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IMST

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Report

Dosimetric Assessment of the Inari8-3GAN-1 Tablet PC from Aava Mobile Oy (FCC ID: 2ABVH-INARI81) (IC: 11875A-INARI81)

According to the FCC Requirements

May 06, 2014

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Executive Summary

The Inari8-3GAN-1 is a new tablet computer (Portable Device) from Aava Mobile Oy operating in the 850 MHz, 900 MHz, 1750 MHz, 1800 MHz, 1900 MHz, 2450 MHz and 5 GHz frequency range. The device has different integrated antennas (2 x WWAN, 2 x WLAN, 1 x BT) and work in 2G, 3G and IEEE 802.11 a/b/g/n standards. The two WWAN antennas work as a receive diversity system. Since the second WWAN antenna only work as receive antenna, only the WWAN main antenna was assessed for SAR measurements.

The objective of the measurements done by IMST was the dosimetric assessment of one device in different configurations according the applicable KDB. For IEEE 802.11 a/b/g/n SAR assessment, a special test software was used to set the device to a specific frequency and maximum output power with a specific data rate and antenna. The examinations have been carried out with the dosimetric assessment system „DASY4".

The measurements were made according to the 47 CFR § 2.1093 [47CFR] for evaluating compliance of mobile and portable devices with FCC limits for human exposure (general population) to radiofrequency emissions and IEEE 1528-2013 [IEEE1528-2013].

Additional information and guidelines given by the following FCC documents were used:

- SAR Measurement Requirements for 100 MHz to 6 GHz [KDB 865664 D01 v01r03]
- Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies [KDB 447498 D01 v05r02]
- SAR Measurement Procedures for 3G Devices [KDB 941225 D01 v02]
- SAR Guidance for HSPA, HSPA+, DC-HSDPA and 1x-Advanced [KDB 941225 D02 v02r02]
- Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE [KDB 941225 D03 vo1]
- SAR Evaluation Considerations for Laptop, Netbook, Netbook and Tablet Computers [KDB 616217 D04 v01r01]
- SAR Measurement Procedures for 802.11 a/b/g Transmitters [KDB 248227 Rev. 1.2]

All measurements have been performed in accordance to the recommendations given by SPEAG.

Compliance Statement

The assessed SAR values for Inari8-3GAN-1 tablet computer from Aava Mobile Oy (FCC ID: 2ABVH-INARI81; IC: 11875A-INARI81) are in compliance with the SAR limits over any 1g tissue according to:

- **47 CFR § 2.1093 [47CFR]**
- **ANSI / IEEE C95.1-1999 [IEEE C95.1-1999]**

The maximum SAR results are shown in Table 36 - 41.

prepared by: .... reviewed by: ....

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Subject of Investigation

The Inari8-3GAN-1 is a new tablet computer (Portable Device) from Aava Mobile Oy operating in the 850 MHz, 900 MHz, 1750 MHz, 1800 MHz, 1900 MHz, 2450 MHz and 5 GHz frequency range. The device has different integrated antennas (2 x WWAN, 2 x WLAN, 1 x BT) and work in 2G, 3G and IEEE 802.11 a/b/g/n standards. The two WWAN antennas work as a receive diversity system. Since the second WWAN antenna only work as receive antenna, only the WWAN main antenna was assessed for SAR measurements.

Fig. 1: Picture of the device under test with antenna location and separation distances.

Fig. 2: Picture of the device under test with antenna location and separation distances.

The objective of the measurements done by IMST was the dosimetric assessment of one device in different configurations according the applicable KDB. For IEEE 802.11 a/b/g/n SAR assessment a special test software was used to set the device to a specific frequency and maximum output power with a specific data rate and antenna. The examinations have been carried out with the dosimetric assessment system „DASY4“.

1 FCC Exposure Criteria

In the USA the FCC exposure criteria [KDB 865664] are based on the withdrawn IEEE Standard C95.1-1999 [IEEE C95.1-1999].

In this report the comparison between the FCC exposure limits and the measured data is made using the spatial peak SAR; the power level of the device under test guarantees that the whole body averaged SAR is not exceeded.

Having in mind a worst case consideration, the SAR limit is valid for uncontrolled environment and mobile respectively portable transmitters. According to Table 1 the SAR values have to be averaged over a mass of 1 g (SAR_{1g}) with the shape of a cube.

Rule	SAR Limit [W/kg]
47 CFR § 2.1093 (d)(2)	1.6

Table 1: Relevant spatial peak SAR limit averaged over a mass of 1 g.

1.1 Distinction Between Exposed Population, Duration of Exposure and Frequencies

The American Standard [IEEE C95.1-1999] distinguishes between controlled and uncontrolled environment. Controlled environments are locations where there is exposure that may be incurred by persons who are aware of the potential for exposure as a concomitant of employment or by other cognizant persons. Uncontrolled environments are locations where there is the exposure of individuals who have no knowledge or control of their exposure. The exposures may occur in living quarters or workplaces. For exposure in controlled environments higher field strengths are admissible. In addition the duration of exposure is considered.

Due to the influence of frequency on important parameters, as the penetration depth of the electromagnetic fields into the human body and the absorption capability of different tissues, the limits in general vary with frequency.

1.2 Distinction between Maximum Permissible Exposure and SAR Limits

The biological relevant parameter describing the effects of electromagnetic fields in the frequency range of interest is the specific absorption rate SAR (dimension: power/mass). It is a measure of the power absorbed per unit mass. The SAR may be spatially averaged over the total mass of an exposed body or its parts. The SAR is calculated from the r.m.s. electric field strength *E* inside the human body, the conductivity σ and the mass density ρ of the biological tissue:

$$SAR = \sigma \frac{E^2}{\rho} = c \left. \frac{\partial T}{\partial t} \right|_{t \to 0+} . \tag{1}$$

The specific absorption rate describes the initial rate of temperature rise $\partial T / \partial t$ as a function of the specific heat capacity *c* of the tissue. A limitation of the specific absorption rate prevents an excessive heating of the human body by electromagnetic energy.

As it is sometimes difficult to determine the SAR directly by measurement (e.g. whole body averaged SAR), the standard specifies more readily measurable maximum permissible exposures in terms of external electric *E* and magnetic field strength *H* and power density *S*, derived from the SAR limits. The limits for *E*, *H* and *S* have been fixed so that even under worst case conditions, the limits for the specific absorption rate SAR are not exceeded.

For the relevant frequency range the maximum permissible exposure may be exceeded if the exposure can be shown by appropriate techniques to produce SAR values below the corresponding limits.

2 The FCC Measurement Procedure

2.1 General Requirements

The test shall be performed in a laboratory with an environment which avoids influence on SAR measurements by ambient EM sources and any reflection from the environment itself. The ambient temperature shall be in the range of 20°C to 26°C and 30-70% humidity. All tests have been conducted according the latest version of all relevant KDBs.

2.2 SAR Testing for Tablet Computers according KDB 616217 D04

Due to its size, according KDB 616217 D04 this device is a full sized tablet computer. Accordingly the back surface and edges of the tablet should be tested for SAR compliance ith the tablet touching the phantom. The SAR exclusion threshold in KDB 447498 D01 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge position against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

2.3 Additional Test Positions due to Proximity Sensor Consideration

This device uses a proximity sensor to reduce the output power in 2G and 3G mode in tablet configuration.

While the device is touching the user on the 2G/3G antenna region, the capacitive proximity sensors activate and reduce the maximum output power for 2G and 3G. However, when the device is moved beyond the sensor triggering distance, the sensor de-activate the power reduction and the output power in the 2G and 3G mode is no longer limited. Therefore, an additional exposure condition is needed in the vicinity of the triggering distance to ensure SAR is compliant when the device is allowed to operate at a non-reduced output power level.

2.4 Back and Side Triggering Distance

FCC KDB 616217 D04 paragraph 6.2 was used as a guideline for selecting SAR test distance for this device at these additional exposure conditions. Since the capacitive proximity sensor activation distance for the back side is 15 mm, a conservative distance of 14 mm was used for SAR test on the back side, at maximum power. Since the capacitive proximity sensor activation distance for the upper edge is 13 mm, a conservative distance of 12 mm was used for SAR test on the upper edge, at maximum power.

2.5 Sensor Coverage Area

Since the proximity sensing elements are placed on two sides of the transmitting WWAN antenna and the fact that the traces also detect proximity, the antenna and sensor are not spatially offset and therefore proximity coverage area does not need to be determined as described in FCC 616217 D04 SAR v01r01 paragraph 6.3.

2.6 Tilt Angle Testing

FCC KDB 616217 D04 paragraph 6.4 was used as a guideline for assessing the influence of the tilt angle for this device.

Tilt Angle Test - Distance 13mm													
-50°	-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°	50°	60°
OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON

Table 2: Tilt angle test

2.7 Proximity Sensor Triggering Distances

According to FCC KDB 616217 paragraph 6.2 the procedure to determine proximity sensor triggering distances was applied. The capacitive proximity sensor does not trigger power reduction from the front side, bottom edge, left side or right side.

Back Side Trigger - 3mm Steps													
40mm	37mm	34mm	31mm	28mm	25mm	22mm	19mm	16mm	13mm	10mm	7mm	4mm	0mm
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON

Table 3: Back side trigger, 3mm steps

Back Side Trigger - 3mm Steps													
0mm	4mm	7mm	10mm	13mm	16mm	19mm	22mm	25mm	28mm	31mm	34mm	37mm	40mm
ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Table 4: Back side trigger, reversed process, 3mm steps

Back Side Trigger - 1mm Steps														
21mm	20mm	19mm	18mm	17mm	16mm	15mm	14mm	13mm	12mm	11mm	10mm	9mm	8mm	7mm
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON

Table 5: Back side trigger, 1mm steps

Back Side Trigger - 1mm Steps														
7mm	8mm	9mm	10mm	11mm	12mm	13mm	14mm	15mm	16mm	17mm	18mm	19mm	20mm	21mm
ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF

Table 6: Back side trigger, reversed process, 1mm steps

Top Edge Trigger - 3mm Steps													
40mm	37mm	34mm	31mm	28mm	25mm	22mm	19mm	16mm	13mm	10mm	7mm	4mm	0mm
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON

Table 7: Top edge trigger, 3mm steps

Top Edge Trigger - 3mm Steps													
0mm	4mm	7mm	10mm	13mm	16mm	19mm	22mm	25mm	28mm	31mm	34mm	37mm	40mm
ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Table 8: Top edge trigger, reversed process, 3mm steps

Top Edge Trigger - 1mm Steps														
20mm	19mm	18mm	17mm	16mm	15mm	14mm	13mm	12mm	11mm	10mm	9mm	8mm	7mm	6mm
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON

Table 9: Top edge trigger, 1mm steps

Top Edge Trigger - 1mm Steps														
6mm	7mm	8mm	9mm	10mm	11mm	12mm	13mm	14mm	15mm	16mm	17mm	18mm	19mm	20mm
ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Table 10: Top edge trigger, reversed process, 1mm steps

Power Reduction by Activation of Proximity Sensor [dB]					
Band	Top Edge	Left Edge	Right Edge	Bottom Edge	Back Side
GPRS 850 (3TX)	7.0	0.0	0.0	0.0	7.0
GPRS 1900 (3TX)	6.0	0.0	0.0	0.0	6.0
FDD 5	4.9	0.0	0.0	0.0	4.9
FDD 4	5.1	0.0	0.0	0.0	5.1
FDD 2	6.9	0.0	0.0	0.0	6.9
WLAN	Power reduction is not applicable for WLAN				

Table 11: Maximum power reduction applied by activation of prosimity sensor.

