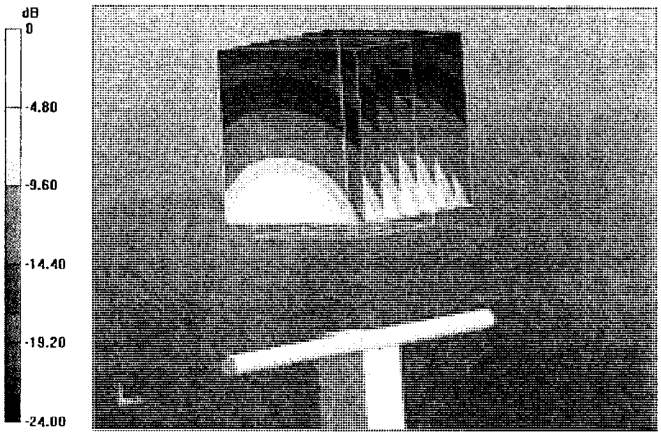
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 927

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2 S/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.560 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 12.8 W/kg; SAR(10 g) = 5.89 W/kg
Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 16.8 W/kg = 12.25 dBW/kg

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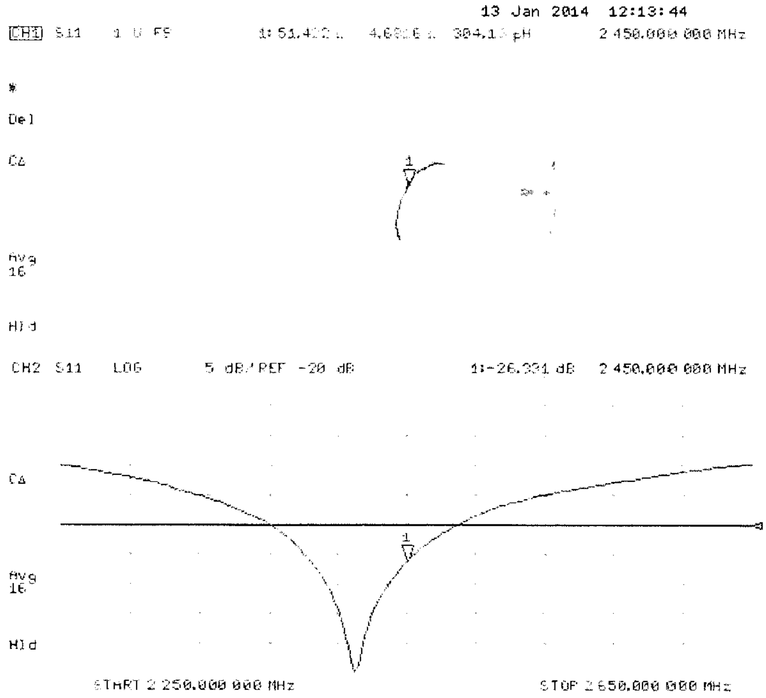
Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 108**

Client **Auden**

Certificate No: **EX3-3801_Jun14**

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3801

Calibration procedure(s): QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: June 18, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

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

Issued: June 18, 2014

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z*: *A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:3801

Manufactured: April 5, 2011
Calibrated: June 18, 2014

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3801

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.53	0.60	0.53	± 10.1 %
DCP (mV)[B]	100.2	98.4	100.9	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	128.0	±2.7 %
		Y	0.0	0.0	1.0		134.4	
		Z	0.0	0.0	1.0		146.7	

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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EX3DV4– SN:3801 June 18, 2014

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3801

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	41.9	0.89	9.44	9.44	9.44	0.35	1.00	± 12.0 %
835	41.5	0.90	9.15	9.15	9.15	0.80	0.64	± 12.0 %
900	41.5	0.97	8.92	8.92	8.92	0.50	0.79	± 12.0 %
1450	40.5	1.20	7.90	7.90	7.90	0.41	1.02	± 12.0 %
1750	40.1	1.37	7.82	7.82	7.82	0.80	0.58	± 12.0 %
1900	40.0	1.40	7.51	7.51	7.51	0.76	0.59	± 12.0 %
2000	40.0	1.40	7.55	7.55	7.55	0.80	0.57	± 12.0 %
2300	39.5	1.67	7.25	7.25	7.25	0.44	0.75	± 12.0 %
2450	39.2	1.80	6.85	6.85	6.85	0.53	0.70	± 12.0 %
2600	39.0	1.96	6.76	6.76	6.76	0.63	0.66	± 12.0 %
5200	36.0	4.66	4.96	4.96	4.96	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.74	4.74	4.74	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.73	4.73	4.73	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.54	4.54	4.54	0.35	1.80	± 13.1 %
5800	35.3	5.27	4.45	4.45	4.45	0.40	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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DASY/EASY - Parameters of Probe: EX3DV4 - SN:3801

