
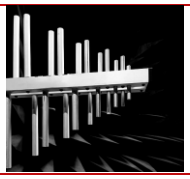
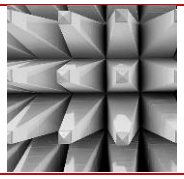

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TEST REPORT

Test Report No.: 1-9110/14-01-07-C

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-00

Testing Laboratory

CETECOM ICT Services GmbH
Untertürkheimer Straße 6 – 10
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Accredited Test Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-00

Applicant

Ascom AB
Grimbodalen 2
SE-402 76 Göteborg/SWEDEN

Phone: +46 31559300

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e-mail: Lena.kindmark@ascom.se
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Manufacturer

Ascom AB
Grimbodalen 2
SE-402 76 Göteborg/SWEDEN

Test Standard/s

IEEE 1528-2003	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR)in the Human Head from Wireless Communications Devices: Measurement Techniques
RSS-102 Issue 5	Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	Smart phone
Device type:	portable device
Model name:	**SH1-ABAA**
S/N serial number:	T26105EEQA / T26105GMX5
FCC-ID:	BXZSH1B
IC:	3724B-SH1B
Hardware status:	PF
Software status:	myco-eng 4.4.2 sedm. 20150302.081558 eng.sedm.20150302.081558 dev-keys
Tested bands:	**WLAN 2.4 / 5 GHz**
Antenna:	integrated antenna
Battery option:	Li-ion Battery 1520mAh / 3.7V
Accessories:	---
Test sample status:	identical prototype
Exposure category:	general population / uncontrolled environment

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test Report authorised:

cn=Oleksandr Hnatovskiy, o=CETECOM ICT, ou=HNA-100728, email=Oleksandr.Hnatovskiy@cetecom.com, c=DE
2015.06.08 15:05:03 +02'00'

Oleksandr Hnatovskiy
Radio Communications & EMC

Test performed:

Marco Scigliano

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Marco Scigliano
Radio Communications & EMC

1 Table of contents

2 General information

2.1 Notes and disclaimer

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2.2 Application details

Date of receipt of order:	2014-12-08
Date of receipt of test item:	2014-12-17
Start of test:	2015-01-21
End of test:	2015-03-21
Person(s) present during the test:	

2.3 Statement of compliance

The SAR values found for the SH1-ABAA Smart phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1 g tissue according to the FCC rule §2.1093, the ANSI/IEEE C 95.1:1992, the NCRP Report Number 86 for uncontrolled environment, according to the Health Canada's Safety Code 6 and the Industry Canada Radio Standards Specification RSS-102 for General Population/Uncontrolled exposure.
For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with a minimum of 0mm from the body.

2.4 Technical details

Band tested for this test report	Technology	Lowest transmit frequency/MHz	Highest transmit frequency/MHz	Lowest receive Frequency/MHz	Highest receive Frequency/MHz	Kind of modulation	Tested power control level	Test channel low	Test channel middle	Test channel high	Averaged max. output power/dBm
☐	WLAN	2412	2472	2412	2472	CCK OFDM	max	1	7	13	16.4
☒	WLAN US	2412	2462	2412	2462	CCK OFDM	max	1	6	11	16.4
☒	WLAN	5180	5240	5180	5240	OFDM	max	--	--	48	11.0
☒	WLAN	5260	5320	5260	5320	OFDM	max	--	--	64	10.0
☒	WLAN	5500	5700	5500	5700	OFDM	max	--	132	--	10.7
☒	WLAN	5745	5825	5745	5825	OFDM	max	--	153	--	9.4

3 Test standards/ procedures references

Test Standard	Version	Test Standard Description
IEEE 1528-2003	2003-04	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
IEEE 1528-2013	2014-06	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
RSS-102 Issue 5	2015-04	Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
Canada's Safety Code No. 6	2015-03	Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz
IEEE Std. C95-3	2002	IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave
IEEE Std. C95-1	2005	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
IEC 62209-2	2010	Human exposure to radio frequency fields from hand-held and bodymounted wireless communication devices. Human models, instrumentation, and procedures. Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)

FCC KDBs:

KDB 865664D01v01	February 7, 2014	FCC OET SAR measurement requirements 100 MHz to 6 GHz
KDB 865664D02v01	May 28, 2013	RF Exposure Compliance Reporting and Documentation Considerations
KDB 447498D01v05	February 7, 2014	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
KDB 648474D04v01	December 4, 2013	SAR Evaluation Considerations for Wireless Handsets
KDB 248227D01v02	March 16, 2015	SAR Measurement Procedures for 802.11 a/b/g Transmitters

3.1 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain and Trunk)	**1.60 mW/g**	8.00 mW/g
Spatial Average SAR** (Whole Body)	0.08 mW/g	0.40 mW/g
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	4.00 mW/g	20.00 mW/g

Table 1: RF exposure limits

The limit applied in this test report is shown in bold letters

Notes:

* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time

** The Spatial Average value of the SAR averaged over the whole body.

*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

4 Summary of Measurement Results

☒	**No deviations from the technical specifications ascertained**
☐	Deviations from the technical specifications ascertained

Maximum SAR value reported for 1g (W/kg)		
	DTS	**UNII**
head	**0.312**	**0.405**
body worn 0 mm distance	**0.428**	**0.544**

4.1.1 Tissue simulating liquids: dielectric properties

The following materials are used for producing the tissue-equivalent materials.

(Liquids used for tests described in section 7. are marked with ☒) :

Ingredients (% of weight)	**Frequency (MHz)**								
frequency band	☐ 450	☐ 750	☐ 835	☐ 900	☐ 1450	☐ 1750	☐ 1900	☒ 2450	☒ 5000
Water	38.56	41.1	41.45	40.92	54.37	55.35	55.19	54.7	64 - 78
Salt (NaCl)	3.95	1.4	1.45	1.48	0.63	0.38	0.19	0.0	2 - 3
Sugar	56.32	57.0	56.0	56.5	0.0	0.0	0.0	0.0	0.0
HEC	0.98	0.2	1.0	1.0	0.0	0.0	0.0	0.0	0.0
Bactericide	0.19	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Tween 20	0.0	0.0	0.0	0.0	44.90	44.17	44.52	45.2	0.0
Emulsifiers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9 - 15
Mineral Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11 - 18

Table 2: Head tissue dielectric properties

Ingredients (% of weight)	**Frequency (MHz)**								
frequency band	☐ 450	☐ 750	☐ 835	☐ 900	☐ 1450	☐ 1750	☐ 1900	☒ 2450	☒ 5000
Water	51.16	51.7	52.4	56.0	71.40	71.45	71.56	71.65	64 - 78
Salt (NaCl)	1.49	0.9	1.40	0.76	0.55	0.5	0.39	0.3	2 - 3
Sugar	46.78	47.2	45.0	41.76	0.0	0.0	0.0	0.0	0.0
HEC	0.52	0.0	1.0	1.21	0.0	0.0	0.0	0.0	0.0
Bactericide	0.05	0.1	0.1	0.27	0.1	0.1	0.1	0.1	0.0
Tween 20	0.0	0.0	0.0	0.0	27.95	27.95	27.95	27.95	0.0
Emulsifiers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9 - 15
Mineral Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11 - 18

Table 3: Body tissue dielectric properties

Salt: 99+% Pure Sodium Chloride
Water: De-ionized, 16MΩ+ resistivity
Sugar: 98+% Pure Sucrose
HEC: Hydroxyethyl Cellulose
Tween 20: Polyoxyethylene (20) sorbitan monolaurate

4.1.2 Tissue simulating liquids: parameters

Liquid HSL	Freq. (MHz)	Target head tissue		Measurement **head** tissue					Measurement date
		Permittivity	Conductivity (S/m)	Permittivity	Dev. %	Conductivity ε"	Conductivity (S/m)	Dev. %	
2450	2412	39.27	1.77	39.0	-0.7%	12.92	1.73	-1.9%	2015-01-21
	2437	39.22	1.79	38.9	-0.8%	12.91	1.75	-2.1%	
	2450	39.20	1.80	38.9	-0.8%	12.89	1.76	-2.4%	
	2462	39.18	1.81	38.8	-1.0%	12.90	1.77	-2.6%	
5GHz	5200	35.99	4.66	35.9	-0.2%	15.72	4.55	-2.3%	2015-03-21
	5240	35.94	4.70	35.9	-0.2%	15.73	4.58	-2.4%	
	5320	35.85	4.78	35.8	-0.2%	15.75	4.66	-2.4%	
	5500	35.64	4.96	35.6	-0.2%	15.89	4.86	-2.1%	
	5660	35.46	5.13	35.3	-0.4%	15.95	5.02	-2.0%	
	5765	35.34	5.23	35.1	-0.5%	16.06	5.15	-1.6%	
	5800	35.30	5.27	35.1	-0.5%	16.05	5.18	-1.8%	

Table 4: Parameter of the head tissue simulating liquid

Liquid MSL	Freq. (MHz)	Target body tissue		Measurement **body** tissue					Measurement date
		Permittivity	Conductivity (S/m)	Permittivity	Dev. %	Conductivity ε"	Conductivity (S/m)	Dev. %	
2450	2412	52.75	1.91	50.8	-3.7%	14.49	1.94	1.6%	2015-01-22
	2437	52.72	1.94	51.1	-3.1%	14.67	1.99	2.6%	
	2450	52.70	1.95	51.1	-3.0%	14.69	2.00	2.7%	
	2462	52.68	1.97	51.1	-3.0%	14.73	2.02	2.6%	
5GHz	5200	49.01	5.30	50.5	3.0%	17.92	5.18	-2.2%	2015-03-20
	5240	48.96	5.35	50.4	2.9%	17.97	5.24	-2.0%	
	5320	48.85	5.44	50.3	3.0%	18.09	5.35	-1.6%	
	5500	48.61	5.65	50.0	2.9%	18.24	5.58	-1.2%	
	5660	48.39	5.84	49.7	2.7%	18.45	5.81	-0.5%	
	5765	48.25	5.96	49.5	2.6%	18.57	5.95	-0.1%	
	5800	48.20	6.00	49.5	2.7%	18.66	6.02	0.3%	

Table 5: Parameter of the body tissue simulating liquid
Note: The dielectric properties have been measured using the contact probe method at 22°C.

4.1.3 Measurement uncertainty evaluation for SAR test

DASY5 Uncertainty Budget According to IEEE 1528/2003 and IEC 62209-1 for the 30 MHz - 3 GHz range									
Source of uncertainty	Uncertainty Value ± %	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 6.0 %	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√ 3	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary effects	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Integration time	± 2.6 %	Rectangular	√ 3	1	1	± 1.5 %	± 1.5 %	∞
RF ambient noise	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.4 %	Rectangular	√ 3	1	1	± 0.2 %	± 0.2 %	∞
Probe positioning	± 2.9 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Max.SAR evaluation	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Test Sample Related								
Device positioning	± 2.9 %	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device holder uncertainty	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√ 3	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
Liquid conductivity (target)	± 5.0 %	Rectangular	√ 3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (meas.)	± 5.0 %	Rectangular	√ 3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid permittivity (target)	± 5.0 %	Rectangular	√ 3	0.6	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (meas.)	± 5.0 %	Rectangular	√ 3	0.6	0.49	± 1.7 %	± 1.4 %	∞
Combined Std.						± 11.1 %	± 10.8 %	387
Expanded Std.						± **22.1** %	± **21.6** %	

Table 6: Measurement uncertainties
Worst-Case uncertainty budget for DASY5 assessed according to IEEE 1528/2003.
The budget is valid for 2G and 3G communication signals and frequency range 300MHz - 3 GHz.
For these conditions it represents a worst-case analysis. For specifc tests and configurations, the uncertainty could be considerable smaller.

Relative DASY5 Uncertainty Budget for SAR Tests According to IEEE 1528/2013 and IEC62209/2011 for the 0.3 - 3GHz range									
Error Description	Uncertainty Value ± %	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 6.0 %	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√ 3	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary effects	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Modulation Response	± 2.4 %	Rectangular	√ 3	1	1	± 1.4 %	± 1.4 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Integration time	± 2.6 %	Rectangular	√ 3	1	1	± 1.5 %	± 1.5 %	∞
RF ambient noise	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.4 %	Rectangular	√ 3	1	1	± 0.2 %	± 0.2 %	∞
Probe positioning	± 2.9 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Max. SAR evaluation	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Test Sample Related								
Device positioning	± 2.9 %	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device holder uncertainty	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√ 3	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Set-up								
Phantom uncertainty	± 6.1 %	Rectangular	√ 3	1	1	± 3.5 %	± 3.5 %	∞
SAR correction	± 1.9 %	Rectangular	√ 3	1	0.84	± 1.1 %	± 0.9 %	∞
Liquid conductivity (meas.)	± 5.0 %	Rectangular	√ 3	0.78	0.71	± 2.3 %	± 2.0 %	∞
Liquid permittivity (meas.)	± 5.0 %	Rectangular	√ 3	0.26	0.26	± 0.8 %	± 0.8 %	∞
Temp. Unc. - Conductivity	± 3.4 %	Rectangular	√ 3	0.78	0.71	± 1.5 %	± 1.4 %	∞
Temp. Unc. - Permittivity	± 0.4 %	Rectangular	√ 3	0.23	0.26	± 0.1 %	± 0.1 %	∞
Combined Uncertainty						± 11.3 %	± 11.3 %	330
Expanded Std. Uncertainty						± **22.7** %	± **22.5** %	

Table 7: Measurement uncertainties
Worst-Case uncertainty budget for DASY5 assessed according to IEEE 1528/2013 and IEC 62209-1/2011 standards. The budget is valid for the frequency range 300MHz -3 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller.