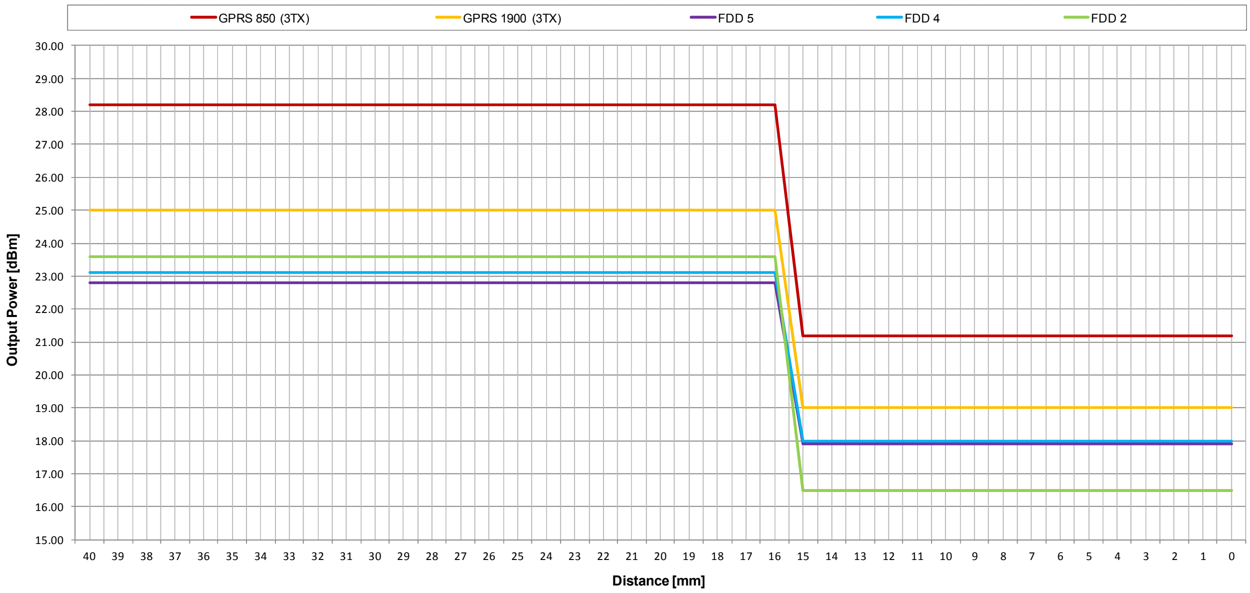


Fig. 3: Proximity sensor detection for back side.

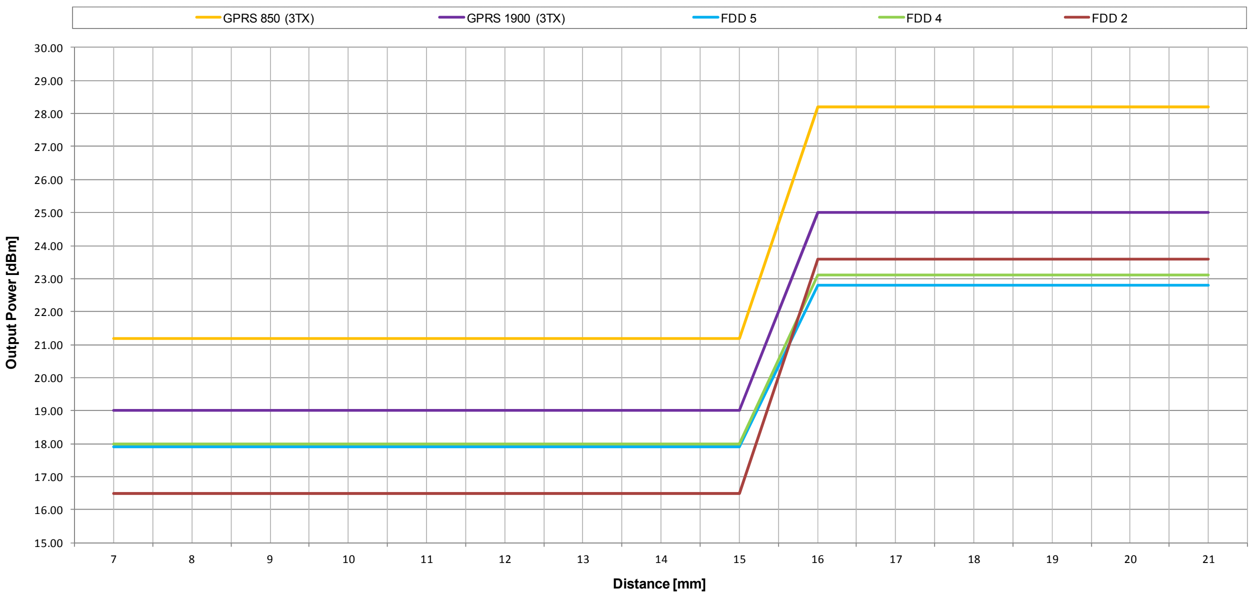


Fig. 4: Proximity sensor detection for back side, reversed process, 1mm steps.

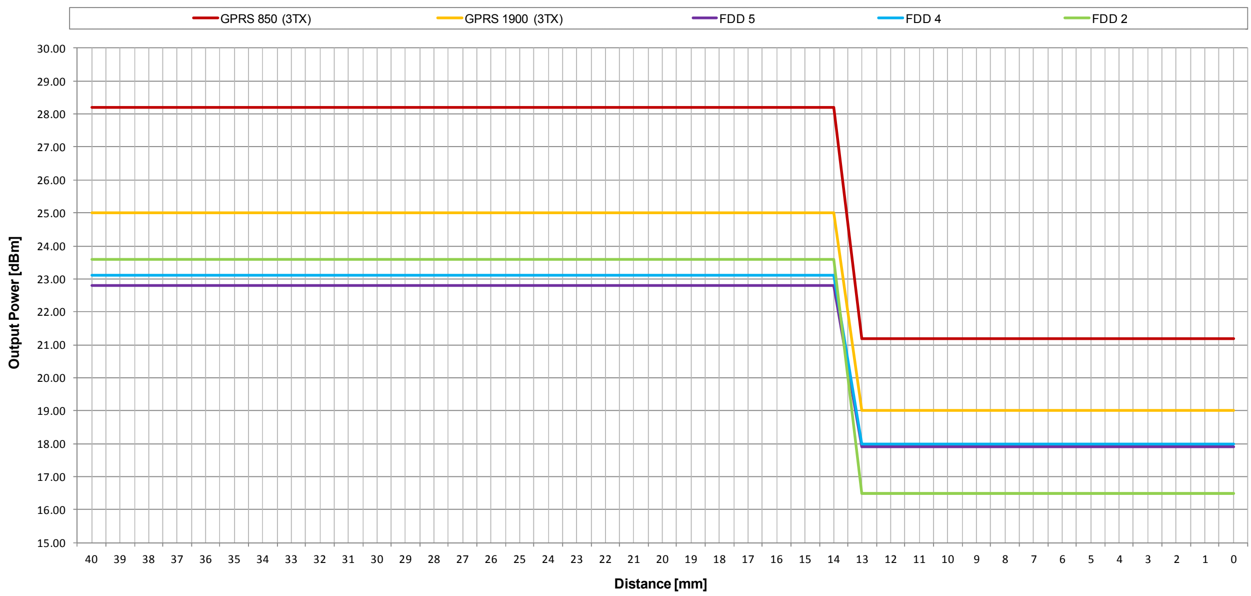


Fig. 5: Proximity sensor detection for top edge.

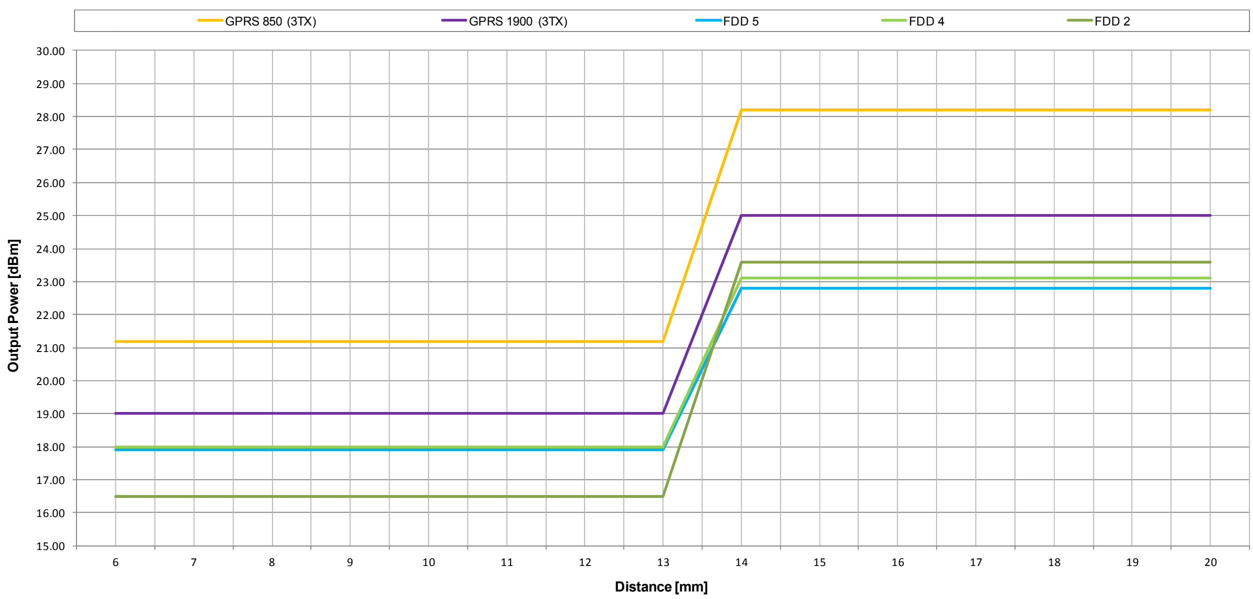


Fig. 6: Proximity sensor detection for top edge, reversed process, 1mm steps.

Since the capacitive proximity sensor activation distance for the back side is 15 mm, a conservative distance of 14 mm was used for SAR test on the back side, at maximum power. Since the capacitive proximity sensor activation distance for the upper edge is 13 mm, a conservative distance of 12 mm was used for SAR test on the upper edge, at maximum power. It is assured that the device can be tilted at least ±45° along the top edge at 13 mm distance without switching to full output power.

2.8 Phantom Requirements

For body-worn and other configurations a flat phantom shall be used which is comprised of material with electrical properties similar to the corresponding tissues.

2.9 Test to be Performed

For devices with retractable antenna the SAR test shall be performed with the antenna fully extended and fully retracted. Other factors that may affect the exposure shall also be tested. For example, optional antennas or optional battery packs which may significantly change the volume, lengths, flip open/closed, etc. of the device, or any other accessories which might have the potential to considerably increase the peak spatial-average SAR value.

The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at the middle channel resp. that channel with the highest output power for each test configuration is < 0.4 W/kg, testing at the high and low channels is optional.