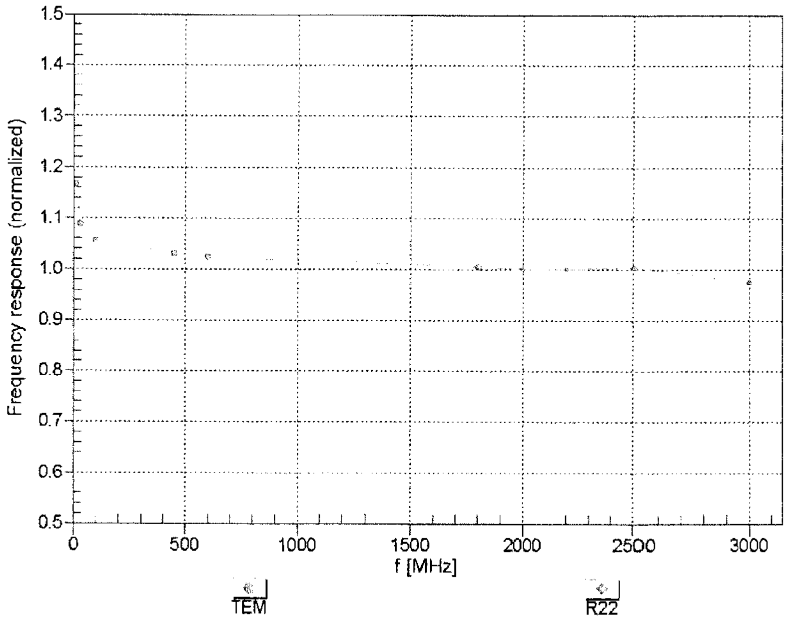
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	55.5	0.96	9.11	9.11	9.11	0.65	0.75	± 12.0 %
835	55.2	0.97	9.12	9.12	9.12	0.80	0.66	± 12.0 %
900	55.0	1.05	8.91	8.91	8.91	0.80	0.67	± 12.0 %
1450	54.0	1.30	7.97	7.97	7.97	0.54	0.76	± 12.0 %
1750	53.4	1.49	7.62	7.62	7.62	0.63	0.71	± 12.0 %
1900	53.3	1.52	7.29	7.29	7.29	0.60	0.71	± 12.0 %
2000	53.3	1.52	7.47	7.47	7.47	0.37	0.90	± 12.0 %
2300	52.9	1.81	7.18	7.18	7.18	0.80	0.60	± 12.0 %
2450	52.7	1.95	6.90	6.90	6.90	0.80	0.50	± 12.0 %
2600	52.5	2.16	6.74	6.74	6.74	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.17	4.17	4.17	0.45	1.90	± 13.1 %
5300	48.9	5.42	4.03	4.03	4.03	0.45	1.90	± 13.1 %
5500	48.6	5.65	3.93	3.93	3.93	0.45	1.90	± 13.1 %
5600	48.5	5.77	3.84	3.84	3.84	0.45	1.90	± 13.1 %
5800	48.2	6.00	3.94	3.94	3.94	0.50	1.90	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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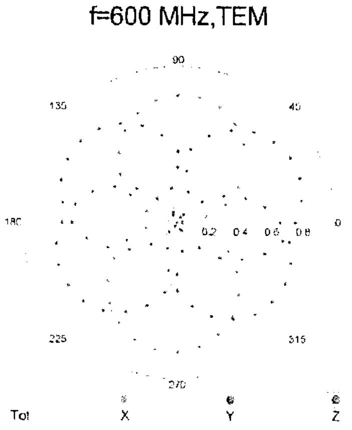
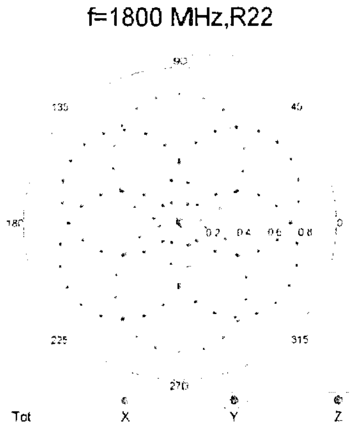
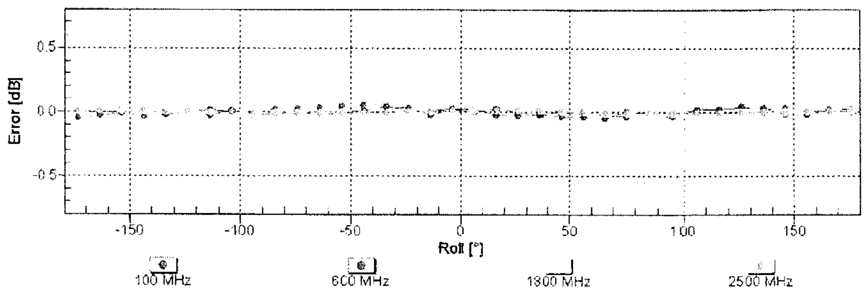
Receiving Pattern (ϕ), ϑ = 0°