DASY5 Uncertainty Budget According to IEC 62209-2/2010 for the 30 MHz - 6 GHz range								v_i^2 or v_{eff}
Source of uncertainty	Uncertainty Value ± %	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)	
Measurement System								
Probe calibration	± 6.6 %	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√ 3	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary effects	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Modulation Response	± 2.4 %	Rectangular	√ 3	1	1	± 1.4 %	± 1.4 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Integration time	± 2.6 %	Rectangular	√ 3	1	1	± 1.5 %	± 1.5 %	∞
RF ambient noise	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Probe positioning	± 6.7 %	Rectangular	√ 3	1	1	± 3.9 %	± 3.9 %	∞
Post-processing	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device positioning	± 2.9 %	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device holder uncertainty	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√ 3	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Set-up								
Phantom uncertainty	± 7.9 %	Rectangular	√ 3	1	1	± 4.6 %	± 4.6 %	∞
SAR correction	± 1.9 %	Rectangular	√ 3	1	0.84	± 1.1 %	± 0.9 %	∞
Liquid conductivity (meas.)	± 5.0 %	Rectangular	√ 3	0.78	0.71	± 2.3 %	± 2.0 %	∞
Liquid permittivity (meas.)	± 5.0 %	Rectangular	√ 3	0.26	0.26	± 0.8 %	± 0.8 %	∞
Temp. Unc. - Conductivity	± 3.4 %	Rectangular	√ 3	0.78	0.71	± 1.5 %	± 1.4 %	∞
Temp. Unc. - Permittivity	± 0.4 %	Rectangular	√ 3	0.23	0.26	± 0.1 %	± 0.1 %	∞
Combined Uncertainty						± 12.7 %	± 12.6 %	330
Expanded Std. Uncertainty						± **25.4** %	± **25.3** %	

Table 8: Measurement uncertainties.
Worst-Case uncertainty budget for DASY5 assessed according to according to IEC 62209-2/2010 standard. The budget is valid for the frequency range 30MHz - 6 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller.

Relative DASY5 Uncertainty Budget for SAR Tests								
According to IEEE 1528/2003 and IEC 62209-1 for the 3 - 6 GHz range								
Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 6.6 %	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√ 3	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary effects	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Integration time	± 2.6 %	Rectangular	√ 3	1	1	± 1.5 %	± 1.5 %	∞
RF ambient noise	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Probe positioning	± 6.7 %	Rectangular	√ 3	1	1	± 3.9 %	± 3.9 %	∞
Max. SAR evaluation	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device positioning	± 2.9 %	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device holder uncertainty	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√ 3	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
Liquid conductivity (target)	± 5.0 %	Rectangular	√ 3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (meas.)	± 5.0 %	Rectangular	√ 3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid permittivity (target)	± 5.0 %	Rectangular	√ 3	0.6	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (meas.)	± 5.0 %	Rectangular	√ 3	0.6	0.49	± 1.7 %	± 1.4 %	∞
Combined Uncertainty						± 12.1 %	± 11.9 %	330
Expanded Std. Uncertainty						± **24.3** %	± **23.8** %	

Table 9: Measurement uncertainties
Worst-Case uncertainty budget for DASY5 valid for 3G communication signals and frequency range 3 - 6 GHz. Probe calibration error reflects uncertainty of the EX3D probe. For specific tests and configurations, the uncertainty could be considerable smaller.

Relative DASY5 Uncertainty Budget for SAR Tests								
According to IEEE 1528/2013 and IEC62209-1/2011 (3-6GHz range)								
Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 6.6 %	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√ 3	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary effects	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Modulation Response	± 2.4 %	Rectangular	√ 3	1	1	± 1.4 %	± 1.4 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Integration time	± 2.6 %	Rectangular	√ 3	1	1	± 1.5 %	± 1.5 %	∞
RF ambient noise	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Probe positioning	± 6.7 %	Rectangular	√ 3	1	1	± 3.9 %	± 3.9 %	∞
Max. SAR evaluation	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device positioning	± 2.9 %	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device holder uncertainty	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√ 3	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Set-up								
Phantom uncertainty	± 6.6 %	Rectangular	√ 3	1	1	± 3.8 %	± 3.8 %	∞
SAR correction	± 1.9 %	Rectangular	√ 3	1	0.84	± 1.1 %	± 0.9 %	∞
Liquid conductivity (meas.)	± 5.0 %	Rectangular	√ 3	0.78	0.71	± 2.3 %	± 2.0 %	∞
Liquid permittivity (meas.)	± 5.0 %	Rectangular	√ 3	0.26	0.26	± 0.8 %	± 0.8 %	∞
Temp. Unc. - Conductivity	± 3.4 %	Rectangular	√ 3	0.78	0.71	± 1.5 %	± 1.4 %	∞
Temp. Unc. - Permittivity	± 0.4 %	Rectangular	√ 3	0.23	0.26	± 0.1 %	± 0.1 %	∞
Combined Uncertainty						± 12.4 %	± 12.4 %	330
Expanded Std. Uncertainty						± **24.9** %	± **24.8** %	

Table 10: Measurement uncertainties
Worst-Case uncertainty budget for DASY5 assessed according to IEEE 1528/2013 and IEC 62209-1/2011 standards. The budget is valid for the frequency range 3GHz -6GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller.

4.1.4 Measurement uncertainty evaluation for System Check

Uncertainty of a System Performance Check with DASY5 System for the 0.3 - 3 GHz range								
Source of uncertainty	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 6.0 %	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 0.0 %	Rectangular	√ 3	0.7	0.7	± 0.0 %	± 0.0 %	∞
Boundary effects	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
Integration time	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
RF ambient conditions	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.4 %	Rectangular	√ 3	1	1	± 0.2 %	± 0.2 %	∞
Probe positioning	± 2.9 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Max. SAR evaluation	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Test Sample Related								
Dev. of experimental dipole	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
Source to liquid distance	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Power drift	± 3.4 %	Rectangular	√ 3	1	1	± 2.0 %	± 2.0 %	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
SAR correction	± 1.9 %	Rectangular	√ 3	1	0.84	± 1.1 %	± 0.9 %	∞
Liquid conductivity (meas.)	± 5.0 %	Normal	1	0.78	0.71	± 3.9 %	± 3.6 %	∞
Liquid permittivity (meas.)	± 5.0 %	Normal	1	0.26	0.26	± 1.3 %	± 1.3 %	∞
Temp. unc. - Conductivity	± 1.7 %	Rectangular	√ 3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 0.3 %	Rectangular	√ 3	0.23	0.26	± 0.0 %	± 0.0 %	∞
Combined Uncertainty						± 9.1 %	± 8.9 %	330
Expanded Std. Uncertainty						± **18.2** %	± **17.9** %	

Table 11: Measurement uncertainties of the System Check with DASY5 (0.3-3GHz)

Uncertainty of a System Performance Check with DASY5 System for the 3 - 6 GHz range								
Source of uncertainty	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 6.6 %	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 0.0 %	Rectangular	√ 3	0.7	0.7	± 0.0 %	± 0.0 %	∞
Boundary effects	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
Integration time	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
RF ambient conditions	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Probe positioning	± 6.7 %	Rectangular	√ 3	1	1	± 3.9 %	± 3.9 %	∞
Max. SAR evaluation	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Test Sample Related								
Dev. of experimental dipole	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
Source to liquid distance	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Power drift	± 3.4 %	Rectangular	√ 3	1	1	± 2.0 %	± 2.0 %	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
SAR correction	± 1.9 %	Rectangular	√ 3	1	0.84	± 1.1 %	± 0.9 %	∞
Liquid conductivity (meas.)	± 5.0 %	Normal	1	0.78	0.71	± 3.9 %	± 3.6 %	∞
Liquid permittivity (meas.)	± 5.0 %	Normal	1	0.26	0.26	± 1.3 %	± 1.3 %	∞
Temp. unc. - Conductivity	± 1.7 %	Rectangular	√ 3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 0.3 %	Rectangular	√ 3	0.23	0.26	± 0.0 %	± 0.0 %	∞
Combined Uncertainty						± 10.1 %	± 10.0 %	330
Expanded Std. Uncertainty						± **20.2** %	± **19.9** %	

Table 12: Measurement uncertainties of the System Check with DASY5 (3-6GHz)

Note: Worst case probe calibration uncertainty has been applied for all probes used during the measurements.

4.1.5 System check

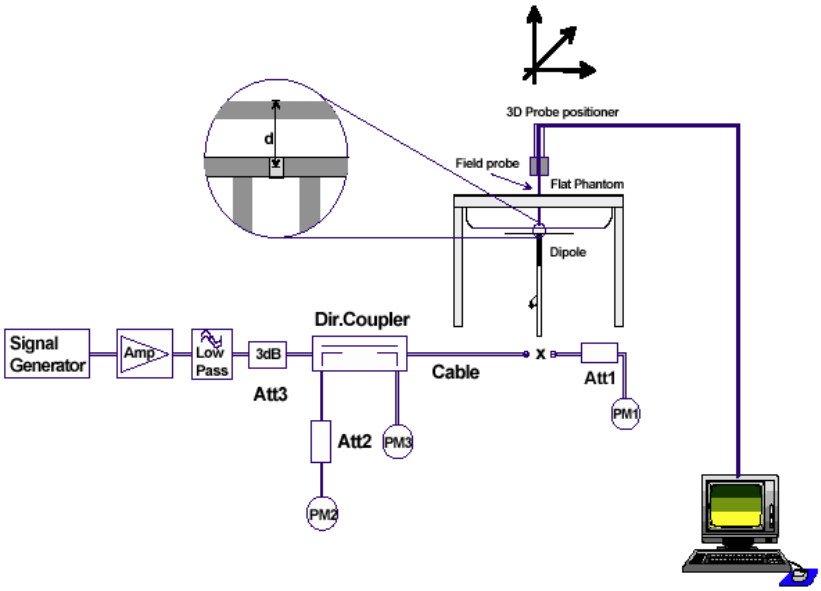
The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE 1528. The following table shows system check results for all frequency bands and tissue liquids used during the tests (plot(s) see annex A).

System performence check (1000 mW)								
System validation Kit	Frequency	Target SAR_{1g} /mW/g (+/- 10%)	Target SAR_{10g} /mW/g (+/- 10%)	Measured SAR_{1g} / mW/g	SAR_{1g} dev.	Measured SAR_{10g} / mW/g	SAR_{10g} dev.	Measured date
D2450V2 S/N: 710	2450 MHz head	52.10	24.00	52.30	0.4%	24.60	2.5%	2015-01-21
D2450V2 S/N: 710	2450 MHz body	51.00	23.80	51.10	0.2%	23.60	-0.8%	2015-01-22
D5GHzV2 S/N: 1055	5200 MHz head	80.40	23.00	77.30	-3.9%	22.20	-3.5%	2015-03-21
D5GHzV2 S/N: 1055	5500 MHz head	84.90	24.30	78.70	-7.3%	22.10	-9.1%	2015-03-21
D5GHzV2 S/N: 1055	5800 MHz head	80.10	22.70	79.20	-1.1%	22.20	-2.2%	2015-03-21
D5GHzV2 S/N: 1055	5200 MHz body	74.20	20.80	73.00	-1.6%	20.70	-0.5%	2015-03-20
D5GHzV2 S/N: 1055	5500 MHz body	77.90	21.70	75.90	-2.6%	21.30	-1.8%	2015-03-20
D5GHzV2 S/N: 1055	5800 MHz body	73.30	20.20	72.30	-1.4%	20.50	1.5%	2015-03-20

Table 13: Results system check

4.1.6 System check procedure

The system check is performed by using a validation dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a plexiglass spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 1000 mW for frequencies below 2 GHz or 100 mW for frequencies above 2 GHz. To adjust this power a power meter is used. The power sensor is connected to the cable before the system check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the validation to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot).
System check results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system.



4.1.7 System validation

The system validation is performed in a similar way as a system check. It needs to be performed once a SAR measurement system has been established and allows an evaluation of the system accuracy with all components used together with the specified system. It has to be repeated at least once a year or when new system components are used (DAE, probe, phantom, dipole, liquid type).
In addition to the procedure used during system check a system validation also includes checks of probe isotropy, probe modulation factor and RF signal.