2.10 Additional Information for 802.11 a/b/g Transmitters

In May 2007 the FCC published the revised issue of the SAR Measurement Procedures for 802 a/b/g transmitters to support the SAR measurements for demonstrating compliance with the FCC RF exposure guidelines. Additional information were required to establish specific device operating configurations to use during the measurements since the specific signal modulations, data rates, network conditions and other parameters were not considered within the current SAR measurement procedures (FCC, IEEE-1528).

Following the most important differences compared to the common SAR measurements of e.g. mobile phones working in the GSM or PCS standards were listed:

- Using of chipset based test mode software to ensure consistent and reliable results
- If the device supports switched diversity, the SAR should be measured with only one antenna transmitting (with fixed modulation and data rate) at a time
- The SAR is measured for the “default test channels” listed below as given by the FCC
- SAR measurements for 802.11 g channels when the maximum avg output power is less than ≥ 0.25 dB higher than the values for the corresponding 802.11b channels
- The avg. output power for 802.11a should be measured on all channels in each frequency band
- If the channel with the maximum avg. output power is not included in the default test channels, this channel should be tested instead of an adjacent default test channel
- For multiple channel bandwidth configurations, the configuration with the highest output power limit should be tested.
- Each channel should be tested at the lowest data rate in each a/b/g mode
- When the extrapolated maximum peak SAR for the maximum output channel is ≤ 1.6 W/kg and the 1g avg SAR is ≤ 0.8 W/kg, testing of other channels in the default test channel configuration is optional.

- If the device supports MIMO capability and the antennas are in close proximity to each other (within 3 cm – 5 cm), it is necessary to summarize the SAR_{1g} values of the antennas.
- If the peak SAR locations from different antennas are more than 5 cm apart, spatial summing is optional.
- Each channel should be tested at the lowest data rate in each a-b/g mode.

Mode 802.11		Frequency [MHz]	Channel	Turbo Channel	Default Test Channels			
					§ 15.247		UNII	
					b	g		
b / g		2412	1°		x	^		
		2437	6	6	x	^		
		2462	11°		x	^		
a	UNII	5180	36				x	
		5200	40	42 (5.21 GHz)				*
		5220	44					*
		5240	48	50 (5.29 GHz)			x	
		5260	52				x	
		5280	56	58 (5.29 GHz)				*
		5300	60					*
		5320	64				x	
		5500	100	Unknown				*
		5520	104				x	
		5540	108					*
		5560	112					*
		5580	116				x	
		5600	120					*
		5620	124				x	
		5640	128					*
		5660	132					*
		5680	136				x	
		5700	140					*
	UNII or §15.247	5745	149		x		x	
		5765	153	152 (5.76 GHz)		*		*
		5785	157		x			*
		5805	161	160 (5.80 GHz)		*	x	
	§15.247	5825	165		x			

Table 12: Default Test channels given by the FCC.

X: default test channels

*: possible 802.11a channels with maximum avg output > the default test channels

^: possible 802.11g channels with maximum avg output ¼ dB ≥ the default test channels

°: when output power is reduced for channel 1 and / or 11 to meet restricted band requirements the highest output channels closet to each of these channels should be tested

2.10.1 Measurement Variability

According KDB 865664 repeated measurements are required only when the measured SAR is ≥ 0.80 W/kg. If the measured SAR value of the initial repeated measurement is < 1.45 W/kg with ≤ 20% variation, only one repeated measurement is required to reaffirm that the results are not expected to have substantial variations, which may introduce significant compliance concerns. A second repeated measurement is required only if the measured result for the initial repeated measurement is within 10% of the SAR limit and vary by more than 20%, which are often related to device and measurement setup difficulties. The following procedures are applied to determine if repeated measurements are required.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

3 The Measurement System

DASY is an abbreviation of „Dosimetric Assessment System“ and describes a system that is able to determine the SAR distribution inside a phantom of a human being according to different standards. The DASY4 system consists of the following items as shown in Fig: 7. Additional Fig: 8 show the equipment, similar to the installations in other laboratories.

- Fully compliant with all current measurement standards as stated in Fig. 16
- High precision robot with controller
- Measurement server (for surveillance of the robot operation and signal filtering)
- Data acquisition electronics DAE (for signal amplification and filtering)
- Field probes calibrated for use in liquids
- Electro-optical converter EOC (conversion from the optical into a digital signal)
- Light beam (improving of the absolute probe positioning accuracy)
- Two SAM phantoms filled with tissue simulating liquid
- DASY4 software
- SEMCAD

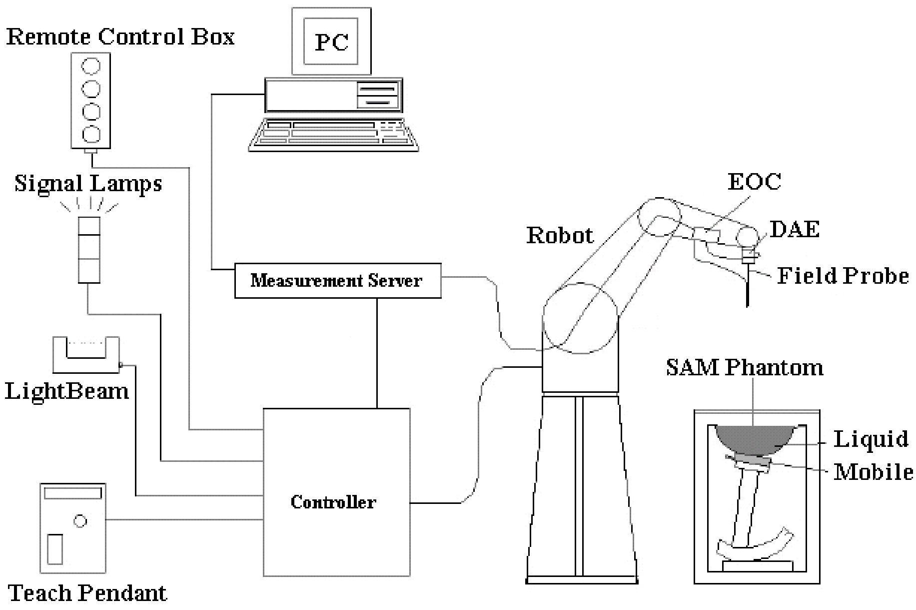


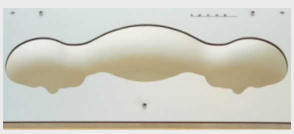
Fig. 7: The DASY4 measurement system.

Fig. 8: The measurement set-up with two SAM phantoms containing tissue simulating liquid.

The mobile phone operating at the maximum power level is placed by a non metallic device holder (delivered from Schmid & Partner) in the above described positions at a shell phantom of a human being. The distribution of the electric field strength E is measured in the tissue simulating liquid within the shell phantom. For this miniaturised field probes with high sensitivity and low field disturbance are used. Afterwards the corresponding SAR values are calculated with the known electrical conductivity σ and the mass density ρ of the tissue in the SEMCAD FDTD software. The software is able to determine the averaged SAR values (averaging region 1 g or 10 g) for compliance testing.

The measurements are done by two scans: first a coarse scan determines the region of the maximum SAR, afterwards the averaged SAR is measured in a second scan within the shape of a cube. The measurement time takes about 20 minutes.

3.1 Phantoms

TWIN SAM PHANTOM V4.0	
	Specific Anthropomorphic Mannequin defined in IEEE 1528 and IEC 62209-1 and delivered by Schmid & Partner Engineering AG. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. The details and the Certificate of conformity can be found in Fig. 17.
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions	Length: 1000 mm; Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters

3.2 E-Field-Probes

For the measurements the Dosimetric E-Field Probes ET3DV6R or EX3DV4 with following specifications are used. They are manufactured and calibrated in accordance with KDB 865664 and IEEE [IEEE 1528-2003] recommendations annually by Schmid & Partner Engineering AG.

ET3DV6R	
Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system (ET3DV6 only) Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Dimensions	Overall length: 337 mm (Tip: 16 mm) Tip diameter: 6.8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.7 mm
Frequency	10 MHz to 2.3 GHz Linearity: ± 0.2 dB (30 MHz to 2.3 GHz)
Directivity	Axial isotropy: ± 0.2 dB in TSL (rotation around probe axis) Spherical isotropy: ± 0.4 dB in TSL (rotation normal to probe axis)
Dynamic Range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Calibration Range	450 MHz / 750 MHz / 900 MHz / 1750 MHz / 1900 MHz / 1950 MHz for head and body simulating liquid

EX3DV4	
Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	Axial isotropy: ± 0.3 dB in TSL (rotation around probe axis) Spherical isotropy: ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Calibration Range	1950 MHz / 2450 MHz / 2600 MHz / 3500 MHz / 5200 MHz / 5300 MHz / 5600 MHz / 5800 MHz for head and body simulating liquid

3.3 Measurement Procedure

The following steps are used for each test position:

- Establish a call with the maximum output power with a base station simulator or by software. The connection between the mobile phone and the base station simulator is established via air interface.
- Measurement of the local E-field value at a fixed location (P1). This value serves as a reference value for calculating a possible power drift.
- Measurement of the SAR distribution with resolution settings for area scan and zoom scan according KDB 865664 D01 as shown in Table 13.
- The used extrapolation and interpolation routines are all based on the modified Quadratic Shepard´s method [DASY4].
- Repetition of the E-field measurement at the fixed location (P1) and repetition of the whole procedure if the two results differ by more than ± 0.21dB.

<table>
<tr><th colspan="3"></th><th>≤ 3 GHz</th><th>≥ 3 GHz</th></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 - 3 GHz: ≤ 12 mm</td><td>3 - 4 GHz: ≤ 12 mm
4 - 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: ΔX_{Zoom}, ΔY_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 - 3 GHz: ≤ 5 mm*</td><td>3 - 4 GHz: ≤ 5 mm*
4 - 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">Uniform grid: $\Delta Z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 - 4 GHz: ≤ 4 mm
4 - 5 GHz: ≤ 3 mm
5 - 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta Z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 - 4 GHz: ≤ 3 mm
4 - 5 GHz: ≤ 2.5 mm
5 - 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta Z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5· $\Delta Z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 - 4 GHz: ≥ 28 mm
4 - 5 GHz: ≥ 25 mm
5 - 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium: see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the reported SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz</td></tr>
</table>

Table 13: Parameters for SAR scan procedures.

Dasy_Report_FCC_DECT_1900_1.1.doc/28.11.2013/AvB

3.4 Uncertainty Assessment

Table *15* includes the worst case uncertainty budget suggested by the IEEE 1528 [IEEE 1528-2003] and determined by Schmid & Partner Engineering AG. The expanded uncertainty (K=2) is assessed to be ± 21.7% and is valid up to 3.0 GHz.