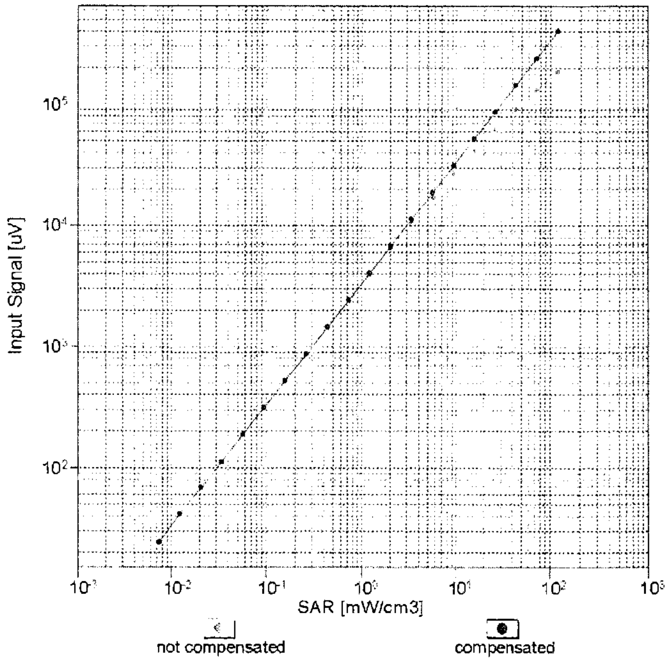


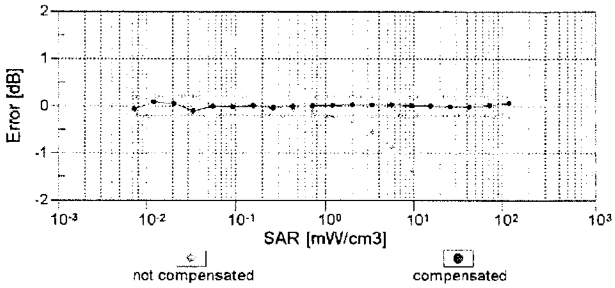




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

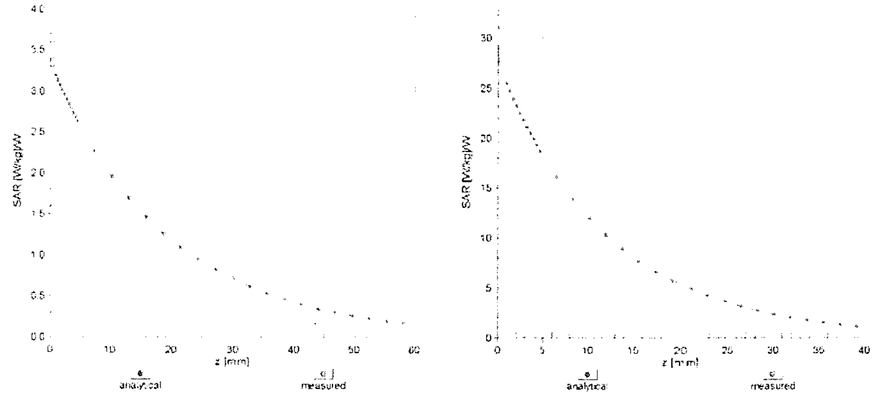
Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)





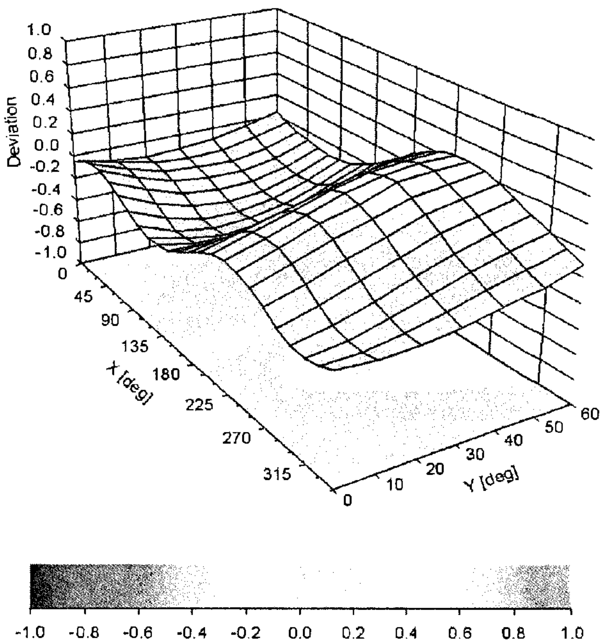
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3801

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-53.8
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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IMPORTANT NOTICE

USAGE OF THE DAE 4

The DAE unit is a delicate, high precision instrument and requires careful treatment by the user. There are no serviceable parts inside the DAE. Special attention shall be given to the following points:

Battery Exchange: The battery cover of the DAE4 unit is closed using a screw, over tightening the screw may cause the threads inside the DAE to wear out.