The following table lists the system validations relevant for this test report:

Freq. (MHz)	Test System	DASY SW	Dipole Type /SN	Probe Type / SN	Calibrated signal type(s)	DAE unit Type / SN	head validation	body validation
2450	Saarbrücken / SAR-1	V52.8.7	D2450V2 / 710	ET3DV6 / SN1554	CW	DAE3 / 413	2015-01-20	2015-01-20
5200	Saarbrücken / SAR-2	V52.8.7	D5GHzV2 / 1055	EX3DV4 / 3944	CW	DAE3 / 413	2015-03-09	2015-03-05
5500	Saarbrücken / SAR-2	V52.8.7	D5GHzV2 / 1055	EX3DV4 / 3944	CW	DAE3 / 413	2015-03-09	2015-03-06
5800	Saarbrücken / SAR-2	V52.8.7	D5GHzV2 / 1055	EX3DV4 / 3944	CW	DAE3 / 413	2015-03-10	2015-03-06

5 Detailed Test Results

5.1 Conducted power measurements

5.1.1 Conducted power measurements WLAN 2.4 GHz

802.11b		maximum average conducted output power [dBm]			
Band	Ch	1Mbps	2Mbps	5.5Mbps	11Mbps
2450MHz	1	**16.4**	16.2	15.7	15.7
	6	16.2	16.0	15.5	15.6
	11	15.5	15.3	15.0	15.0

Table 14: Test results conducted power measurement 802.11b

802.11g		maximum average conducted output power [dBm]							
Band	Ch	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
2450MHz	1	12.6	12.5	12.5	12.6	12.5	12.6	12.5	12.5
	6	14.1	13.7	13.7	13.6	13.6	13.5	13.4	13.4
	11	11.9	11.9	11.8	11.9	11.7	11.8	11.8	11.7

Table 15: Test results conducted power measurement 802.11g

802.11n HT-20		maximum average conducted output power [dBm]							
Band	Ch	MCS-0 6.5Mbps	MCS-1 13Mbps	MCS-2 19.5Mbps	MCS-3 26Mbps	MCS-4 39Mbps	MCS-5 52Mbps	MCS-6 58.5Mbps	MCS-7 65Mbps
2450MHz	1	12.4	12.0	12.0	11.8	11.8	11.9	11.8	11.7
	6	13.8	13.6	13.5	13.5	13.4	13.3	13.3	13.3
	11	10.8	10.9	10.8	10.6	10.6	10.7	10.7	10.6

Table 16: Test results conducted power measurement 802.11n HT-20

5.1.2 Conducted power measurements WLAN 5 GHz

802.11a		maximum average conducted output power [dBm]							
Band	**Ch**	**6Mbps**	**9Mbps**	**12Mbps**	**18Mbps**	**24Mbps**	**36Mbps**	**48Mbps**	**54Mbps**
5200	36	10.4	10.3	10.3	10.3	10.2	10.3	10.3	10.2
	40	10.6	10.4	10.5	10.5	10.5	10.4	10.5	10.5
	44	10.8	10.7	10.6	10.7	10.6	10.7	10.6	10.5
	48	**11.0**	10.9	10.9	10.9	10.9	10.9	10.9	10.9
5300	52	9.6	9.4	9.5	9.5	9.5	9.5	9.5	9.5
	56	9.8	9.7	9.7	9.7	9.7	9.7	9.7	9.7
	60	9.9	9.8	9.7	9.8	9.8	9.8	9.8	9.8
	64	**10.0**	9.9	9.9	9.9	9.9	9.9	9.8	9.7
5600	100	9.3	9.1	9.2	9.2	9.2	9.2	9.2	9.2
	104	9.1	9.0	9.0	9.0	9.0	9.0	9.0	9.0
	108	8.7	8.6	8.6	8.5	8.6	8.6	8.6	8.6
	112	8.4	8.3	8.3	8.3	8.3	8.2	8.3	8.3
	116	8.3	8.2	8.2	8.2	8.2	8.2	8.2	8.2
	120	7.5	7.4	7.4	7.4	7.4	7.4	7.4	7.4
	124	7.0	6.9	6.9	6.9	6.9	6.9	6.9	6.9
	128	6.5	6.4	6.4	6.4	6.4	6.4	6.4	6.4
	132	**10.7**	10.6	10.6	10.6	10.6	10.6	10.6	10.6
	136	10.1	10.0	9.9	10.0	9.9	10.0	9.9	10.0
	140	9.6	9.5	9.5	9.5	9.5	9.4	9.3	9.2
5800	149	8.2	8.1	8.0	8.1	8.1	8.1	8.1	8.1
	153	**9.4**	9.3	9.3	9.3	9.3	9.3	9.3	9.2
	157	8.8	8.7	8.7	8.7	8.7	8.7	8.7	8.7
	161	8.2	8.1	8.1	8.1	8.1	8.0	8.1	8.1
	165	7.9	7.7	7.8	7.8	7.8	7.8	7.8	7.8

Table 17: Test results conducted power measurement 802.11a

802.11n HT-20 / 802.11ac VHT-20										
		maximum average conducted output power [dBm]								
Band [MHz]	Ch	MCS-0 6.5Mbps	MCS-1 13Mbps	MCS-2 19.5Mbps	MCS-3 26Mbps	MCS-4 39Mbps	MCS-5 52Mbps	MCS-6 58.5Mbps	MCS-7 65Mbps	MCS-8 78Mbps
5200	36	10.7	10.5	10.6	10.6	10.6	10.6	10.6	10.5	10.6
	40	10.8	10.7	10.6	10.7	10.6	10.7	10.7	10.7	10.7
	44	10.9	10.7	10.8	10.7	10.8	10.7	10.7	10.7	10.7
	48	11.0	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
5300	52	9.5	9.4	9.4	9.4	9.3	9.4	9.3	9.2	9.3
	56	9.7	9.6	9.6	9.6	9.6	9.6	9.6	9.6	9.6
	60	9.7	9.6	9.6	9.6	9.6	9.5	9.6	9.6	9.5
	64	9.8	9.7	9.7	9.6	9.7	9.6	9.5	9.5	9.5
5600	100	9.0	8.9	8.9	8.9	8.8	8.9	8.9	8.9	8.9
	104	8.7	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
	108	8.3	8.2	8.2	8.2	8.2	8.2	8.1	8.2	8.2
	112	7.9	7.8	7.7	7.8	7.8	7.8	7.8	7.8	7.8
	116	7.5	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.3
	120	7.0	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.8
	124	6.5	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
	128	6.0	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
	132	10.0	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
	136	9.3	9.1	9.2	9.1	9.2	9.1	9.2	9.2	9.2
	140	8.7	8.6	8.5	8.4	8.6	8.5	8.4	8.3	8.3
5800	149	7.3	7.2	7.2	7.2	7.2	7.1	7.2	7.2	7.1
	153	8.2	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.0
	157	7.6	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	161	7.0	6.9	6.8	6.9	6.9	6.9	6.9	6.9	6.8
	165	6.3	6.2	6.2	6.2	6.1	6.2	6.2	6.2	6.2

Table 18: Test results conducted power measurement 802.11n HT-20 / 802.11ac VHT-20

5.2 SAR test results

5.2.1 Results overview

measured / extrapolated SAR numbers - Head - WLAN 2450 MHz											
Ch.	Freq. (MHz)	test cond.	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)		power drift (dB)	liquid (°C)
				declared**	measured	meas.	extrap.	meas.	extrap.		
1	2412	1Mbit/s	left cheek	18.0	16.4	0.148	0.214	0.073	0.106	-0.040	22.1
1	2412	1Mbit/s	left tilted 15°	18.0	16.4	0.098	0.142	0.049	0.071	-0.020	22.1
1	2412	1Mbit/s	right cheek	18.0	16.4	**0.216**	**0.312**	**0.107**	**0.155**	-0.070	22.1
6	2437	1Mbit/s	right cheek	18.0	16.2	0.182	0.275	0.091	0.138	-0.080	22.1
11	2462	1Mbit/s	right cheek	18.0	15.5	0.113	0.201	0.055	0.098	-0.070	22.1
1	2412	1Mbit/s	right tilted 15°	18.0	16.4	0.162	0.234	0.074	0.107	0.020	22.1

Table 19: Test results head SAR WLAN 2450 MHz (see max. SAR plot in Annex B.1: WLAN 2450MHz page 33)

measured / extrapolated SAR numbers - body worn - WLAN 2450 MHz												
Ch.	Freq. (MHz)	test cond.	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)		power drift (dB)	liquid (°C)	dist. (mm)
				declared**	measured	meas.	extrap.	meas.	extrap.			
1	2412	1Mbit/s	front	18.0	16.4	**0.296**	**0.428**	**0.130**	**0.188**	0.020	22.3	0
6	2437	1Mbit/s	front	18.0	16.2	0.261	0.395	0.115	0.174	0.050	22.3	0
11	2462	1Mbit/s	front	18.0	15.5	0.232	0.413	0.100	0.178	0.020	22.3	0
1	2412	1Mbit/s	rear	18.0	16.4	0.236	0.341	0.123	0.178	-0.020	22.3	0

Table 20: Test results body worn SAR WLAN 2450 MHz (see max. SAR plot in Annex B.1: WLAN 2450MHz)

measured / extrapolated SAR numbers - Head - WLAN 5 GHz											
Ch.	Freq. (MHz)	test cond.	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)		power drift (dB)	liquid (°C)
				declared**	measured	meas.	extrap.	meas.	extrap.		
48	5240	6Mbit/s	left cheek	12.0	11.0	**0.322**	**0.405**	**0.117**	0.147	-0.13	22.3
64	5320	6Mbit/s	left cheek	12.0	10.0	0.253	0.401	0.092	0.145	-0.10	22.3
132	5660	6Mbit/s	left cheek	12.0	10.7	0.151	0.204	0.053	0.072	0.09	22.3
153	5765	6Mbit/s	left cheek	11.0	9.4	0.048	0.069	0.018	0.025	0.07	22.3
48	5240	6Mbit/s	left tilted 15°	12.0	11.0	0.284	0.358	0.107	0.135	-0.03	22.3
64	5320	6Mbit/s	left tilted 15°	12.0	10.0	0.238	0.377	0.088	0.139	0.00	22.3
132	5660	6Mbit/s	left tilted 15°	12.0	10.7	0.129	0.174	0.045	0.060	0.12	22.3
153	5765	6Mbit/s	left tilted 15°	11.0	9.4	0.053	0.077	0.015	0.021	0.10	22.3
48	5240	6Mbit/s	right cheek	12.0	11.0	0.186	0.234	0.069	0.086	-0.02	22.3
64	5320	6Mbit/s	right cheek	12.0	10.0	0.234	0.371	0.085	0.135	0.11	22.3
132	5660	6Mbit/s	right cheek	12.0	10.7	0.184	0.248	0.061	0.082	-0.18	22.3
153	5765	6Mbit/s	right cheek	11.0	9.4	0.061	0.088	0.021	0.030	0.09	22.3
48	5240	6Mbit/s	right tilted 15°	12.0	11.0	0.176	0.222	0.068	0.086	0.07	22.3
64	5320	6Mbit/s	right tilted 15°	12.0	10.0	0.242	0.384	0.087	0.138	-0.04	22.3
132	5660	6Mbit/s	right tilted 15°	12.0	10.7	0.124	0.167	0.045	0.060	-0.01	22.3
153	5765	6Mbit/s	right tilted 15°	11.0	9.4	0.050	0.073	0.017	0.024	0.11	22.3

Table 21: Test results head SAR WLAN 5 GHz (see max. SAR plot in Annex B.2: WLAN 5GHz page 35)

** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - body worn - WLAN 5 GHz												
Ch.	Freq. (MHz)	test cond.	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)		power drift (dB)	liquid (°C)	dist. (mm)
				declared**	measured	meas.	extrap.	meas.	extrap.			
48	5240	6Mbit/s	front	12.0	11.0	**0.432**	**0.544**	**0.144**	0.181	-0.08	22.5	0
64	5320	6Mbit/s	front	12.0	10.0	0.392	0.621	0.129	0.204	0.15	22.5	0
132	5660	6Mbit/s	front	12.0	10.7	0.235	0.317	0.081	0.109	0.05	22.5	0
153	5765	6Mbit/s	front	11.0	9.4	0.101	0.146	0.034	0.049	0.08	22.5	0
48	5240	6Mbit/s	rear	12.0	11.0	0.217	0.273	0.061	0.077	-0.03	22.5	0
64	5320	6Mbit/s	rear	12.0	10.0	0.195	0.309	0.058	0.092	-0.01	22.5	0
132	5660	6Mbit/s	rear	12.0	10.7	0.178	0.240	0.058	0.079	-0.03	22.5	0
153	5765	6Mbit/s	rear	11.0	9.4	0.070	0.101	0.023	0.034	0.06	22.5	0

Table 22: Test results body worn SAR WLAN 5 GHz (see max. SAR plot in Annex B.2: WLAN 5GHz)

** - maximum possible output power declared by manufacturer

5.2.2 General description of test procedures

- Test positions as described in the tables above are in accordance with the specified test standard.
- Tests in body position were performed in that configuration, which generates the highest time based averaged output power (see conducted power results).
- WLAN was tested in 802.11a/b mode with 1 MBit/s and 6 MBit/s. According to KDB 248227 the SAR testing for 802.11g/n is not required since the maximum power of 802.11g/n is less ¼ dB higher than maximum power of 802.11a/b.
- Required WLAN test channels were selected according to KDB 248227
- According to IEEE 1528 the SAR test shall be performed at middle channel. Testing of top and bottom channel is optional.
- According to KDB 447498 D01 testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
  - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
  - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
  - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
- IEEE 1528-2003 require the middle channel to be tested first. This generally applies to wireless devices that are designed to operate in technologies with tight tolerances for maximum output power variations across channels in the band. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

6 Test equipment and ancillaries used for tests

To simplify the identification of the test equipment and/or ancillaries which were used, the reporting of the relevant test cases only refer to the test item number as specified in the table below.

Equipment	Type	Manufacturer	Serial No.	Last Calibration	Frequency (months)
Dosimetric E-Field Probe	ET3DV6	Schmid & Partner Engineering AG	1554	May 08, 2014	12
Dosimetric E-Field Probe	ES3DV3	Schmid & Partner Engineering AG	3320	May 09, 2014	12
Dosimetric E-Field Probe	EX3DV4	Schmid & Partner Engineering AG	3944	August 19, 2014	12
2450 MHz System Validation Dipole	D2450V2	Schmid & Partner Engineering AG	710	August 11, 2014	24
5 GHz System Validation Dipole	D5GHzV 2	Schmid & Partner Engineering AG	1055	August 19, 2013	24
Data acquisition electronics	DAE3V1	Schmid & Partner Engineering AG	413	January 15, 2015	12
Data acquisition electronics	DAE3V1	Schmid & Partner Engineering AG	477	May 14, 2014	12
Software	DASY52 52.8.7	Schmid & Partner Engineering AG	---	N/A	--
Triple Modular Flat Phantom V5.1	QD 000 P51 C	Schmid & Partner Engineering AG	1154	N/A	--
SAM Twin Phantom V5.0	QD 000 P40 C	Schmid & Partner Engineering AG	1813	N/A	--
Universal Radio Communication Tester	CMU 200	Rohde & Schwarz	106826	January 27, 2014	24
Universal Radio Communication Tester	CMW500	Rohde & Schwarz	102375	January 16, 2013	24
Network Analyser 300 kHz to 6 GHz	8753ES	Hewlett Packard)*	US39174436	January 28, 2014	24
Dielectric Probe Kit	85070C	Hewlett Packard	US99360146	N/A	12
Signal Generator	8671B	Hewlett Packard	2823A00656	January 22, 2014	24
Amplifier	25S1G4 (25 Watt)	Amplifier Reasearch	20452	N/A	--
Power Meter	NRP	Rohde & Schwarz	101367	January 21, 2014	24
Power Meter Sensor	NRP Z22	Rohde & Schwarz	100227	January 21, 2014	12
Power Meter Sensor	NRP Z22	Rohde & Schwarz	100234	January 21, 2014	12
Directional Coupler	778D	Hewlett Packard	19171	January 21, 2014	12

)* : Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

7 Observations

No observations exceeding those reported with the single test cases have been made.