Uncertainty Budget of DASY4 up to 3 GHz						
Error Sources	**Uncertainty Value**	**Probability Distribution**	**Divisor**	**c_i**	**Standard Uncertainty**	**v_i^2 or v_{eff}**
Measurement System						
Probe calibration	± 5.9 %	Normal	1	1	± 5.9 %	∞
Axial isotropy	± 4.7 %	Rectangular	√3	0.7	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√3	0.7	± 3.9 %	∞
Boundary effects	± 1.0 %	Rectangular	√3	1	± 0.6 %	∞
Linearity	± 4.7 %	Rectangular	√3	1	± 2.7 %	∞
System detection limit	± 1.0 %	Rectangular	√3	1	± 0.6 %	∞
Readout electronics	± 1.0 %	Normal	1	1	± 1.0 %	∞
Response time	± 0.8 %	Rectangular	√3	1	± 0.5 %	∞
Integration time	± 2.6%	Rectangular	√3	1	± 1.5 %	∞
RF ambient conditions	± 3.0 %	Rectangular	√3	1	± 1.7 %	∞
Probe positioner	± 0.4 %	Rectangular	√3	1	± 0.2 %	∞
Probe positioning	± 2.9 %	Rectangular	√3	1	± 1.7 %	∞
Algorithm for max SAR eval.	± 1.0 %	Rectangular	√3	1	± 0.6 %	∞
Test Sample Related						
Device positioning	± 2.9 %	Normal	1	1	± 2.9 %	145
Device holder	± 3.6 %	Normal	1	1	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√3	1	± 2.9 %	∞
Phantom and Set-up						
Phantom uncertainty	± 4.0 %	Rectangular	√3	1	± 2.3 %	∞
Liquid conductivity (target)	± 5.0 %	Rectangular	√3	0.64	± 1.8 %	∞
Liquid conductivity (meas.)	± 2.5 %	Normal	1	0.64	± 1.6 %	∞
Liquid permittivity (target)	± 5.0 %	Rectangular	√3	0.6	± 1.7 %	∞
Liquid permittivity (meas.)	± 2.5 %	Normal	1	0.6	± 1.5 %	∞
Combined Uncertainty					**± 10.8 %**	

Table 14: Uncertainty budget of DASY4 up to 3 GHz.

Table 14 includes the worst case uncertainty budget determined by Schmid & Partner Engineering AG for the frequency range up to 6 GHz. The expanded uncertainty (K=2) is assessed to be ± 25.9 %.

Uncertainty Budget of DASY4 up to 6 GHz						
Error Sources	**Uncertainty Value**	**Probability Distribution**	**Divisor**	c_i	**Standard Uncertainty**	v_i^2 **or** v_{eff}
Measurement Equipment						
Calibration	± 6.8 %	Normal	1	1	± 6.8 %	∞
Axial Isotropy	± 4.7 %	Rectangular	√3	0.7	± 1.9 %	∞
Hemispherical Isotropy	± 9.6 %	Rectangular	√3	0.7	± 3.9 %	∞
Linearity	± 4.7 %	Rectangular	√3	1	± 2.7 %	∞
Detection limits	± 1.0 %	Rectangular	√3	1	± 0.6 %	∞
Boundary effects	± 2.0 %	Rectangular	√3	1	± 1.2 %	∞
Readout Electronics	± 0.3 %	Normal	1	1	± 0.3 %	∞
Response time	± 0.8 %	Rectangular	√3	1	± 0.5 %	∞
RF Ambient Noise	± 3.0 %	Rectangular	√3	1	± 1.7 %	∞
RF Ambient Reflections	± 3.0 %	Rectangular	√3	1	± 1.7 %	∞
Integration time	± 2.6 %	Rectangular	√3	1	± 1.5 %	∞
Probe Positioner	± 0.8 %	Rectangular	√3	1	± 0.5 %	∞
Probe Positioning	± 9.9 %	Rectangular	√3	1	± 5.7 %	∞
Max SAR Eavaluation	± 4.0%	Rectangular	√3	1	± 2.3 %	∞
Mechanical Constraints						
Positioning of the phone	± 2.9 %	Normal	1	1	± 2.9 %	∞
Device Holder	± 3.6 %	Normal	1	1	± 3.6 %	∞
Power Drift	± 5.0 %	Rectangular	√3	1	± 2.9 %	∞
Physical Parameters						
Phantom Uncertainty	± 4.0 %	Rectangular	√3	1	± 2.3 %	∞
Liquid conductivity (target)	± 5.0 %	Rectangular	√3	0.64	± 1.8 %	∞
Liquid conductivity (meas.)	± 2.5 %	Normal	1	0.64	± 1.6 %	∞
Liquid permittivity (target)	± 5.0 %	Rectangular	√3	0.60	± 1.7 %	∞
Liquid permittivity (meas.)	± 2.5 %	Normal	1	0.60	± 1.5 %	∞
Combined Uncertainty					**± 12.9 %**	

Table 15: Uncertainty budget of DASY4 up to 6 GHz.

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4 Output Power Values

4.1 Output Power Values for GPRS/EDGE

This device supports GPRS/EDGE Multislot class 12 and it is a class B device without DTM support. The device does not support voice mode. According the following tables, GPRS 850/1900 with 3 TX represent the worst case, therefore measurements with three active time slots are conducted for GPRS 850/1900.

Averaged Output Power per Slot [dBm]						
Band	Freq. [MHz]	CH	GPRS (GMSK /CS1)			
			1TX	2 TX	3 TX	4 TX
850	824.2	128	31.7	29.4	27.9	26.4
	836.6	190	31.9	29.6	28.2	26.5
	848.8	251	31.9	29.6	28.2	26.5
1900	1850.2	512	29.0	26.5	25.0	23.5
	1880.0	661	28.9	26.5	25.0	23.5
	1909.8	810	29.0	26.5	25.0	23.5

Table 16: Measured output power for GPRS for the used Inari8-3GAN-1 tablet from Aava Mobile Oy, proximity sensor OFF.

Averaged Output Power over 8 Slots [dBm]						
Band	Freq. [MHz]	CH	GPRS (GMSK /CS1)			
			1TX	2 TX	3 TX	4 TX
850	824.2	128	22.7	23.4	23.6	23.4
	836.6	190	22.9	23.6	23.9	23.5
	848.8	251	22.9	23.6	23.9	23.5
1900	1850.2	512	20.0	20.5	20.7	20.5
	1880.0	661	19.9	20.5	20.7	20.5
	1909.8	810	20.0	20.5	20.7	20.5

Table 17: Measured output power for GPRS averaged over 8 slots for the used Inari8-3GAN-1 tablet from Aava Mobile Oy, proximity sensor OFF.

Averaged Output Power per Slot [dBm]						
Band	Freq. [MHz]	CH	EDGE (GMSK / MCS1)			
			1TX	2 TX	3 TX	4 TX
850	824.2	128	31.9	29.4	27.9	26.4
	836.6	190	31.9	29.5	28.0	26.5
	848.8	251	31.9	29.5	28.0	26.5
1900	1850.2	512	29.0	26.5	25.0	23.5
	1880.0	661	29.0	26.5	24.9	23.4
	1909.8	810	29.0	26.5	25.0	23.5

Table 18: Measured output power for EDGE (GMSK) for the used Inari8-3GAN-1 tablet from Aava Mobile Oy, proximity sensor OFF

Averaged Output Power over 8 Slots [dBm]						
Band	Freq. [MHz]	CH	EDGE (GMSK / MCS1)			
			1TX	2 TX	3 TX	4 TX
850	824.2	128	22.9	23.4	23.6	23.4
	836.6	190	22.9	23.5	23.7	23.5
	848.8	251	22.9	23.5	23.7	23.5
1900	1850.2	512	20.0	20.5	20.7	20.5
	1880.0	661	20.0	20.5	20.6	20.4
	1909.8	810	20.0	20.5	20.7	20.5

Table 19: Measured output power for EDGE (GMSK) averaged over 8 slots for the used Inari8-3GAN-1 from Aava Mobile Oy, proximity sensor OFF.

Averaged Output Power over 8 Slots [dBm]						
Band	Freq. [MHz]	CH	EDGE (8-PSK / MCS5)			
			1TX	2 TX	3 TX	4 TX
850	824.2	128	17.3	18.3	18.8	18.7
	836.6	190	17.3	18.3	18.8	18.7
	848.8	251	17.3	18.3	18.8	18.7
1900	1850.2	512	16.6	17.9	18.0	17.8
	1880.0	661	16.5	17.9	18.0	17.7
	1909.8	810	16.5	17.9	18.0	17.8

Table 20: Measured output power for EDGE (8-PSK) averaged over 8 slots for the used Inari8-3GAN-1 tablet from Aava Mobile Oy, proximity sensor OFF.

4.2 Output Power Values for WCDMA (FDD)

For measurements in WCDMA, without HSDPA or HSUPA, the default test configuration is to establish a radio link between the DUT and a communication test set using a 12.2 kbps RMC configured Test Loop Mode 1 and TPC bits configured to all "1". The SAR will be tested for all bands using a Rel99 call configured to transmit at maximum output power per 3GPP 34.121 [3GPP 34.121]. The Rel99 parameters are summarized in Table 21.
WCDMA SAR was tested in RMC mode without HSPA. According KDB 941225 D01 HSPA SAR is not required when the averaged output power of the HSPA subtests are not higher than 0.25 dB then measured in RMC mode and the assessed SAR value in this mode is not higher than 1.2 W/kg.

Maximum Peak-Averaged Output Power [dBm]												
Band	Freq. [MHz]	CH	WCDMA RMC	HSDPA				HSUPA				
				Subt. 1	Subt. 2	Subt. 3	Subt. 4	Subt. 1	Subt. 2	Subt. 3	Subt. 4	Subt. 5
850 (FDD 5)	826.4	4132	26.6	26.5	25.3	24.9	24.6	24.7	26.0	24.4	26.5	24.5
	836.6	4183	26.2	26.1	25.1	24.7	24.3.	24.5	25.7	24.2	26.2	24.2
	846.6	4233	26.3	26.3	24.5	24.7	24.4	24.4	25.7	24.3	26.2	24.2
1750 (FDD 4)	1712.4	1312	24.9	24.4	22.7	23.1	21.6	22.8	23.9	22.6	24.4	23.3
	1732.6	1413	24.6	24.0	23.1	22.8	22.6	22.6	23.6	22.3	24.1	22.3
	1752.6	1513	24.5	24.1	23.0	22.8	22.4	22.4	23.6	22.2	24.0	22.2
1900 (FDD 2)	1852.4	9626	25.1	24.7	22.9	22.2	22.9	22.7	24.1	22.7	24.4	22.7
	1880.0	9400	25.4	24.9	23.9	23.7	23.4	23.2	24.5	23.1	24.9	23.0
	1907.6	9538	24.6	24.2	23.2	22.9	22.5	22.7	23.7	22.4	24.2	22.3
βc				2/15	12/15	15/15	15/15	11/15	6/15	15/15	2/15	15/15
βd				15/15	15/15	8/15	4/15	15/15	15/15	9/15	15/15	15/15
ΔACK. ΔNACK. ΔCQI				8	8	8	8	8	8	8	8	8

Table 21: According TS 34.121 table C10.1.4 measured max. peak averaged output power for WCMDA for the used Inari8-3GAN-1 tablet from Aava Mobile Oy, proximity sensor OFF.

RMS Output Power [dBm]			
Band	Freq. [MHz]	CH	WCDMA RMC
850 (FDD 5)	826.4	4132	22.7
	836.6	4183	22.8
	846.6	4233	22.7
1750 (FDD 4)	1712.4	1312	23.1
	1732.6	1413	23.1
	1752.6	1513	23.0
1900 (FDD 2)	1852.4	9626	23.3
	1880.0	9400	23.6
	1907.6	9538	22.9

Table 22: Measured RMS output power for WCMDA for the used Inari8-3GAN-1 tablet from Aava Mobile Oy, proximity sensor OFF.

4.3 Power Reduction for GPRS and WCDMA (proximity sensor ON)

This Inari8-3GAN-1 tablet uses two proximity sensors for SAR reduction in 2G and 3G mode. The capacitive proximity sensors are activated when used in close proximity to the user´s body, as shown in Table 3 - 10.