Shipping of the DAE: Before shipping the DAE to SPEAG for calibration, remove the batteries and pack the DAE in an antistatic bag. This antistatic bag shall then be packed into a larger box or container which protects the DAE from impacts during transportation. The package shall be marked to indicate that a fragile instrument is inside.

E-Stop Failures: Touch detection may be malfunctioning due to broken magnets in the E-stop. Rough handling of the E-stop may lead to damage of these magnets. Touch and collision errors are often caused by dust and dirt accumulated in the E-stop. To prevent E-stop failure, the customer shall always mount the probe to the DAE carefully and keep the DAE unit in a non-dusty environment if not used for measurements.

Repair: Minor repairs are performed at no extra cost during the annual calibration. However, SPEAG reserves the right to charge for any repair especially if rough unprofessional handling caused the defect.

DASY Configuration Files: Since the exact values of the DAE input resistances, as measured during the calibration procedure of a DAE unit, are not used by the DASY software, a nominal value of 200 MOhm is given in the corresponding configuration file.

Important Note:
Warranty and calibration is void if the DAE unit is disassembled partly or fully by the Customer.

Important Note:
Never attempt to grease or oil the E-stop assembly. Cleaning and readjusting of the E-stop assembly is allowed by certified SPEAG personnel only and is part of the annual calibration procedure.

Important Note:
To prevent damage of the DAE probe connector pins, use great care when installing the probe to the DAE. Carefully connect the probe with the connector notch oriented in the mating position. Avoid any rotational movement of the probe body versus the DAE while turning the locking nut of the connector. The same care shall be used when disconnecting the probe from the DAE.

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Accreditation No.: SCS 108

Client **Auden**

Certificate No: **DAE4-918_Dec14**

CALIBRATION CERTIFICATE

Object: DAE4 - SD 000 D04 BK - SN: 918

Calibration procedure(s): QA CAL-06.v28
Calibration procedure for the data acquisition electronics (DAE)

Calibration date: December 29, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	03-Oct-14 (No:15573)	Oct-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Auto DAE Calibration Unit	SE UWS 053 AA 1001	07-Jan-14 (in house check)	In house check: Jan-15
Calibrator Box V2.1	SE UMS 006 AA 1002	07-Jan-14 (in house check)	In house check: Jan-15

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	i.V.

Issued: December 29, 2014

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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Accreditation No.: **SCS 108**

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.263 ± 0.02% (k=2)	404.441 ± 0.02% (k=2)	403.975 ± 0.02% (k=2)
Low Range	3.99223 ± 1.50% (k=2)	3.98766 ± 1.50% (k=2)	3.99058 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	321.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200032.31	-4.38	-0.00
Channel X	+ Input	20003.84	-0.13	-0.00
Channel X	- Input	-20004.78	1.10	-0.01
Channel Y	+ Input	200032.27	-4.06	-0.00
Channel Y	+ Input	20002.00	-1.87	-0.01
Channel Y	- Input	-20006.00	0.05	-0.00
Channel Z	+ Input	200034.27	-2.10	-0.00
Channel Z	+ Input	20002.22	-1.48	-0.01
Channel Z	- Input	-20008.25	-2.23	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.31	0.03	0.00
Channel X	+ Input	200.99	0.68	0.34
Channel X	- Input	-198.48	1.20	-0.60
Channel Y	+ Input	2000.13	0.00	0.00
Channel Y	+ Input	199.66	-0.39	-0.20
Channel Y	- Input	-199.91	-0.16	0.08
Channel Z	+ Input	1999.95	-0.05	-0.00
Channel Z	+ Input	198.93	-1.21	-0.60
Channel Z	- Input	-201.20	-1.44	0.72

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	5.38	3.39
	- 200	-1.40	-3.69
Channel Y	200	11.47	11.14
	- 200	-12.53	-12.38
Channel Z	200	-14.52	-14.40
	- 200	11.50	11.86

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-0.57	-5.19
Channel Y	200	8.22	-	0.42
Channel Z	200	9.83	6.01	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15962	16466
Channel Y	16023	17247
Channel Z	15984	16328

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-0.60	-2.24	1.43	0.75
Channel Y	1.14	-0.87	2.02	0.43
Channel Z	-0.52	-1.84	0.61	0.42

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9