Annex A: System performance check

Date/Time: 21.01.2015 10:24:19

SystemPerformanceCheck-D2450 head 2015-01-21

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 710

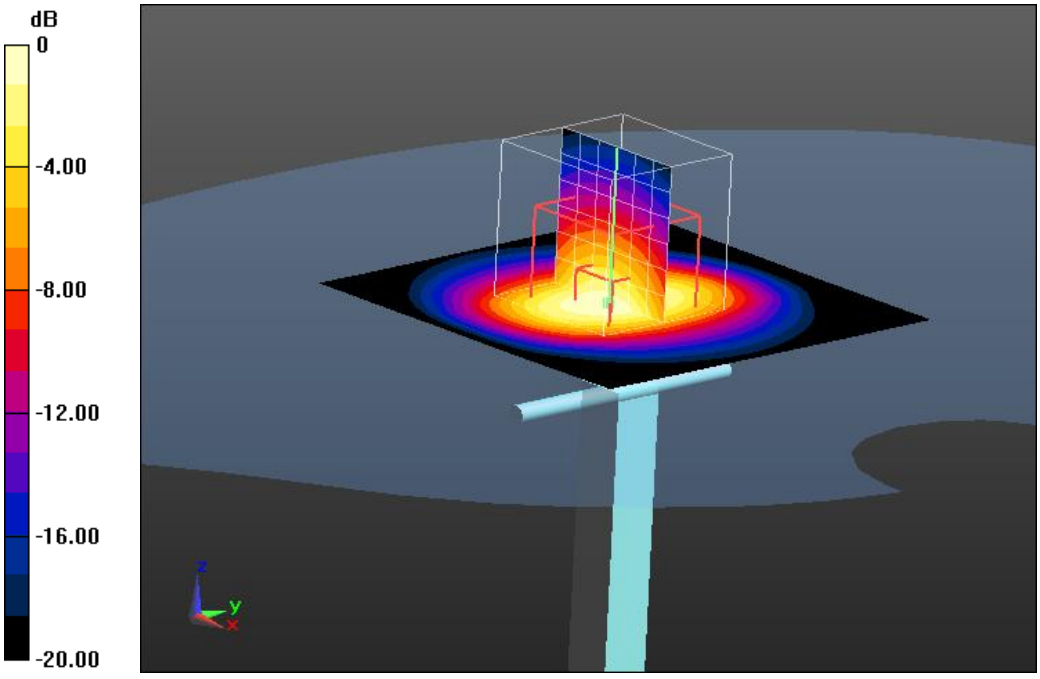
Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2450 MHz; σ = 1.757 S/m; ε_r = 38.87; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(4.25, 4.25, 4.25); Calibrated: 08.05.2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn413; Calibrated: 22.05.2014
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL2450/d=10mm, Pin=1000 mW, dist=4.0mm/Area Scan (81x81x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 58.9 W/kg

HSL2450/d=10mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 185.3 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 113 W/kg
SAR(1 g) = 52.3 W/kg; SAR(10 g) = 24.6 W/kg
Maximum value of SAR (measured) = 58.6 W/kg



0 dB = 58.6 W/kg = 17.68 dBW/kg

Additional information:
ambient temperature: 22.4°C; liquid temperature: 22.1°C

Date/Time: 22.01.2015 15:49:23

SystemPerformanceCheck-D2450 body 2015-01-22

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 710

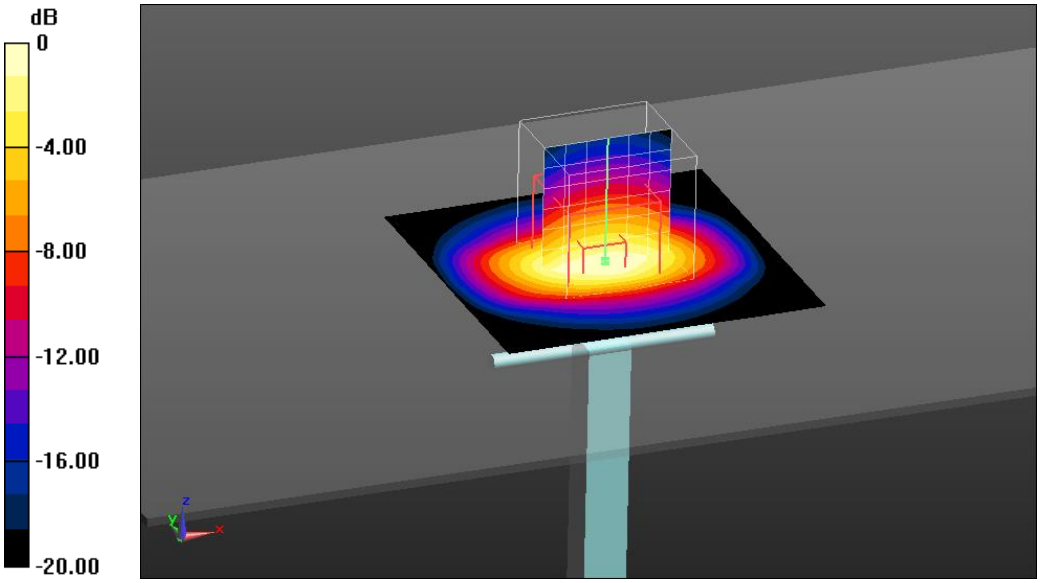
Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2450 MHz; σ = 2.003 S/m; ε_r = 51.123; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(4.3, 4.3, 4.3); Calibrated: 09.05.2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn477; Calibrated: 14.05.2014
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL2450/d=10mm, Pin=1000 mW, dist=4.0mm/Area Scan (51x51x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 74.8 W/kg

MSL2450/d=10mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 170.7 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 107 W/kg
SAR(1 g) = 51.1 W/kg; SAR(10 g) = 23.6 W/kg
Maximum value of SAR (measured) = 58.0 W/kg



0 dB = 58.0 W/kg = 17.63 dBW/kg

Additional information:
ambient temperature: 22.6°C; liquid temperature: 22.3°C

Date/Time: 21.03.2015 21:11:59

SystemPerformanceCheck-D5GHz head 2015-03-21

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

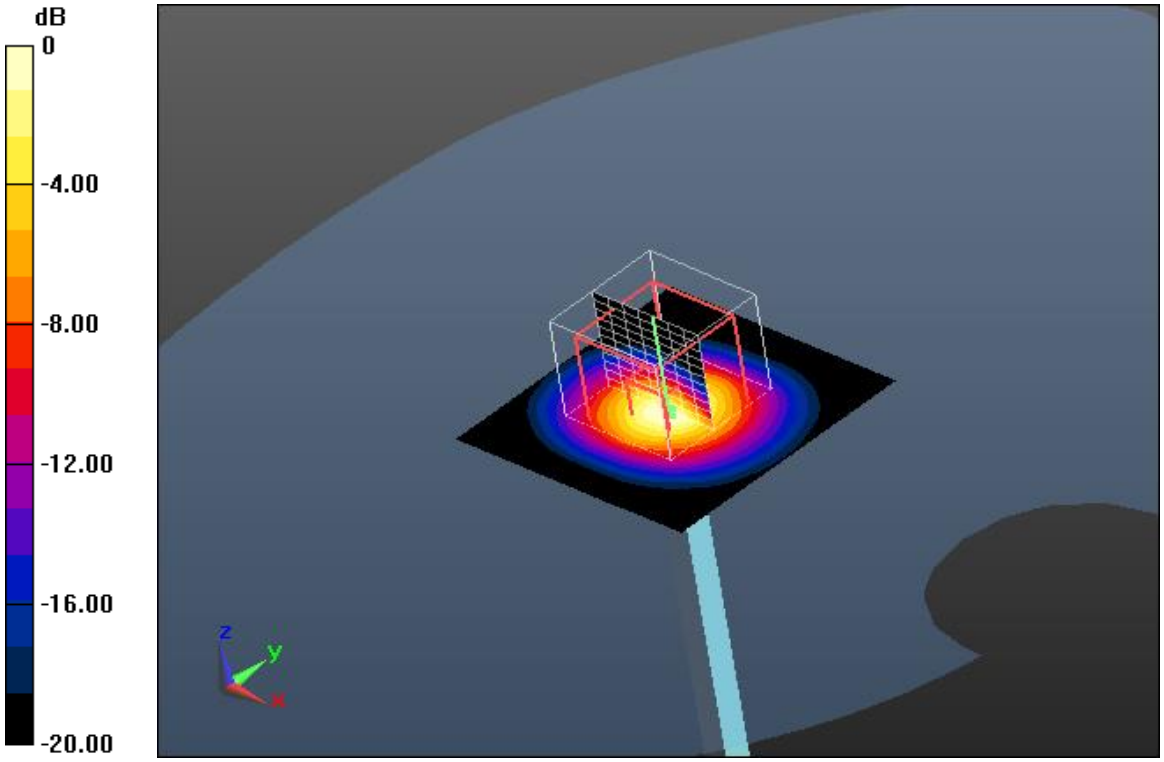
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5200 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5200 MHz; σ = 4.547 S/m; ε_r = 35.926; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(5.28, 5.28, 5.28); Calibrated: 19.08.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 15.01.2015
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.2 W/kg

HSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Zoom Scan (8x8x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 63.110 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 31.4 W/kg
SAR(1 g) = 7.73 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 15.6 W/kg



0 dB = 15.6 W/kg = 11.93 dBW/kg

Additional information:
ambient temperature: 23.4°C; liquid temperature: 22.3°C

Date/Time: 21.03.2015 21:51:16

SystemPerformanceCheck-D5GHz head 2015-03-21

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

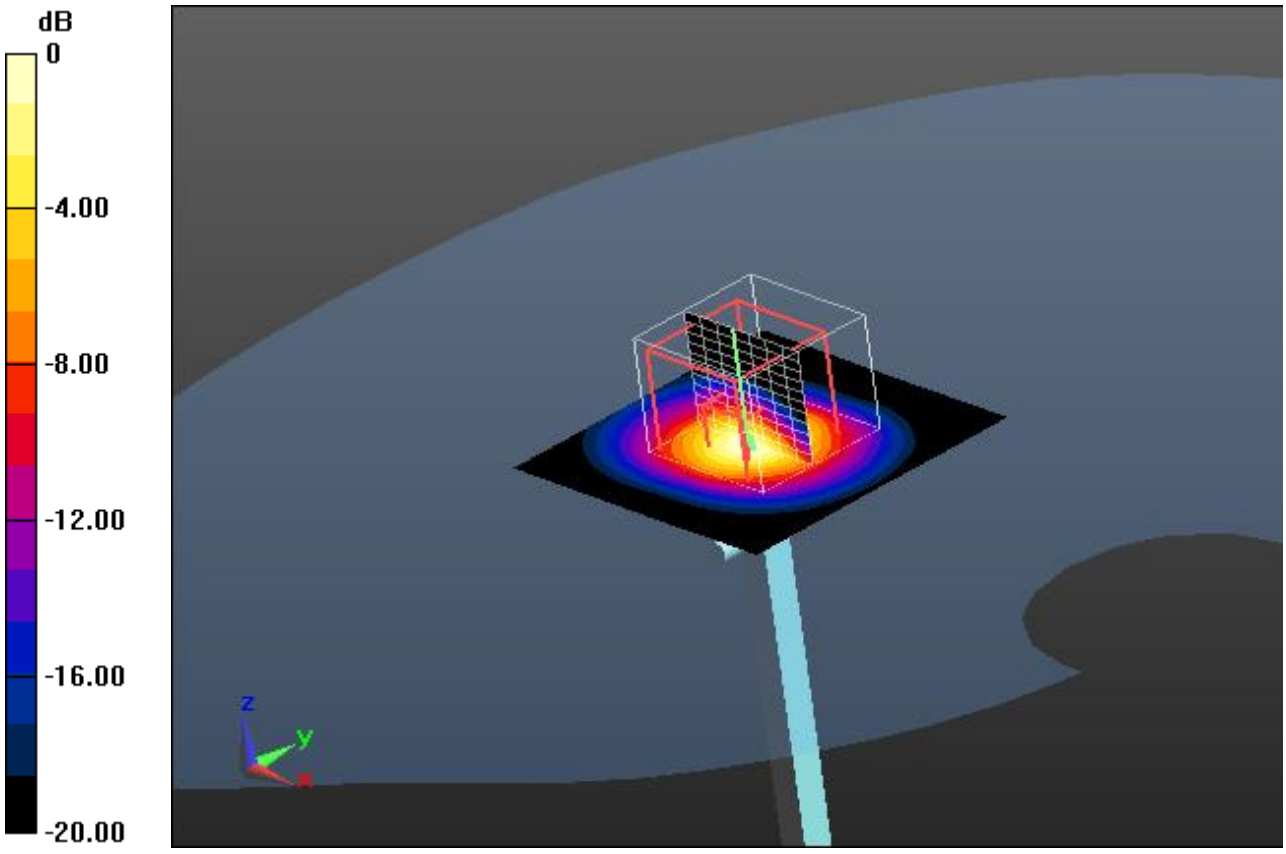
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5500 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5500 MHz; σ = 4.861 S/m; ε_r = 35.554; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.87, 4.87, 4.87); Calibrated: 19.08.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 15.01.2015
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.5 W/kg

HSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Zoom Scan (8x8x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 62.818 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 34.0 W/kg
SAR(1 g) = 7.87 W/kg; SAR(10 g) = 2.21 W/kg
Maximum value of SAR (measured) = 16.6 W/kg