Reduced Averaged Output Power per Slot [dBm]						
Band	Freq. [MHz]	CH	GPRS (GMSK /CS1)			
			1TX	2 TX	3 TX	4 TX
850	824.2	128	25.9	22.9	20.9	19.8
	836.6	190	26.1	23.2	21.2	20.0
	848.8	251	26.2	23.2	21.3	20.1
1900	1850.2	512	24.0	21.1	19.1	18.1
	1880.0	661	23.8	21.0	19.0	18.0
	1909.8	810	24.0	21.2	19.1	18.0

Table 23: Measured output power for the used Inari8-3GAN-1 tablet from Aava Mobile Oy, proximity sensor ON.

Reduced RMS Output Power [dBm]			
Band	Freq. [MHz]	CH	WCDMA RMC
850 (FDD 5)	826.4	4132	17.8
	836.6	4183	17.9
	846.6	4233	17.8
1750 (FDD 4)	1712.4	1312	18.1
	1732.6	1413	18.0
	1752.6	1513	17.9
1900 (FDD 2)	1852.4	9626	16.4
	1880.0	9400	16.5
	1907.6	9538	16.0

Table 24: Measured RMS output power for WCMDA for the used Inari8-3GAN-1 tablet from Aava Mobile Oy, proximity sensor ON.

4.4 Output Power Values for IEEE802.11 a/b/g/n MAIN Antenna

Averaged Output Power IEEE 802.11 b [dBm]						
Mode	Freq. [MHz]	CH	Data Rate [Mbit/s]			
			1	2	5.5	11
b	2412	1	11.8	12.0	11.0	11.3
	2437	6	12.4	12.6	11.4	11.7
	2462	11	12.4	12.8	11.7	11.7

Table 25: Measured output power for b-mode for Inari8-3GAN-1 tablet from Aava Mobile Oy.

Averaged Output Power IEEE 802.11 g [dBm]										
Mode	Freq. [MHz]	CH	Data Rate [Mbit/s]							
			6	9	12	18	24	36	48	54
g	2412	1	11.1	11.2	11.3	11.3	11.1	11.4	11.2	11.3
	2437	6	11.4	11.5	11.5	11.8	11.5	11.6	11.6	11.5
	2462	11	11.5	11.6	11.5	11.8	11.6	11.7	11.8	11.8

Table 26: Measured output power for g-mode for Inari8-3GAN-1 tablet from Aava Mobile Oy.

Averaged Output Power IEEE 802.11 n [dBm]										
Mode	Freq. [MHz]	CH	MCS Index No.							
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
n HT20	2412	1	11.0	11.0	11.1	11.1	11.1	11.2	11.2	11
	2437	6	11.4	11.4	11.5	11.4	11.6	11.5	11.5	11.5
	2462	11	11.5	11.5	11.6	11.7	11.6	11.7	11.7	11.7
n HT40	2412	1	10.6	10.6	10.6	10.5	10.6	10.6	10.6	10.3
	2437	6	10.7	10.8	10.8	10.8	11.0	10.9	10.8	10.5
	2462	11	10.9	10.9	10.9	11.1	11.0	11.1	11.1	10.5

Table 27: Measured output power for n-mode for Inari8-3GAN-1 tablet from Aava Mobile Oy.

Averaged Output Power IEEE 802.11 a [dBm]										
Mode	Freq. [MHz]	CH	Data Rate [Mbit/s]							
			6	9	12	18	24	36	48	54
a	5180	36	11.9	11.6	11.7	11.8	11.9	11.9	12.0	12.0
	5200	40	11.8	11.8	11.8	11.7	11.8	11.9	12.0	11.9
	5220	44	11.9	12.0	12.0	12.1	12.1	12.0	11.9	12.0
	5240	48	11.8	11.9	12.0	11.9	12	12.1	12.1	12.0
	5260	52	11.6	11.8	11.8	11.9	11.8	11.9	12.0	12.0
	5280	56	11.7	11.9	11.8	11.8	11.8	11.9	12	11.9
	5300	60	11.8	11.9	11.9	11.9	11.9	12.0	12.0	12.1
	5320	64	11.6	12.0	11.9	12.0	11.9	11.8	12.1	12.1
	5500	100	11.1	11.1	11.2	11.2	11.3	11.2	11.4	11.4
	5520	104	11.2	11.1	11.1	11.2	11.2	11.2	11.3	11.3
	5540	108	11.0	11.1	11.2	11.2	11.2	11.3	11.3	11.3
	5560	112	10.9	11.1	11.1	11.1	11.2	11.1	11.2	11.3
	5580	116	10.9	11.0	11.0	10.9	10.9	11.0	11.1	11.1
	5600	120	10.8	10.7	10.7	10.8	10.8	10.8	10.8	10.9
	5620	124	10.7	10.7	10.7	10.8	10.8	10.8	10.7	10.9
	5640	128	10.9	10.8	10.9	10.9	10.8	10.9	11.0	10.9
	5660	132	10.7	10.8	10.8	10.8	10.8	10.8	10.9	10.9
	5680	136	10.6	10.6	10.7	10.7	10.8	10.7	10.7	10.8
	5700	140	10.8	10.8	10.9	10.9	10.9	10.9	11.0	11.0
	5745	149	10.6	10.6	10.7	10.7	10.9	10.7	10.8	10.8
	5765	153	10.5	10.6	10.7	10.6	10.6	10.7	10.6	10.7
	5785	157	10.4	10.2	10.1	10.3	10.3	10.4	10.3	10.4
	5805	161	10.3	10.4	10.5	10.5	10.4	10.4	10.5	10.4
	5825	165	10.3	10.3	10.4	10.3	10.3	10.4	10.4	10.4

Table 28: Measured output power for a-mode for Inari8-3GAN-1 tablet from Aava Mobile Oy.

Averaged Output Power IEEE 802.11 n [dBm]										
Mode	Freq. [MHz]	CH	MCS Index No.							
			MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
n HT20	5180	36	7.7	8	7.9	7.9	7.8	7.9	7.9	7.8
	5200	40	7.8	8	7.9	7.8	7.8	7.9	7.8	7.7
	5220	44	7.7	7.9	7.9	7.8	7.8	7.8	7.8	7.8
	5240	48	7.8	7.9	7.7	7.7	7.7	7.8	7.8	7.6
	5260	52	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
	5280	56	7.7	7.9	7.7	7.6	7.8	7.9	7.9	7.7
	5300	60	7.6	7.8	7.7	7.6	7.7	7.7	7.6	7.5
	5320	64	7.6	7.6	7.6	7.5	7.6	7.6	7.6	7.5
	5500	100	7.5	7.8	7.7	7.6	7.7	7.7	7.6	7.6
	5520	104	7.3	7.5	7.5	7.3	7.4	7.4	7.4	7.3
	5540	108	7.2	7.4	7.3	7.3	7.3	7.3	7.3	7.1
	5560	112	7.3	7.6	7.5	7.5	7.4	7.5	7.4	7.5
	5580	116	7.5	7.6	7.6	7.5	7.5	7.6	7.5	7.5
	5600	120	7.5	7.3	7.2	7.2	7.2	7.2	7.3	7.1
	5620	124	7.4	7.3	7.2	7.2	7.1	7.3	7.3	7.1
	5640	128	7.2	7.4	7.4	7.3	7.3	7.3	7.3	7.1
	5660	132	7.2	7.4	7.4	7.3	7.3	7.4	7.3	7.3
	5680	136	7.1	7.3	7.4	7.3	7.3	7.3	7.2	7.2
	5700	140	7.1	7.3	7.2	7.1	7.2	7.3	7.2	7.1
	5745	149	7.0	7.0	7.0	6.9	7.0	7.0	6.9	7.0
	5765	153	6.9	6.9	6.9	6.9	6.9	6.9	7.0	6.9
	5785	157	7.0	7.0	6.9	6.8	6.8	6.9	6.9	6.7
	5805	161	6.9	6.9	6.8	6.8	6.9	6.7	6.8	6.7
	5825	165	6.8	6.8	6.8	6.7	6.8	6.9	6.8	6.7
n HT40	5190	36	7.5	7.5	7.6	7.5	7.7	7.9	7.9	8.0
	5230	44	7.6	7.4	7.6	7.5	7.7	7.8	7.7	8.0
	5270	52	7.6	7.6	7.7	7.5	7.7	7.9	7.7	8.0
	5310	60	7.4	7.3	7.5	7.4	7.6	7.7	7.6	7.9
	5510	100	6.8	6.7	6.9	6.7	6.9	7.1	7.0	7.3
	5550	108	6.7	6.7	6.8	6.7	6.8	6.9	6.9	7.0
	5590	116	6.8	6.7	6.8	6.6	6.7	7.0	6.9	7.2
	5630	124	6.7	6.5	6.6	6.5	6.6	7.0	6.9	7.0
	5670	132	6.4	6.6	6.6	6.5	6.6	6.8	6.6	6.9
	5755	149	6.3	6.2	6.4	6.3	6.4	6.6	6.5	6.8
	5795	157	6.0	5.9	6.0	6.0	6.1	6.4	6.3	6.5

Table 29: Measured output power for n-mode (5 GHz) for Inari8-3GAN-1 tablet from Aava Mobile Oy.

4.5 Output Power Values for IEEE802.11 n MAIN and AUX Antenna

Only in n-mode (HT 40, MCS 8 – 15) the MAIN and AUX antenna are both active at the same time. Although the output power of each single antenna in this mode is lower than in any a – mode, the simultaneously transmission in this n – mode needs to be considered for SAR testing. Therefore the MAIN and AUX antenna were assessed in MCS 8, which represent the lowest data rate for simultaneous transmission of MAIN and AUX antenna.

Averaged Output Power IEEE 802.11 n HT40 [dBm]				
Mode	Freq. [MHz]	CH	MCS 8	
			MAIN Antenna	AUX Antenna
2.4 GHz HT 40	2412	1	10.7	9.9
	2437	6	10.8	10.2
	2462	11	11.3	10.4
5 GHz HT40	5190	36	7.2	7.7
	5230	44	7.3	7.8
	5270	52	7.2	7.7
	5310	60	7.2	7.7
	5510	100	6.6	7.9
	5550	108	6.6	8.0
	5590	116	6.5	7.8
	5630	124	6.4	7.8
	5670	132	6.4	7.8
	5755	149	5.9	6.8
	5795	157	6.0	6.9

Table 30: Measured output power for n-mode 2.4 and 5 GHz range (HT40, MCS 8) for MAIN and AUX antennas of Inari8-3GAN-1 tablet from Aava Mobile Oy.

4.6 Output Power Values for Bluetooth

Averaged Output Power for Bluetooth [dBm]					
Mode	Freq. [MHz]	CH	BDR	EDR2	EDR3
BT	2402	0	9.5	8.6	9.2
	2440	39	9.5	8.5	8.9
	2480	78	9.6	8.4	8.9

Table 31: Measured output power for Bluetooth for Inari8-3GAN-1 tablet from Aava Mobile Oy.

4.7 Tune-Up Information

Tune-up procedure according KDB 447498 D01v05r02 is applicable. The measured SAR values are scaled according the tune-up information given by the manufacturer, shown below.

Tune-Up Information for WWAN Antenna [dBm]							
Antenna	Band	Freq. [MHz]	CH	Proximity Sensor OFF		Proximity Sensor ON	
				Output Power	Tune-Up Limit	Output Power	Tune-Up Limit
WWAN	850 (3 TX)	824.2	128	27.9	29.5	20.9	22.0
		836.6	190	28.2		21.2	
		848.8	251	28.2		21.3	
	1900 (3TX)	1850.2	512	25.0	26.5	19.1	20.0
		1880.0	661	25.0		19.0	
		1909.8	810	25.0		19.1	
	850 (FDD 5)	826.4	4132	22.7	24.5	17.8	18.0
		836.6	4183	22.8		17.9	
		846.6	4233	22.7		17.8	
	1750 (FDD 4)	1712.4	1312	23.1	24.5	18.1	18.5
		1732.6	1413	23.1		18.0	
		1752.6	1513	23.0		17.9	
	1900 (FDD 2)	1852.4	9626	23.3	24.5	16.4	16.5
		1880.0	9400	23.6		16.5	
		1907.6	9538	22.9		16.0	

Table 32: Measured output power and tune-up information for WWAN antenna of Inari8-3GAN-1 tablet from Aava Mobile Oy, proximity sensor OFF and ON.

Tune-Up Information for WLAN Antennas [dBm]					
Antenna	**Band**	**Freq. [MHz]**	**CH**	**Output Power**	**Tune-Up Limit**
WLAN MAIN	802.11 b (2 MBit/s)	2412	1	12.0	13.0
		2437	6	12.6	13.0
		2462	11	12.8	13.0
	802.11 n HT40, MCS8	2412	1	10.7	11.5
		2437	6	10.8	11.5
		2462	11	11.3	11.5
	802.11 a	5180-5320	36 - 64	11.6 – 11.9	12.0
		5500-5700	100-140	10.7 – 11.2	11.5
		5745-5825	149-165	10.3 – 10.6	11.0
	802.11 n HT40, MCS8	5190-5310	36 - 60	7.2 – 7.3	9.0
		5510-5670	100-132	6.4 – 6.6	8.0
		5755-5795	149-157	5.9 – 6.0	7.5
WLAN AUX	802.11 n HT40, MCS8	2412	1	9.9	11.5
		2437	6	10.2	11.5
		2462	11	10.4	11.5
		5190-5310	36 - 60	7.7 – 7.8	9.0
		5510-5670	100-132	7.8 – 8.0	8.0
		5755-5795	149-157	6.8 – 6.9	7.5

Table 33: Measured output power and tune-up information for WLAN antennas (MAIN and AUX) of Inari8-3GAN-1 tablet from Aava Mobile Oy.

4.8 SAR Test Exclusion Consideration according KDB 447498

SAR Test Exclusion												
Pos.	**Mode**	**GPRS 850**	**GPRS 1900**	**FDD 2**	**FDD 4**	**FDD 5**	**IEEE 802.11 b**	**802.11n (2 GHz) (HT40, MCS 8)**		**IEEE 802.11 a**	**802.11n (5 GHz) (HT40, MCS 8)**	
								MAIN	**AUX**		**MAIN**	**AUX**
	Pmax [dBm]	23.9	20.7	23.6	23.10	22.8	12.8	11.3	10.4	11.9	7.3	8.0
	Pmax [mW]	245.5	117.5	229.1	204.2	190.6	19.1	13.5	11.0	15.5	5.4	6.3
TOP	Antenna to user [mm]	5					19		101	19		101
	SAR excl. threshold	44.9	32.2	62.8	53.4	34.6	1.57	1.1	605.6	1.9	0.6	573.7
	SAR testing required?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**	**No**	**No**	**No**
LEFT	Antenna to user [mm]	42.0					225.0					
	SAR excl. threshold	5.4	3.8	7.5	6.4	4.1	1846	1846	1846	1816	1816	1814
	SAR testing required?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**	**No**	**No**	**No**
RIGHT	Antenna to user [mm]	132.0					5.0					
	SAR excl. threshold	621.3	929.4	929.4	934.6	616.8	16.6	9.9	7.3	12.2	2.5	3.2
	SAR testing required?	**No**	**No**	**No**	**No**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**
BOTTOM	Antenna to user [mm]	145.0					120		38.0	120		38.0
	SAR excl. threshold	693.8	1059.4	1059.4	1199.2	688.4	0.2	0.2	0.5	0.3	0.1	0.4
	SAR testing required?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
BACK	Antenna to user [mm]	5.0										
	SAR excl. threshold	44.9	32.2	62.8	53.4	34.6	6.0	4.2	3.4	7.1	2.5	3.0
	SAR testing required?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**

Table 34: SAR test exclusion consideration for the applicable modes against different device edges.

Standalone SAR Test Exclusion Considerations for HOTSPOT Mode						
Communication System	**Freq. [MHz]**	**Distance [mm]**	**Pavg [dBm]**	**Pavg [mW]**	**Threshold 1g Comparsion Values**	**SAR Test Exclusion (Yes/No)**
Bluetooth	2480	5	9.60	9.12	2.87	Yes

Table 35: SAR test exclusion for Bluetooth.

The above table shows the SAR test exclusion consideration for the applicable modes against the different device edges with the relevant distances.

The 1g and 10g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50mm are determined by :

[(max power of channel. incl. tune-up tolerance. mW)/(min test separation distance. mm)] [√f(GHz)]*

≤ 3.0 for 1g SAR and ≤ 7.5 for 10g extremity SAR

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

At 100 MHz to 6GHz and a test separation distance of > 50 mm. the SAR test exclusion threshold is determined according to the following. and illustrated in Appendix B of KDB 447498 D01:

- [(Power allowed at numeric threshold for 50 mm)+(test separation distance – 50mm)*(f(MHz)/150] mW . at 100 MHz to 1500 MHz
- [(Power allowed at numeric threshold for 50 mm)+(test separation distance – 50mm)* 10] mW . at 1500 MHz to 6 GHz

5 SAR Results

Since the device is a full tablet size, the Body SAR was evaluated according KDB 616217 D04 for full sized tablets. The tables below contain the measured SAR values averaged over a mass of 1 g. SAR assessment was conducted in the worst case configuration with output power values according Table 16 - 31.

Per FCC KDB 616217 D04, this device was tested by the manufacturer to determine the proximity sensor triggering distance for the back side and the top edge of the device. The measured output power of the triggering points or until touching the phantom is included for back side and top edge in the tables with SAR results. To ensure all production units are compliant, it is necessary to test SAR at a distance 1mm less than the smallest distance from the device and SAR phantom, determined from these triggering tests according to KDB 616217 D04, with the device at maximum output power without power reduction. These additional SAR tests are included additionally to the SAR tests for the device touching the phantom, with reduced power.

Accordingly, SAR assessment for the back and left side in 2G and 3 G mode was conducted with reduced output power, as shown in Table 23 - 24.

Following KDB 447498 D01 V05, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.

Scaling Factor = tune-up limit power (mW) / RF power (mW)
Reported SAR = measured SAR * scaling factor

Furthermore. testing of other required channels within the operating mode of frequency band is not required when the reported SAR for the mid-band or highest output power channel is ≤ 0.4 W/kg for transmission band ≥ 200 MHz.

SAR Results for WWAN Antenna (GPRS Bands)												
Band	Freq. [MHz]	Channel	Test Position	Spacing [mm]	Figure No.	Tune-Up Limit [dBm]	Output Power [dBm]	Measured SAR_{1g} [W/kg]	Power Drift [dBm]	Scaling Factor	Reported SAR_{1g} [W/kg]	Plot No.
GPRS 850 (3TX)	836.6	190	back	14	21	29.5	28.2	0.226	-0.040	1.349	0.305	
GPRS 850 (3TX)	836.6	190	top	12	22	29.5	28.2	0.161	0.066	1.349	0.217	
GPRS 850 (3TX)	836.6	190	left	0	23	29.5	28.2	0.171	-0.086	1.349	0.231	
GPRS 850 (3TX)	836.6	190	back	0	24	22.0	21.2	0.488	-0.180	1.202	0.587	
GPRS 850 (3TX)	836.6	190	top	0	25	22.0	21.2	0.278	0.052	1.202	0.334	
GPRS 850 (3TX)	824.2	128	back	0	24	22.0	20.9	0.474	0.087	1.288	0.611	
GPRS 850 (3TX)	848.8	251	back	0	24	22.0	21.3	0.541	0.046	1.175	0.636	1
GPRS 1900 (3TX)	1880.0	661	back	14	21	26.5	25.0	0.430	0.126	1.413	0.607	
GPRS 1900 (3TX)	1880.0	661	top	12	22	26.5	25.0	0.502	-0.026	1.413	0.709	
GPRS 1900 (3TX)	1880.0	661	left	0	23	26.5	25.0	0.198	-0.011	1.413	0.280	
GPRS 1900 (3TX)	1880.0	661	back	0	24	20.0	19.0	0.592	0.168	1.259	0.745	2
GPRS 1900 (3TX)	1880.0	661	top	0	25	20.0	19.0	0.484	-0.106	1.259	0.609	
GPRS 1900 (3TX)	1850.2	512	back	0	24	20.0	19.1	0.599	0.199	1.230	0.737	
GPRS 1900 (3TX)	1909.8	810	back	0	24	20.0	19.1	0.495	0.022	1.230	0.609	

Table 36: SAR results for GPRS bands for Inari8-3GAN-1 tablet from Aava Mobile Oy.

SAR Results for WWAN Antenna (WCDMA Bands)												
Band	Freq. [MHz]	Channel	Test Position	Spacing [mm]	Figure No.	Tune-Up Limit [dBm]	Output Power [dBm]	Measured SAR_{1g} [W/kg]	Power Drift [dBm]	Scaling Factor	Reported SAR_{1g} [W/kg]	Plot No.
FDD 5 (RMC)	836.6	4183	back	14	21	24.5	22.8	0.365	-0.023	1.479	0.540	
			top	12	22		22.8	0.214	0.155	1.479	0.317	
			left	0	23		22.8	0.193	-0.140	1.479	0.285	
			back	0	24	18.0	17.9	0.856	0.100	1.023	0.876	
			top	0	25		17.9	0.439	-0.014	1.023	0.449	
	826.4	4132	back	0	24		17.8	0.906*	0.027	1.047	0.949	3
	846.8	4233	back	0	24		17.8	0.811	0.051	1.047	0.849	
	826.4	4132	* Variability test according KDB 865664					0.881	0.043	1.047	0.922	4
FDD 4 (RMC)	1732.6	1413	back	14	21	24.5	23.1	0.209	-0.058	1.380	0.289	
			top	12	22		23.1	0.314	-0.009	1.380	0.433	
			left	0	23		23.1	0.151	0.032	1.380	0.208	
			back	0	24	18.5	18.0	0.864	0.200	1.122	0.969	
			top	0	25		18.0	0.916	-0.047	1.122	1.028	
	1712.4	1312	back	0	24		18.1	0.905	-0.013	1.096	0.992	
	1752.6	1513	back	0	24		17.9	1.010	-0.034	1.148	1.160	5
	1712.4	1312	top	0	25		18.1	1.050*	-0.075	1.096	1.151	
	1752.6	1513	top	0	25		17.9	0.909	-0.081	1.148	1.044	
	1712.4	1312	* Variability test according KDB 865664					1.050	-0.076	1.096	1.151	6
FDD 2 (RMC)	1880.0	9400	back	14	21	24.5	23.6	0.729	0.051	1.230	0.897	
			top	12	22		23.6	1.040*	0.009	1.230	1.279	7
			left	0	23		23.6	0.386	-0.004	1.230	0.475	
			back	0	24	16.5	16.5	0.984	0.066	1.000	0.984	
			top	0	25		16.5	0.680	-0.118	1.000	0.680	
	1852.4	9262	back	0	24		16.4	0.902	-0.135	1.023	0.923	
	1907.6	9538	back	0	24		16.0	0.842	-0.035	1.122	0.945	
	1880.0	9400	* Variability test according KDB 865664					1.040	0.012	1.230	1.279	8

Table 37: SAR results for WCDMA bands for Inari8-3GAN-1 tablet from Aava Mobile Oy.