0 dB = 16.6 W/kg = 12.20 dBW/kg

Additional information:
ambient temperature: 23.4°C; liquid temperature: 22.3°C

Date/Time: 21.03.2015 22:15:42

SystemPerformanceCheck-D5GHz head 2015-03-21

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

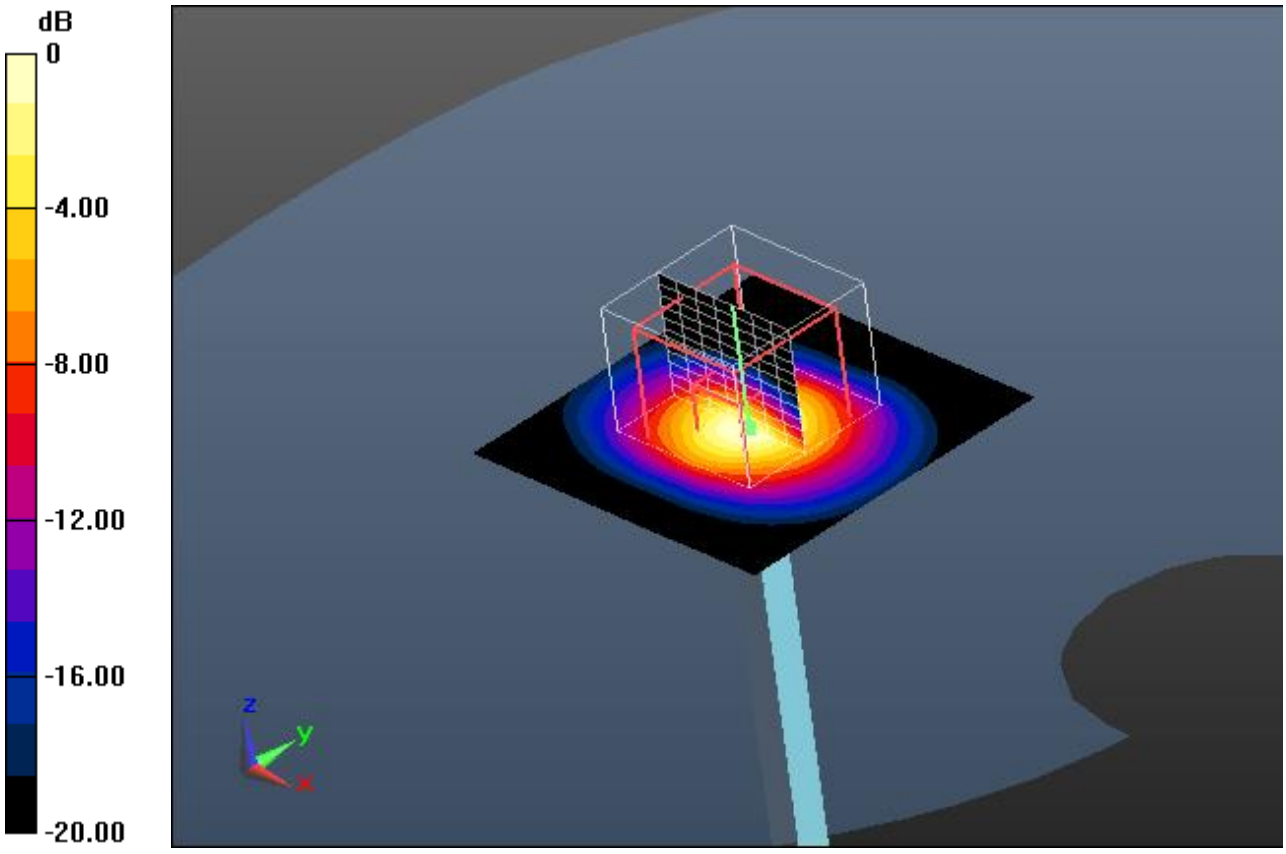
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5800 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5800 MHz; σ = 5.178 S/m; ε_r = 35.119; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.76, 4.76, 4.76); Calibrated: 19.08.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 15.01.2015
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.5 W/kg

HSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Zoom Scan (8x8x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 61.601 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 36.2 W/kg
SAR(1 g) = 7.92 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 17.0 W/kg



0 dB = 17.0 W/kg = 12.30 dBW/kg

Additional information:
ambient temperature: 23.4°C; liquid temperature: 22.3°C

Date/Time: 20.03.2015 15:34:01

SystemPerformanceCheck-D5GHz body 2015-03-20

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

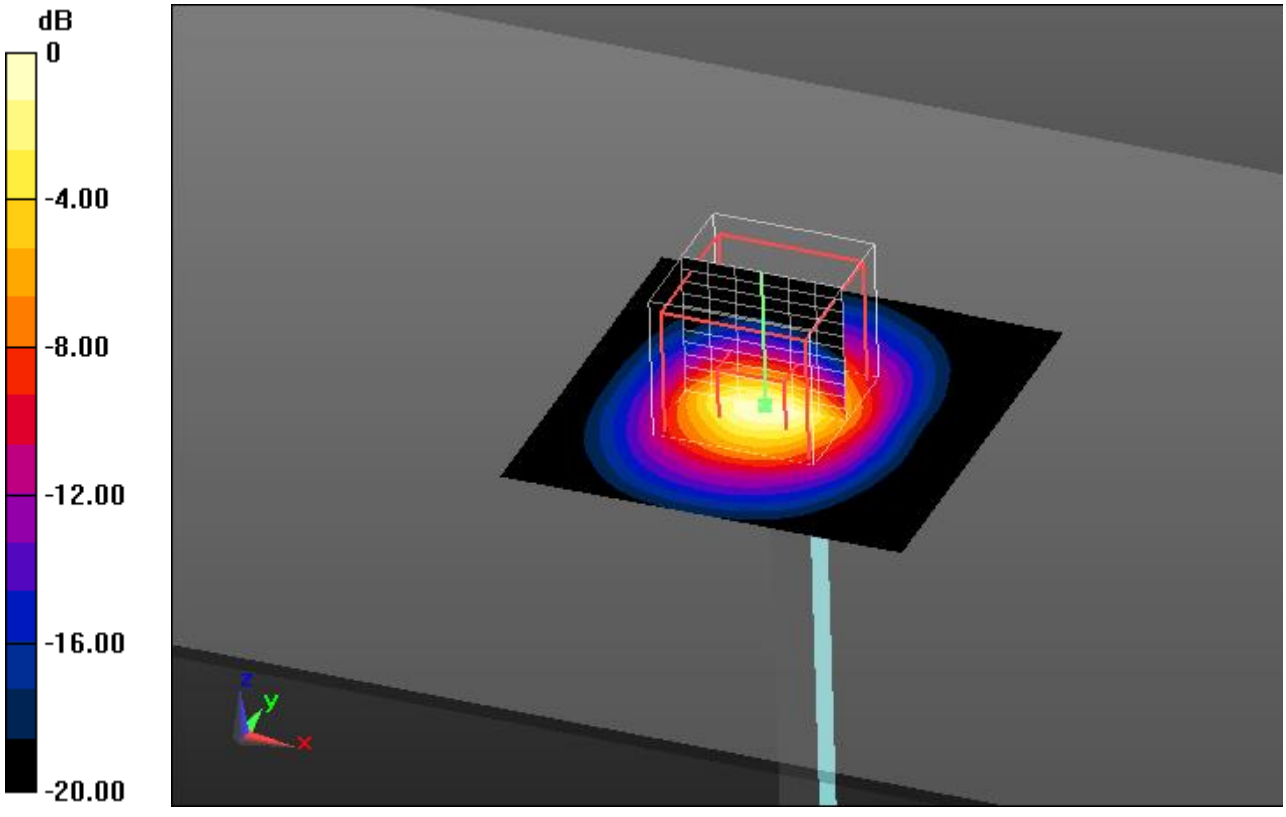
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5200 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5200 MHz; σ = 5.183 S/m; ε_r = 50.481; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.56, 4.56, 4.56); Calibrated: 19.08.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 15.01.2015
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 15.7 W/kg

MSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Zoom Scan (7x7x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 57.919 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 28.9 W/kg
SAR(1 g) = 7.3 W/kg; SAR(10 g) = 2.07 W/kg
Maximum value of SAR (measured) = 15.2 W/kg



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

Additional information:
ambient temperature: 23.7°C; liquid temperature: 22.5°C

Date/Time: 20.03.2015 15:56:10

SystemPerformanceCheck-D5GHz body 2015-03-20

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

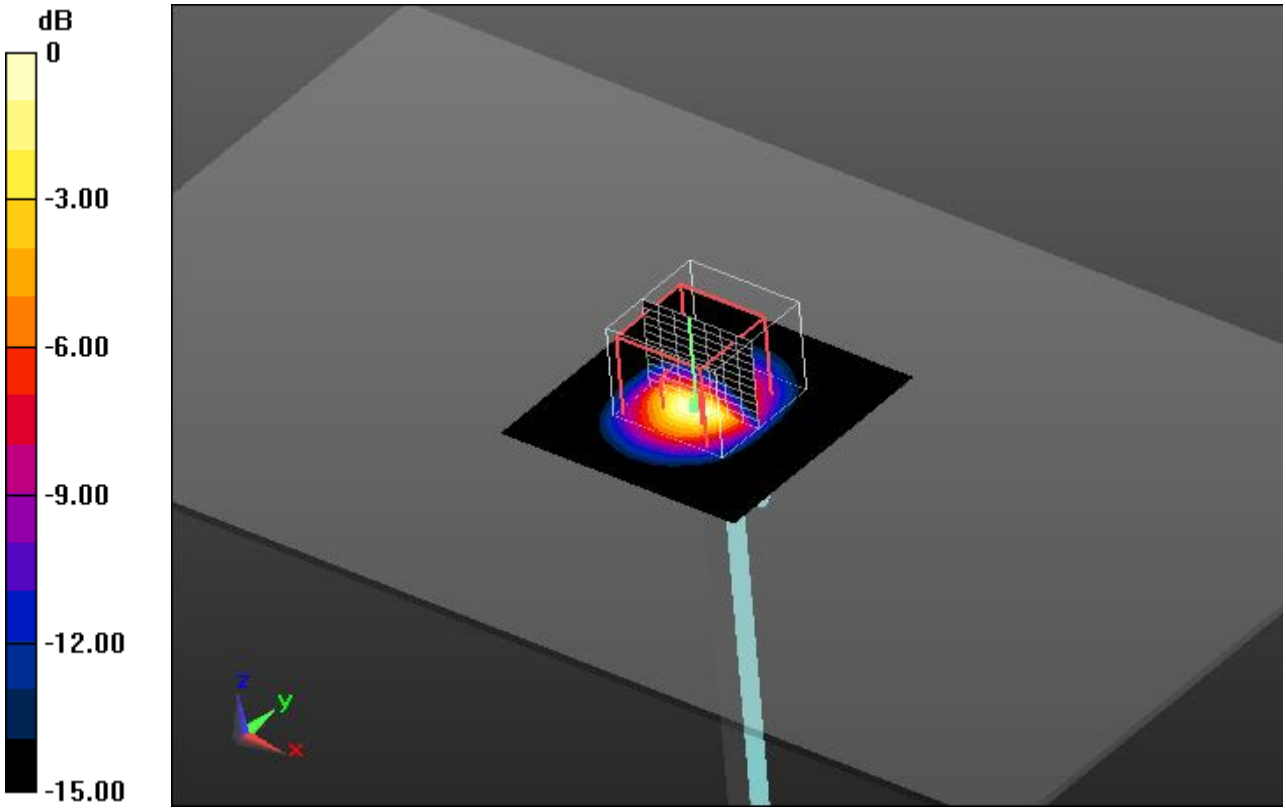
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5500 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5500 MHz; σ = 5.582 S/m; ε_r = 49.997; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.15, 4.15, 4.15); Calibrated: 19.08.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 15.01.2015
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.4 W/kg

MSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Zoom Scan (8x8x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 57.606 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 31.4 W/kg
SAR(1 g) = 7.59 W/kg; SAR(10 g) = 2.13 W/kg
Maximum value of SAR (measured) = 16.3 W/kg