SAR Results for WLAN Antennas (2.4 GHz Range)													
Band	Antenna	Freq. [MHz]	Channel	Test Position	Spacing [mm]	Figure No.	Tune-Up Limit [dBm]	Output Power [dBm]	Measured SAR_{1g} [W/kg]	Power Drift [dBm]	Scaling Factor	Reported SAR_{1g} [W/kg]	Plot No.
IEEE 802.11b (2 Mbit/s)	MAIN	2437	6	back	0	26	13.0	12.6	0.422	0.179	1.096	0.463	
				right	0	28		12.6	0.295	-0.151	1.096	0.323	
		2412	1	back	0	26		12.0	0.344	0.083	1.259	0.433	
		2462	11	back	0	26		12.8	0.454	-0.027	1.047	0.475	9
IEEE 802.11n (HT40, MCS8)	MAIN	2437	6	back	0	26	11.5	10.8	0.344	-0.043	1.175	0.404	10
				right	0	28		10.8	0.240	-0.003	1.175	0.282	
	AUX	2437	6	back	0	27		10.2	0.212	-0.089	1.349	0.286	
				right	0	29		10.2	0.221	0.059	1.349	0.298	

Table 38: SAR results for IEEE 802.11 b/n (2.4 GHz) for Inari8-3GAN-1 tablet from Aava Mobile Oy.

SAR Results for WLAN Antennas (5.2 GHz Range)													
Band	Antenna	Freq. [MHz]	Channel	Test Position	Spacing [mm]	Figure No.	Tune-Up Limit [dBm]	Output Power [dBm]	Measured SAR_{1g} [W/kg]	Power Drift [dBm]	Scaling Factor	Reported SAR_{1g} [W/kg]	Plot No.
IEEE 802.11a (6 Mbit/s)	MAIN	5180	36	back	0	26	12.0	11.9	1.150	-0.122	1.023	1.177	
				right	0	28		11.9	1.240	0.143	1.023	1.269	
		5240	48	back	0	26		11.8	1.150	0.055	1.047	1.204	
		5260	52		0	26		11.6	1.190	0.024	1.096	1.305	
		5320	64		0	26		11.6	1.210	0.058	1.096	1.327	
		5240	48	right	0	28		11.8	1.300	0.171	1.047	1.361	
		5260	52		0	28		11.6	1.320*	0.108	1.096	1.447	11
		5320	64		0	28		11.6	1.290	-0.178	1.096	1.414	
		5260	52	* Variability test according KDB 865664					1.350	0.020	1.096	1.480	12
IEEE 802.11n (HT40, MCS8)	MAIN	5190	36	back	0	26	9.0	7.2	0.463	0.189	1.514	0.701	
		5190	36	right	0	28		7.2	0.551	0.119	1.514	0.834	
		5270	52	right	0	28		7.2	0.615	-0.105	1.514	0.931	13
	AUX	5190	36	back	0	27		7.7	0.091	-0.116	1.349	0.123	
		5190	36	right	0	29		7.7	0.108	-0.043	1.349	0.146	
		5270	52	right	0	29		7.7	0.130	-0.061	1.349	0.175	

Table 39: SAR results for IEEE 802.11 a/n (5.2 GHz) for Inari8-3GAN-1 tablet from Aava Mobile Oy.

SAR Results for WLAN Antennas (5.5 GHz Range)													
Band	**Antenna**	**Freq. [MHz]**	**Channel**	**Test Position**	**Spacing [mm]**	**Figure No.**	**Tune-Up Limit [dBm]**	**Output Power [dBm]**	**Measured SAR_{1g} [W/kg]**	**Power Drift [dBm]**	**Scaling Factor**	**Reported SAR_{1g} [W/kg]**	**Plot No.**
IEEE 802.11a (6 Mbit/s)	MAIN	5520	104	back	0	26	11.5	11.2	0.881	-0.060	1.072	0.944	14
				right	0	28		11.2	0.785	-0.188	1.072	0.841	
		5580	116	back	0	26		10.9	0.739	0.120	1.148	0.848	
		5680	136		0	26		10.6	0.530	0.117	1.230	0.652	
IEEE 802.11n (HT40, MCS8)	MAIN	5590	116	back	0	26	8.0	6.5	0.159	0.172	1.413	0.225	
				right	0	28			0.174	-0.012	1.413	0.246	15
	AUX	5590	116	back	0	27		7.8	0.067	-0.073	1.047	0.070	
				right	0	29			0.080	0.083	1.047	0.084	

Table 40: SAR results for IEEE 802.11 a/n (5.5 GHz) for Inari8-3GAN-1 tablet from Aava Mobile Oy.

SAR Results for WLAN Antennas (5.8 GHz Range)													
Band	**Antenna**	**Freq. [MHz]**	**Channel**	**Test Position**	**Spacing [mm]**	**Figure No.**	**Tune-Up Limit [dBm]**	**Output Power [dBm]**	**Measured SAR_{1g} [W/kg]**	**Power Drift [dBm]**	**Scaling Factor**	**Reported SAR_{1g} [W/kg]**	**Plot No.**
IEEE 802.11a	MAIN	5745	149	back	0	26	11.0	10.6	0.566	-0.079	1.096	0.621	16
				right	0	28		10.6	0.444	0.178	1.096	0.487	
		5805	161	back	0	26		10.3	0.326	0.190	1.175	0.383	
IEEE 802.11n (HT40, MCS8)	MAIN	5755	149	back	0	26	7.5	5.9	0.104	-0.074	1.445	0.150	
				right	0	28			0.126	-0.081	1.445	0.182	17
	AUX	5755	149	back	0	27		6.8	0.056	0.137	1.175	0.066	
				right	0	29			0.118	-0.056	1.175	0.139	

Table 41: SAR results for IEEE 802.11 a/n (5.8 GHz) for tInari8-3GAN-1 tablet from Aava Mobile Oy.

To control the output power stability during the SAR test the used DASY4 system calculates the power drift by measuring the e-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in the above tables labeled as: (Drift[dB]). This ensures that the power drift during one measurement is within 5%.

5.1 Estimated SAR for Standalone SAR Excluded Modes according KDB 447498

Estimated SAR							
Band	**Ant.**	**Pos.**	**Freq. [GHz]**	**Distance [mm]**	**Pavg [dBm]**	**Pavg [mW]**	**Estimated SAR_{1g} [W/kg]**
Bluetooth		Back	2.480	5	9.6	9.1	0.383
IEEE 802.11 b	MAIN	Top	2.462	19	12.8	19.1	0.400*
		Left	2.462	225	12.8	19.1	0.400*
IEEE 802.11 n (HT40, MCS8)	MAIN	Top	2.462	19	11.3	13.5	0.400*
		Left	2.462	225	11.3	13.5	0.400*
	AUX	Top	2.462	101	10.4	11.0	0.400*
		Left	2.462	225	10.4	11.0	0.400*
IEEE 802.11 a	MAIN	Top	5.180	19	11.9	15.5	0.400*
		Left	5.180	225	11.9	15.5	0.400*
IEEE 802.11 n (HT40, MCS8)	MAIN	Top	5.230	19	7.3	5.4	0.400*
		Left	5.230	225	7.3	5.4	0.400*
	AUX	Top	5.550	101	8.0	6.3	0.400*
		Left	5.550	225	8.0	6.3	0.400*
850	WWAN	Right	0.835	132	23.9	245.5	0.400*
1900			1.880	132	20.7	117.5	0.400*
FDD 2			1.880	132	23.6	229.1	0.400*
FDD 4			1.712	132	23.1	204.2	0.400*
FDD 5			0.826	132	22.8	190.5	0.400*

Table 42: Estimated stand alone SAR.

When the standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas the standalone SAR must be estimated according to the following to determine simultaneous transmission SAR test exclusion:

- (*max. power of channel. including tune-up tolerance. mW*)/(*min. test separation distance. mm*)]·[√f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm;

where *x* = 7.5 for 1-g SAR.

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

- 0.4 W/kg for 1g SAR and 1.0 W/kg for 10g SAR. when the test separation distance is > 50 mm

5.2 Hotspot Mode SAR Measurement Position

The hotspot mode SAR procedure in KDB 941225 D06 for handsets and UMPC mini-tablet procedures generally do not apply to the full-size tablet device described in KDB 616217 D04. The stand alone and simultaneous transmission SAR tests required for tablets are more conservative than the hotspot mode use configuration; therefore additional testing for hotspot SAR is not required when the procedures in KDB 616217 D04 are applied. Hotspot is just a subset of the simultaneous transmission configurations applicable to certain categories of hosts and devices.

6 Multiple Transmitter Information

According KDB 447498, the following table gives an overview about the ∑SAR for simultaneous transmitting modes. When ∑SAR > 1.6 W/kg. a SAR test exclusion is determined by the SAR to peak location separation ratio.

The ratio is determined by $(SAR1 + SAR2)^{1.5}/Ri$ rounded to two decimal digits and must be ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. Where Ri is the separation distance between the peak SAR locations for the antenna pair in mm. When SAR is measured for both antennas in a pair the peak location separation distance is computed by the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$ where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the area scans or extrapolated peak SAR locations in the zoom scans as appropriate.

Simultaneous Transmission Scenario SAR [W/kg]						
Exposure Position	Worst Case 2G	Worst Case 3G	IEEE 802.11 a/b		ΣSAR	SPLSR
			MAIN	AUX		
Back	0.745		1.327		2.072	Yes
Top	0.709		0.400*		1.109	No
Left	0.280		0.400*		0.680	No
Right	0.400*		1.447		1.847	Yes
Back		1.160	1.327		2.487	Yes
Top		1.279	0.400*		1.679	Yes
Left		0.475	0.400*		0.875	No
Right		0.400*	1.447		1.847	Yes

*Table 43: Worst case SAR test exclusion consideration for the applicable modes against different device edges, for 2G, 3G and IEEE 802.11 a/b transmission (*estimated SAR value).*

Simultaneous Transmission Scenario SAR [W/kg]						
Exposure Position	Worst Case 2G	Worst Case 3G	IEEE 802.11 n HT40		ΣSAR	SPLSR
			MAIN	AUX		
Back	0.745		0.654	0.129	1.528	No
Top	0.709		0.400*	0.400*	1.509*	No
Left	0.280		0.400*	0.400*	1.080*	No
Right	0.400*		0.849	0.179	1.428	No
Back		1.160	0.654	0.129	1.943	Yes
Top		1.151	0.400*	0.400*	1.951*	No
Left		0.475	0.400*	0.400*	1.275*	No
Right		0.400*	0.849	0.285	1.534	No

*Table 44: Worst case SAR test exclusion consideration for the applicable modes against different device edges, for 2G, 3G and IEEE 802.11 n (HT40) transmission (*estimated SAR value).*

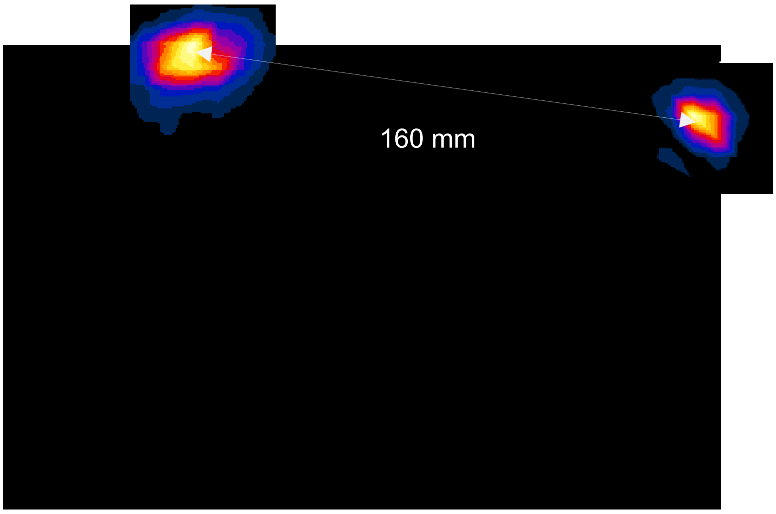
Bluetooth and IEEE802.11 a/b/g/n could not be active at the same time.