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

Additional information:
ambient temperature: 23.7°C; liquid temperature: 22.5°C

Date/Time: 20.03.2015 16:20:21

SystemPerformanceCheck-D5GHz body 2015-03-20

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

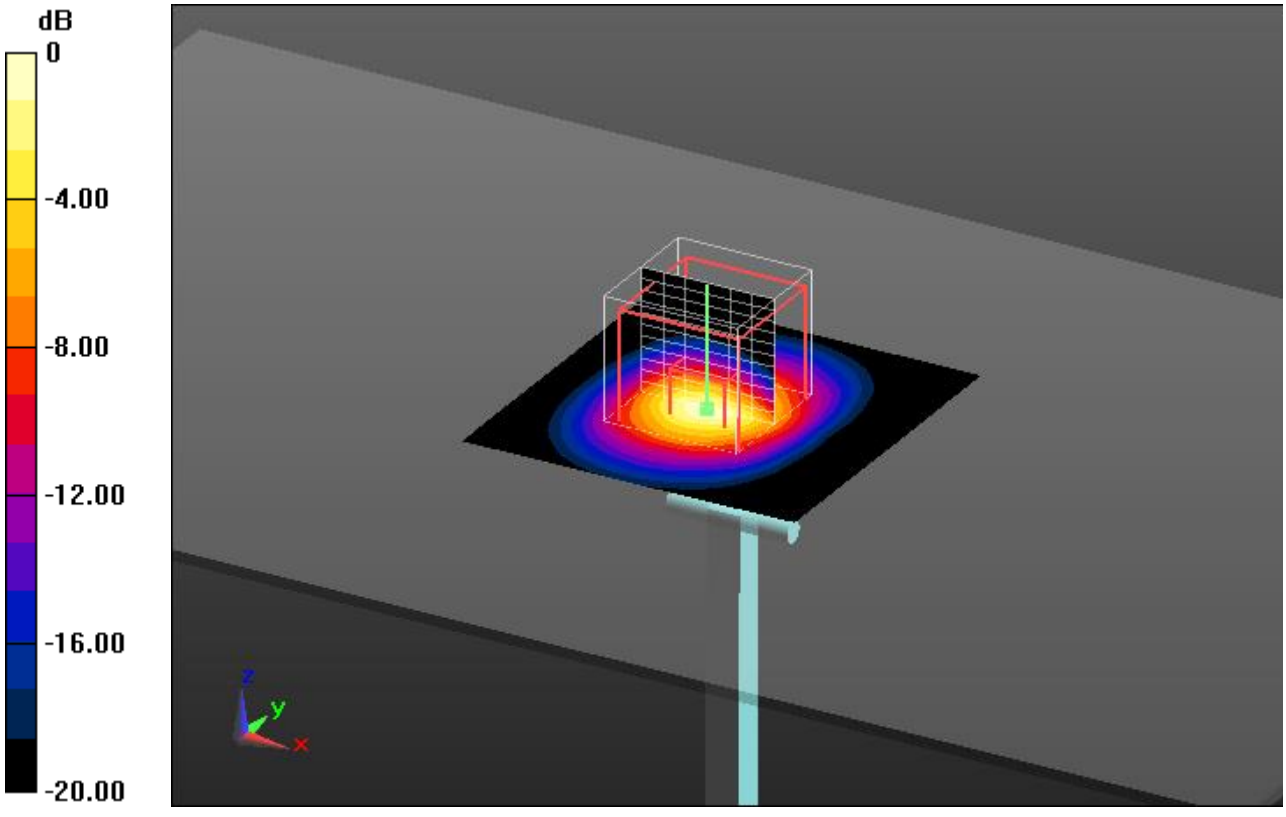
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5800 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5800 MHz; σ = 6.02 S/m; ε_r = 49.493; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.02, 4.02, 4.02); Calibrated: 19.08.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 15.01.2015
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 14.3 W/kg

MSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Zoom Scan (7x7x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 55.425 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 7.23 W/kg; SAR(10 g) = 2.05 W/kg
Maximum value of SAR (measured) = 15.6 W/kg



0 dB = 15.6 W/kg = 11.93 dBW/kg

Additional information:
ambient temperature: 23.7°C; liquid temperature: 22.5°C

Annex B: DASY5 measurement results

SAR plots for **the highest measured SAR** in each exposure configuration, wireless mode and frequency band combination according to FCC KDB 865664 D02

Annex B.1: WLAN 2450MHz

Date/Time: 21.01.2015 14:42:06

EN62209-1-WLAN2450 head

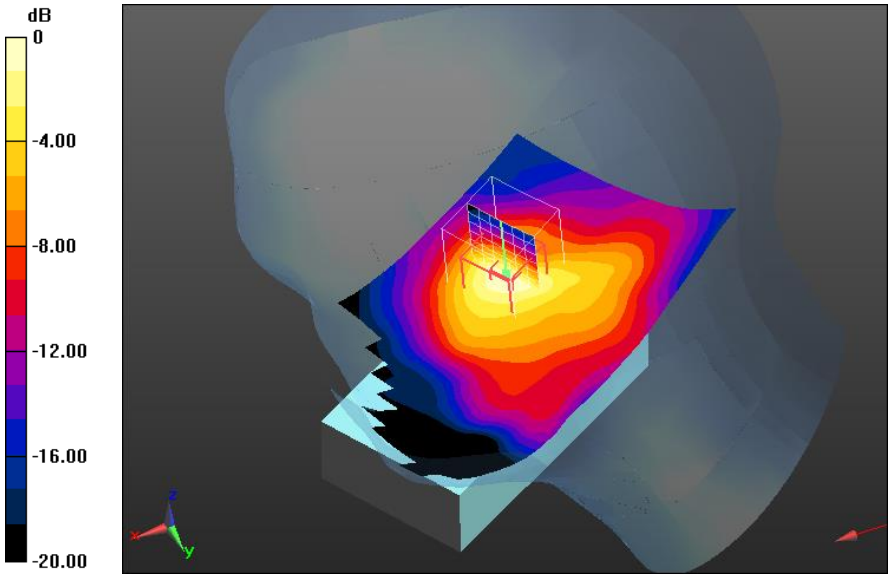
DUT: Ascom; Type: SH1 - ACAA/PF; Serial: T26105EEQA
Communication System: UID 0, WLAN 2450 (0); Communication System Band: 2.4 GHz; Frequency: 2412 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2412 MHz; σ = 1.734 S/m; ε_r = 39.012; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(4.25, 4.25, 4.25); Calibrated: 08.05.2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn413; Calibrated: 22.05.2014
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Right-Hand-Side HSL/Touch Position - Low/Area Scan (101x181x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.257 W/kg

Right-Hand-Side HSL/Touch Position - Low/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.285 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.423 W/kg
SAR(1 g) = 0.216 W/kg; SAR(10 g) = 0.107 W/kg
Maximum value of SAR (measured) = 0.247 W/kg



0 dB = 0.247 W/kg = -6.07 dBW/kg

Additional information:
ambient temperature: 22.4°C; liquid temperature: 22.1°C

Date/Time: 22.01.2015 13:54:32

FCC WLAN2450 body

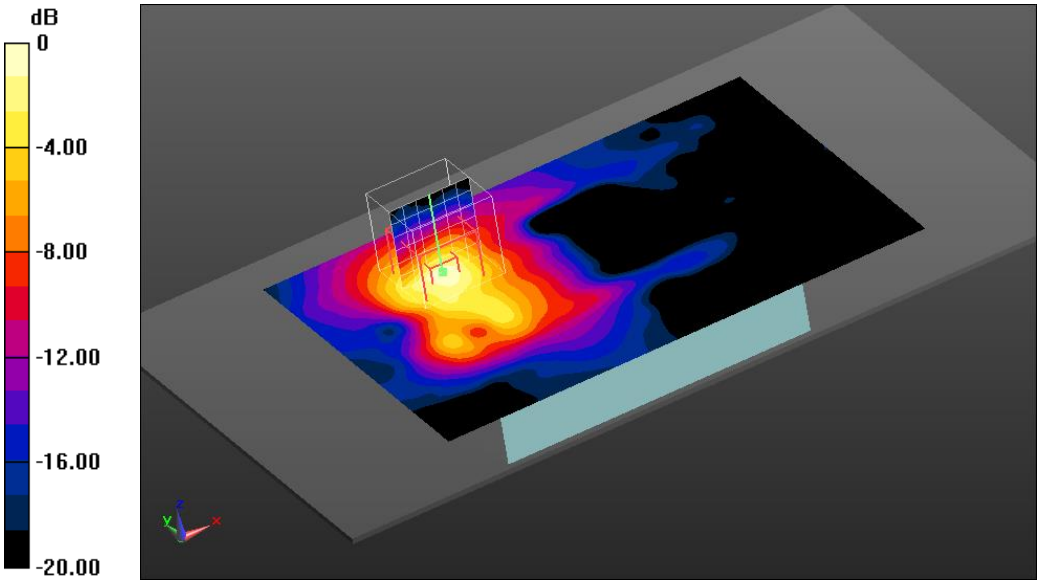
DUT: Ascom; Type: SH1 - ABAA/PF; Serial: T26105EEQA
Communication System: UID 0, WLAN 2450 (0); Communication System Band: 2.4 GHz; Frequency: 2412 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2412 MHz; σ = 1.944 S/m; ε_r = 50.796; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(4.3, 4.3, 4.3); Calibrated: 09.05.2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn477; Calibrated: 14.05.2014
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL2450/Front Low/Area Scan (121x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.337 W/kg

MSL2450/Front Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.124 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.687 W/kg
SAR(1 g) = 0.296 W/kg; SAR(10 g) = 0.130 W/kg
Maximum value of SAR (measured) = 0.343 W/kg



0 dB = 0.343 W/kg = -4.65 dBW/kg

Additional information:
position or distance of DUT to SAM: 0mm
ambient temperature: 22.6°C; liquid temperature: 22.3°C

Annex B.2: WLAN 5GHz

Date/Time: 21.03.2015 11:33:43

EN62209-1-WLAN5GHz head

DUT: Ascom; Type: SH1 - ACAA/PF; Serial: T26105GMX5

Communication System: UID 0, WLAN 5GHz (0); Communication System Band: 5 GHz Band; Frequency: 5240 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 5240 MHz; σ = 4.585 S/m; ε_r = 35.878; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: EX3DV4 - SN3944; ConvF(5.28, 5.28, 5.28); Calibrated: 19.08.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 15.01.2015
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL/Touch Position - Ch48/Area Scan (101x151x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.622 W/kg

Left-Hand-Side HSL/Touch Position - Ch48/Zoom Scan (8x8x12)/Cube 0:

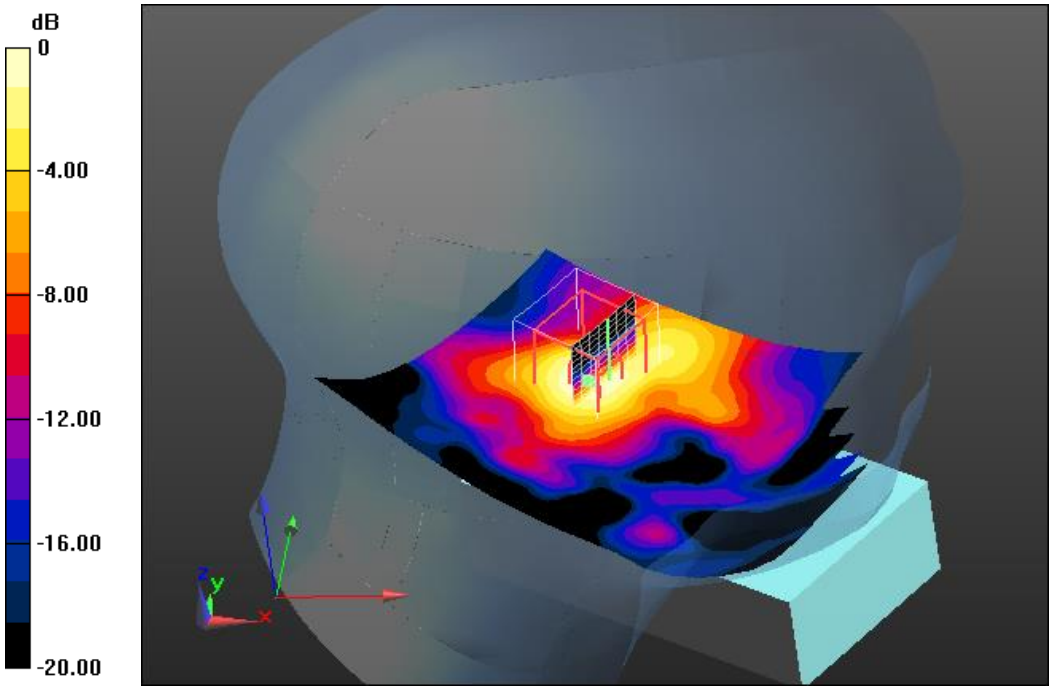
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 11.488 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 1.16 W/kg

SAR(1 g) = 0.322 W/kg; SAR(10 g) = 0.117 W/kg

Maximum value of SAR (measured) = 0.594 W/kg



0 dB = 0.594 W/kg = -2.26 dBW/kg

Additional information:

ambient temperature: 23.4°C; liquid temperature: 22.3°C

Date/Time: 20.03.2015 11:18:48

FCC WLAN5GHz body triple WLAN

DUT: Ascom; Type: SH1 - ACAA/PF; Serial: T26105GMX5

Communication System: UID 0, WLAN 5GHz (0); Communication System Band: 5 GHz Band; Frequency: 5240 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 5240 MHz; σ = 5.239 S/m; ε_r = 50.36; ρ = 1000 kg/m^3

Phantom section: Center Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: EX3DV4 - SN3944; ConvF(4.56, 4.56, 4.56); Calibrated: 19.08.2014;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 15.01.2015
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL5GHz/Front Ch 48/Area Scan (101x171x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.897 W/kg

MSL5GHz/Front Ch 48/Zoom Scan (8x8x12)/Cube 0:

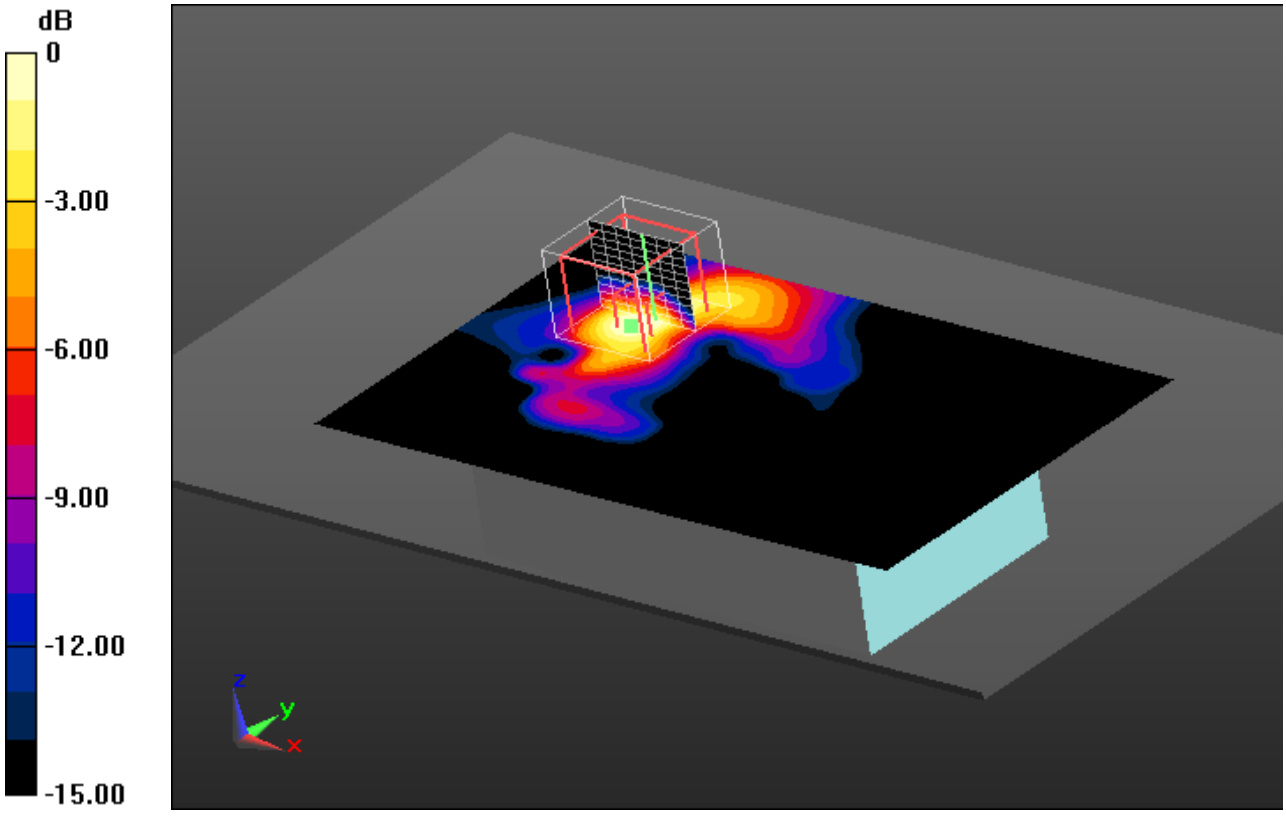
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 10.035 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 1.68 W/kg

SAR(1 g) = 0.432 W/kg; SAR(10 g) = 0.144 W/kg

Maximum value of SAR (measured) = 0.852 W/kg



0 dB = 0.852 W/kg = -0.70 dBW/kg

Additional information:

position or distance of DUT to SAM: 0 mm

ambient temperature: 23.7°C; liquid temperature: 22.5°C

Annex C: Liquid depth

Photo 1: Liquid depth 2450MHz head simulating liquid

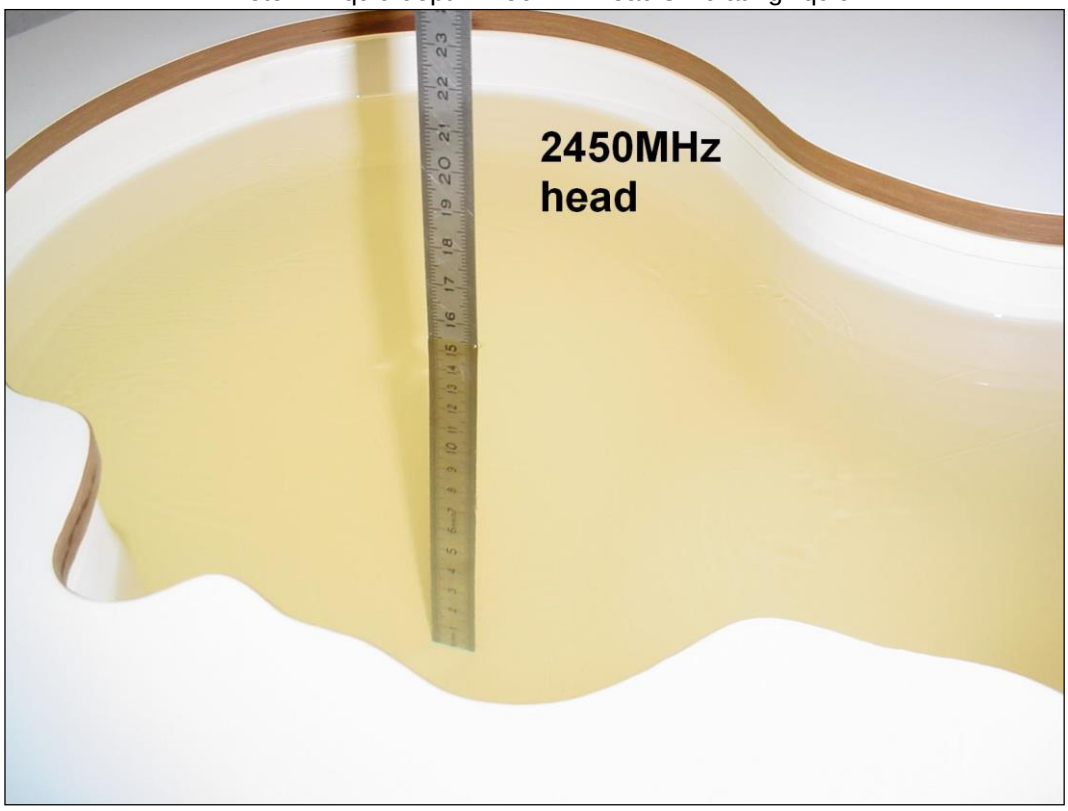


Photo 2: Liquid depth 2450 MHz body simulating liquid

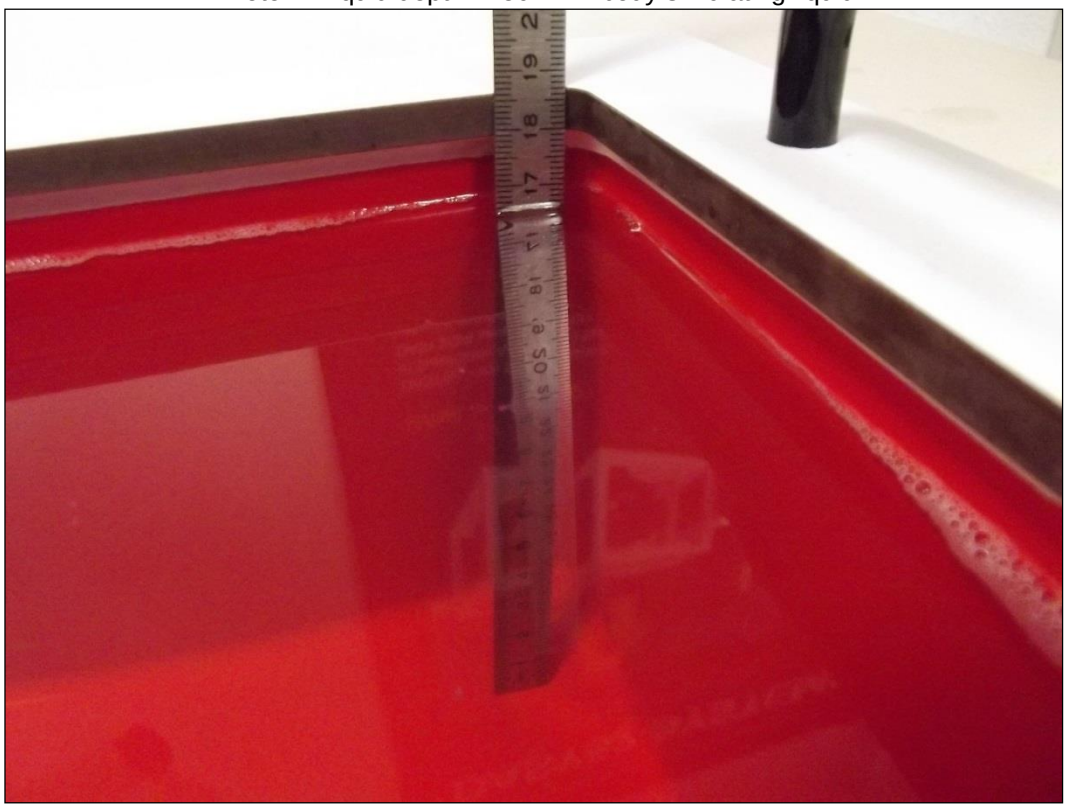
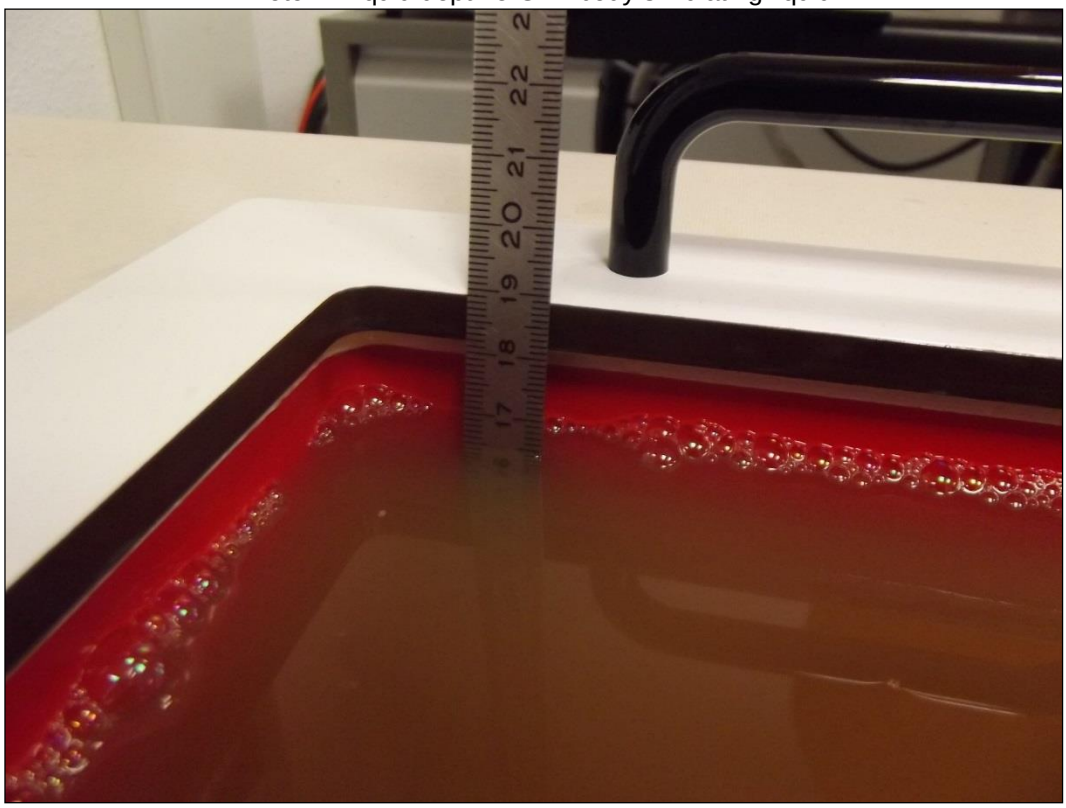


Photo 3: Liquid depth 5 GHz head simulating liquid

Photo 4: Liquid depth 5 GHz body simulating liquid



Annex D: Photo documentation

Photo 1: Measurement System DASY 5

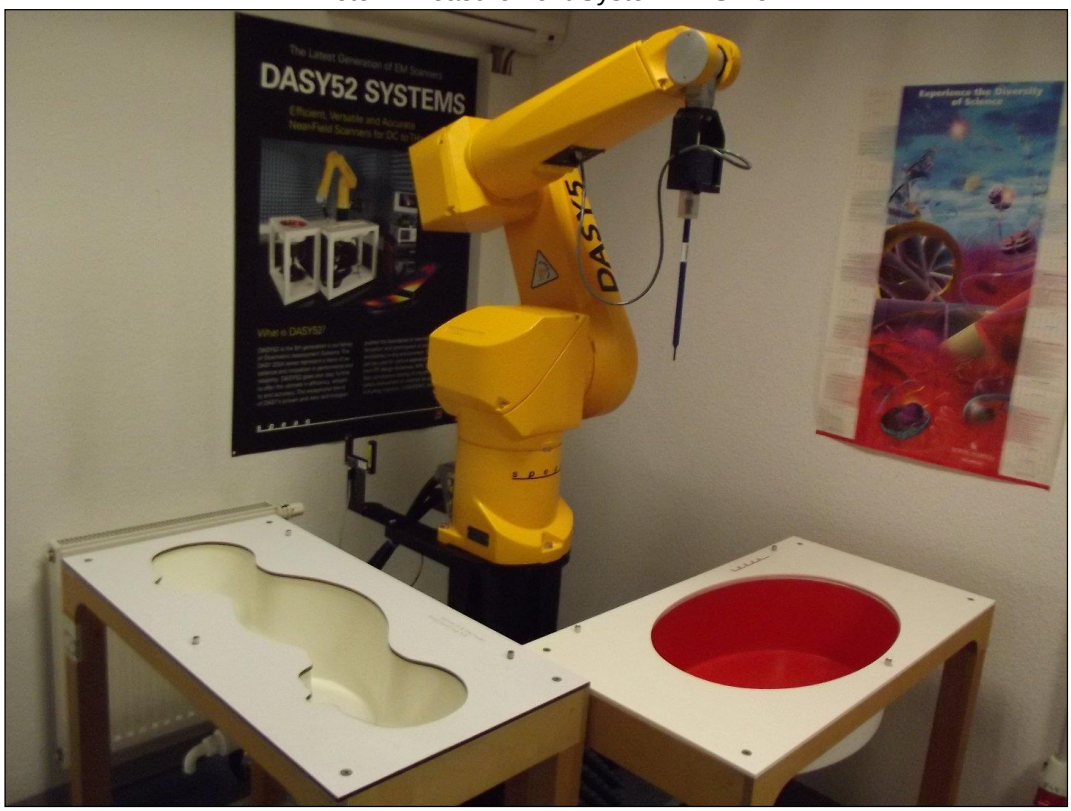


Photo 2: DUT - front view

Photo 3: DUT – right side view

Photo 4: DUT - rear view

Photo 5: DUT - rear view open (without battery)

Photo 6: DUT - rear view (label)

Photo 7: Test position left hand touched

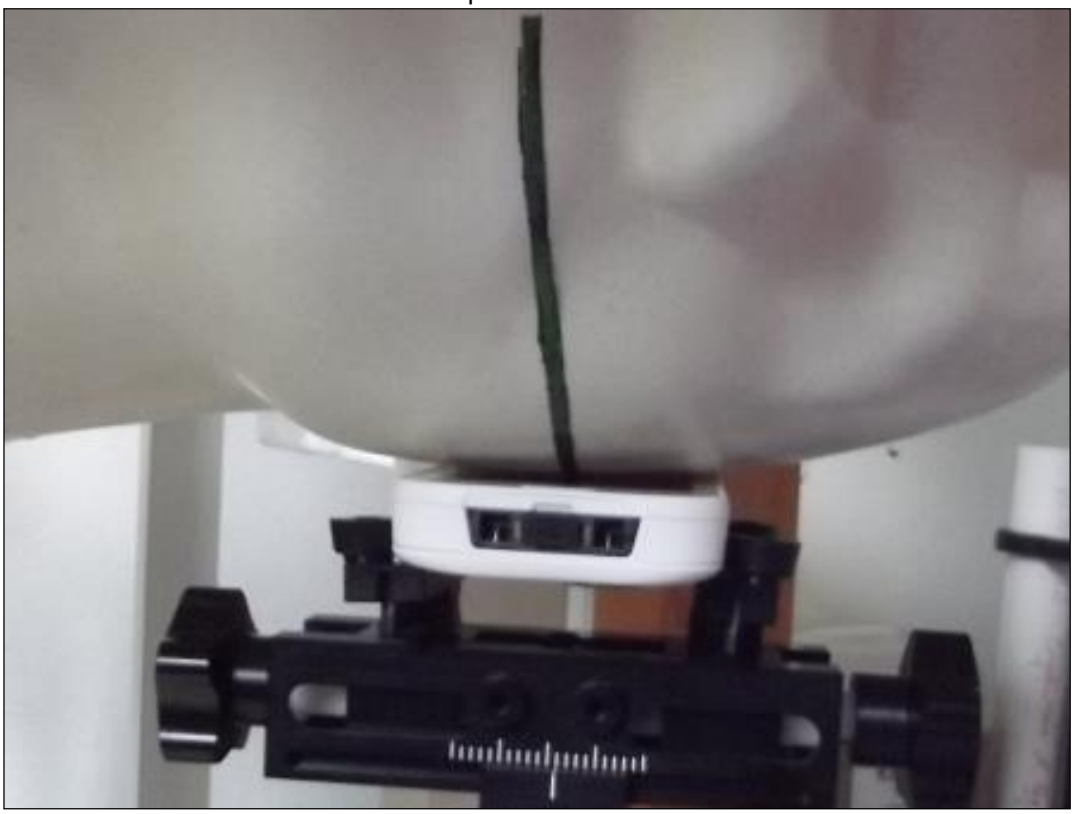


Photo 8: Test position left hand touched

Photo 9: Test position left hand touched

Photo 10: Test position left hand tilted 15°

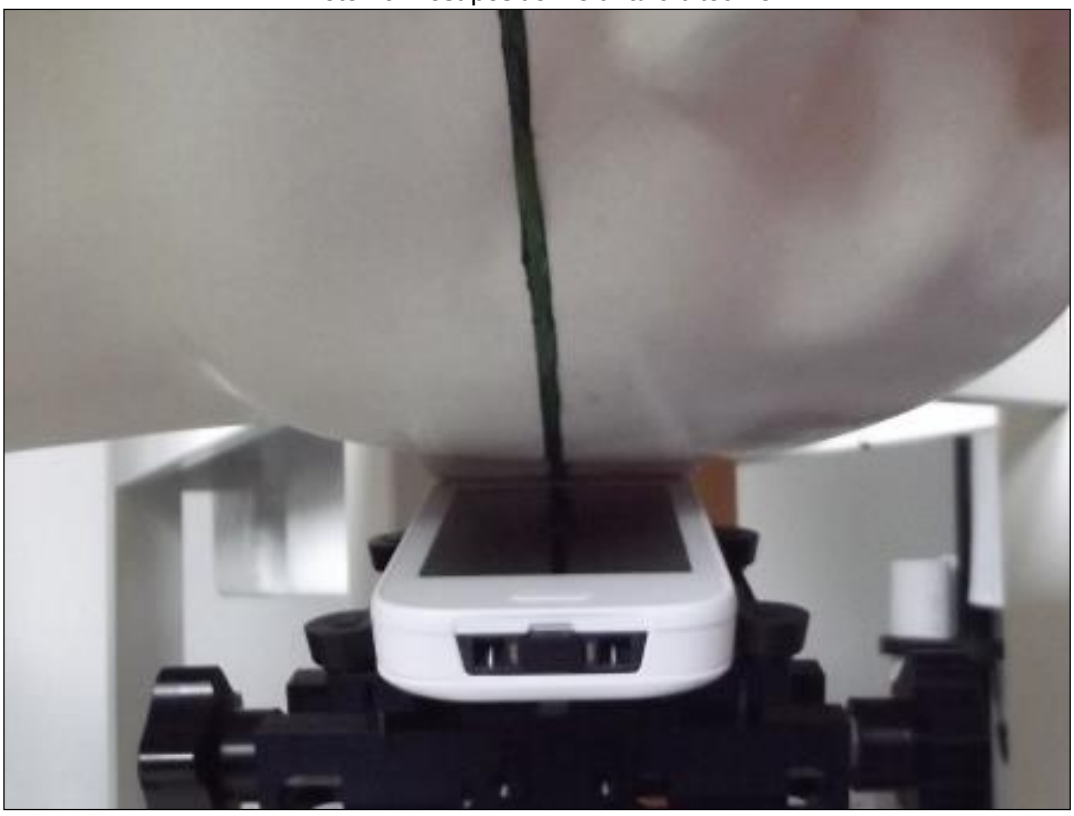


Photo 11: Test position left hand tilted 15°

Photo 12: Test position right hand touched

Photo 13: Test position right hand touched

Photo 14: Test position right hand touched

Photo 15: Test position right hand tilted 15°

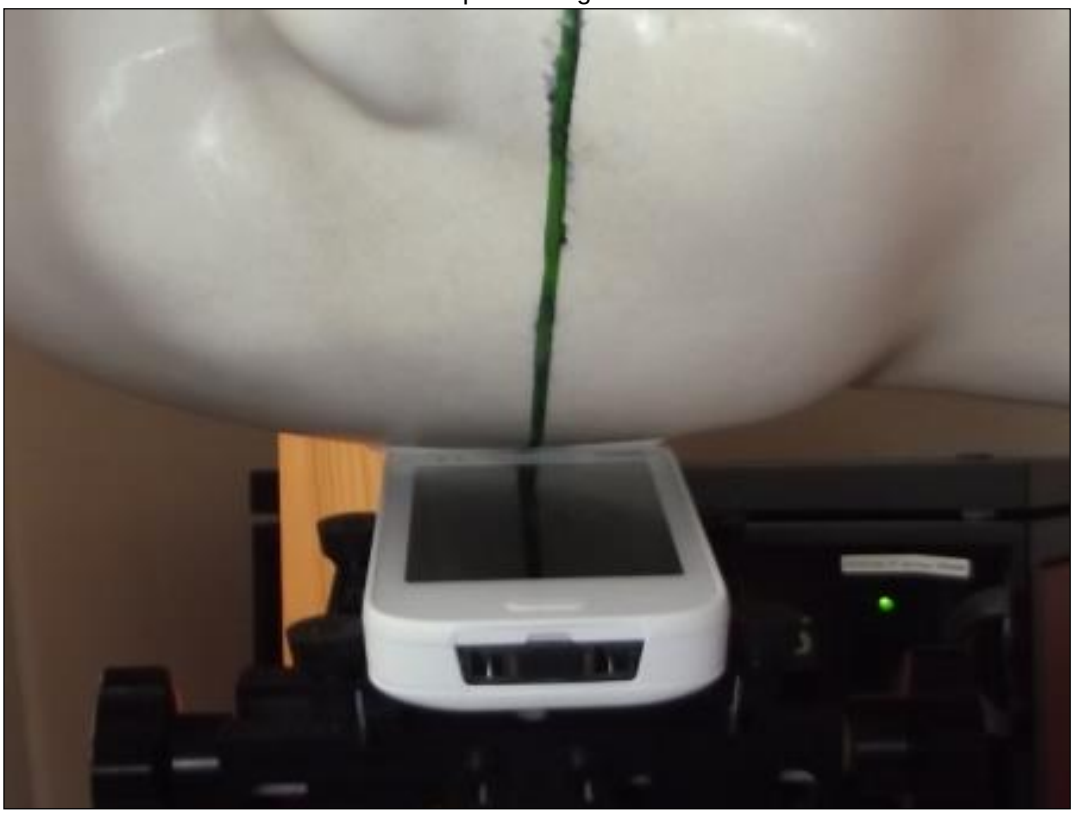


Photo 16: Test position right hand tilted 15°

Photo 17: Test position body worn front side with 0 mm distance

Photo 18: Test position body worn rear side with 0 mm distance

Annex E: Calibration parameters

Calibration parameters are described in the additional document:

Appendix to test report no. 1-9110/14-01-07-C
Calibration data, Phantom certificate
and detail information of the DASY5 System

Annex F: RF Technical Brief Cover Sheet acc. to RSS-102 Annex A

1. COMPANY NUMBER: **3724B**

2. PRODUCT MARKETING NAME (PNM): **ASCOM MYCO WIFI**

3. HARDWARE VERSION IDENTIFICATION NO. (HVIN): **SH1-903278**

4. FIRMWARE VERSION IDENTIFICATION NO. (FVIN): N/A

5. HOST MARKETING NAME (HMN): N/A

6. IC CERTIFICATION NUMBER: **3724B-SH1B**

7. APPLICANT: **ASCOM AB**

8. SAR/RF EXPOSURE TEST LABORATORY: **CETECOM ICT Services GmbH**

9. TYPE OF EVALUATION:

(a) SAR Evaluation: **Device Used in the Vicinity of the Human Head**

- Multiple transmitters: Yes ☐ No ☒
- Evaluated against exposure limits: General Public Use ☒ Controlled Use ☐
- Duty cycle used in evaluation: 100 %
- Standards used for evaluation:

RSS-102 Issue 5	(2015-04)	IEEE C95-3	(2002)
IEEE 1528-2013	(2014-06)	IEEE C95-1	(2005)
Safety Code No.6	(2015-03)		

KDBs and further information follow in separate table below.

- SAR value: **0.405 W/kg**. Measured ☒ Computed ☐ Calculated ☐

(b) SAR Evaluation: **Body-Worn Device**

- Multiple transmitters: Yes ☐ No ☒
- Evaluated against exposure limits: General Public Use ☒ Controlled Use ☐
- Duty cycle used in evaluation: 100 %
- Standard used for evaluation:

RSS-102 Issue 5	(2015-04)	IEEE C95-3	(2002)
IEEE 1528-2013	(2014-06)	IEEE C95-1	(2005)
Safety Code No.6	(2015-03)	IEC 62209-2	(2010)

KDBs and further information follow in separate table below.

- SAR value: **0.544 W/kg**. Measured ☒ Computed ☐ Calculated ☐

Annex F.1: Declaration of RF Exposure Compliance

ATTESTATION: I attest that the information provided in Annex F: is correct; that a Technical Brief was prepared and the information it contains is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed and that the device meets the SAR and/or RF exposure limits of RSS-102.

Signature: 

cn=Oleksandr Hnatovskiy, o=CETECOM ICT,
ou=HNA-100728,
email=Oleksandr.Hnatovskiy@cetecom.com,
c=DE
2015.06.08 15:06:46 +02'00'

NAME : **Oleksandr Hnatovskiy**

TITLE : Dipl.-Ing. (FH)

COMPANY : CETECOM ICT Services GmbH

PRODUCT MARKETING NAME (PMN): **ASCOM MYCO WIFI**

HARDWARE VERSION IDENTIFICATION NO. (HVIN): **SH1-903278**

FIRMWARE VERSION IDENTIFICATION NO. (FVIN): N/A

HOST MARKETING NAME (HMN): N/A

IC CERTIFICATION NUMBER: **3724B-SH1B**

Test Standard	Version	FCC KDBs	Version
IEEE 1528-2003	2003-04	KDB 865664D01v01	February 7, 2014
IEEE 1528-2013	2014-06	KDB 865664D02v01	May 28, 2013
RSS-102 Issue 5	2015-04	KDB 447498D01v05	February 7, 2014
Canada's Safety Code No. 6	2015-03	KDB 648474D04v01	December 4, 2013
IEEE Std. C95-3	2002	KDB 248227D01v02	March 16, 2015
IEEE Std. C95-1	2005		
IEC 62209-2	2010		

Annex G: Document History

Version	Applied Changes	Date of Release
	Initial Release	2015-04-15
-A	Hardware status was corrected on page 1.	2015-04-30
-B	Corrected chapter 3 Test standards/ procedures references on page 5 and Annex F: RF Technical Brief Cover Sheet acc. to RSS-102 Annex A on page 49.	2015-05-29
-C	Corrected SW Version, Applicant- and Manufacturer-Address on page 1 and in Annex F: RF Technical Brief Cover Sheet acc. to RSS-102 Annex A on page 49.	2015-06-03

Annex H: Further Information

Glossary

BW	-	Bandwidth
DTS	-	Distributed Transmission System
DUT	-	Device under Test
EUT	-	Equipment under Test
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
LTE	-	Long Term Evolution
N/A	-	not applicable
PCE	-	Personal Consumption Expenditure
OET	-	Office of Engineering and Technology
RB	-	resource block(s)
SAR	-	Specific Absorption Rate
S/N	-	Serial Number
$SPLSR_i$	-	SAR-to-(peak-locations spacing) ratio
SW	-	Software
UNII	-	Unlicensed National Information Infrastructure