Simultaneous Transmission Scenario SAR [W/kg]					
Exposure Position	Worst Case 2G	Worst Case 3G	Bluetooth	ΣSAR	SPLSR
Back	0.745		0.383*	1.128	No
Back		1.160	0.383*	1.543	No

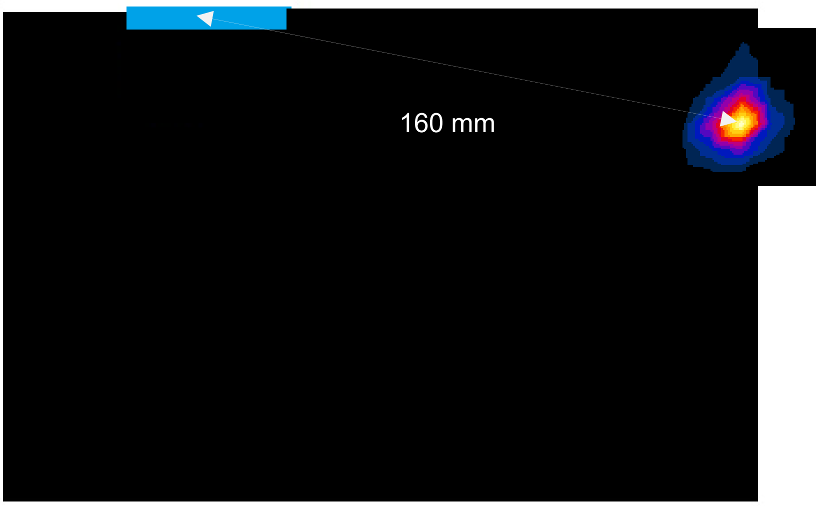
*Table 45: Worst case SAR test exclusion consideration for the applicable modes against different device edges, for 2G, 3G and IEEE 802.11 a/b transmission (*estimated SAR value).*

6.1 SPLSR Analysis for Simultaneous Transmission Scenario

Simultaneous Transmission Scenario SAR [W/kg]					
Exposure Position	**Worst Case 2G**	**IEEE 802.11 a/b MAIN**	**ΣSAR**	**Peak SAR Separation Dinstance (mm)**	**SPLSR Ratio**
Back	0.745	1.327	2.072	160	0.019

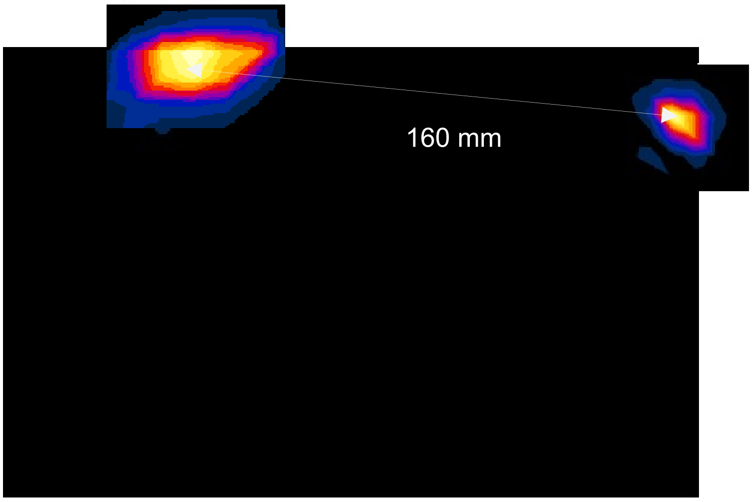


Simultaneous Transmission Scenario SAR [W/kg]					
Exposure Position	**Worst Case 2G**	**IEEE 802.11 a/b MAIN**	**ΣSAR**	**Peak SAR Separation Dinstance (mm)**	**SPLSR Ratio**
Right	0.4	1.447	1.847	160	0.016

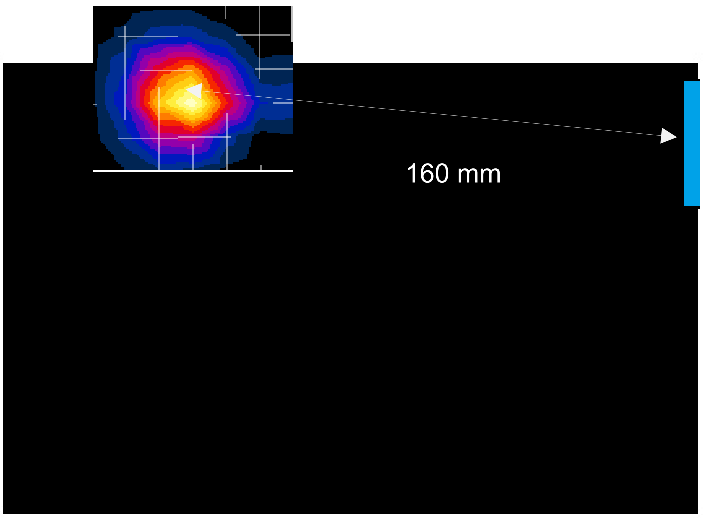


According Table 42 SAR assessment for the 2G antenna in right side configuration was not conducted. Accordingly there is no Peak SAR location available for the 2G antenna in this configuration. Therefore the center of the 2G antenna was used as Peak SAR location.

Simultaneous Transmission Scenario SAR [W/kg]					
Exposure Position	Worst Case 3G	IEEE 802.11 a/b MAIN	ΣSAR	Peak SAR Separation Dinstance (mm)	SPLSR Ratio
Back	1.160	1.327	2.487	160	0.025

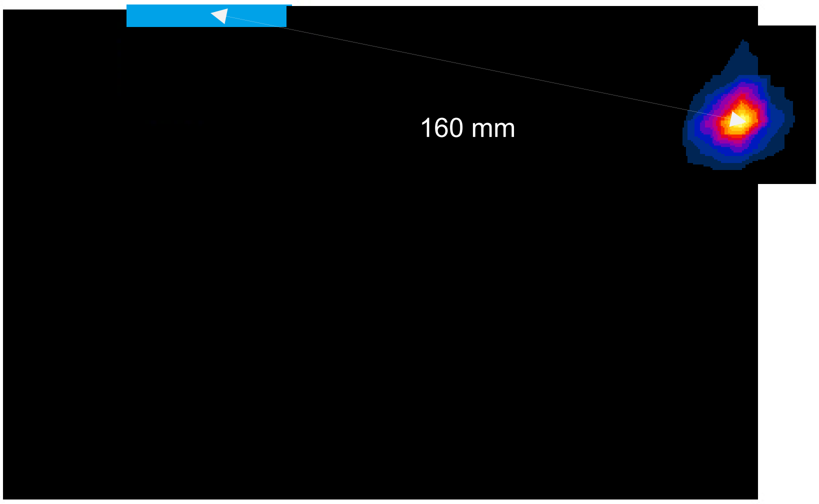


Simultaneous Transmission Scenario SAR [W/kg]					
Exposure Position	Worst Case 3G	IEEE 802.11 a/b MAIN	ΣSAR	Peak SAR Separation Dinstance (mm)	SPLSR Ratio
Top	1.279	0.4	1.679	160	0.013



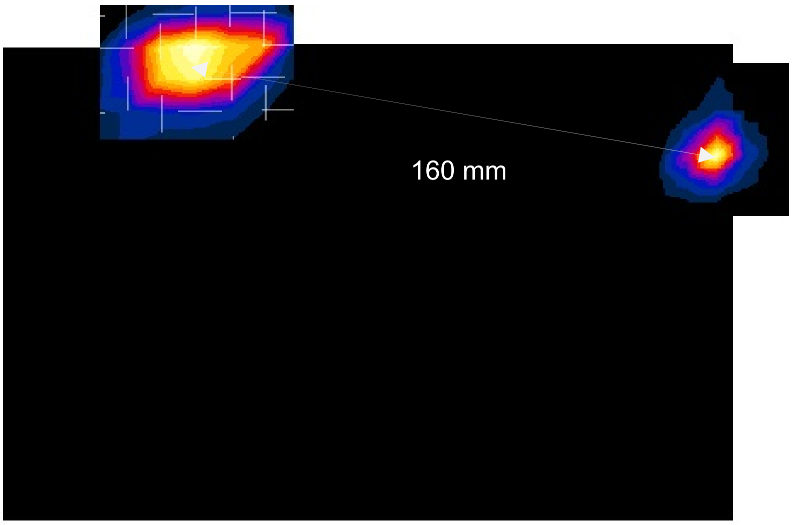
According Table 42 SAR assessment for the WLAN MAIN antenna in top configuration was not conducted. Accordingly there is no Peak SAR location available for the WLAN MAIN antenna in this configuration. Therefore the center of the WLAN MAIN antenna was used as Peak SAR location.

Simultaneous Transmission Scenario SAR [W/kg]					
Exposure Position	Worst Case 3G	IEEE 802.11 a/b MAIN	ΣSAR	Peak SAR Separation Dinstance (mm)	SPLSR Ratio
Right	0.4	1.447	1.847	160	0.016



According Table 42 SAR assessment for the 2G antenna in right side configuration was not conducted. Accordingly there is no Peak SAR location available for the 2G antenna in this configuration. Therefore the center of the 2G antenna was used as Peak SAR location.

Simultaneous Transmission Scenario SAR [W/kg]					
Exposure Position	Worst Case 3G	IEEE 802.11 a/b MAIN	ΣSAR	Peak SAR Separation Dinstance (mm)	SPLSR Ratio
Back	1.160	0.654	1.814	160	0.010



Since there is no method for SPLSR analysis described in KDB 447498 for three antennas active at the same time, this SPLSR analysis base on the worst case SAR configuration of two active antennas.

7 Appendix

7.1 Administrative Data

Date of Validation:	835 MHz Body (GPRS850):	March 19, 2014
	1900 MHz Body (GPRS1900):	March 26, 2014
	835 MHz Body (WCDMA5):	March 19, 2014
	1750 MHz Body (WCDMA4):	March 27, 2014
	1900 MHz Body (WCDMA2):	March 26, 2014
	2450 MHz Body (IEEE802.11b):	March 18, 2014
	5200 MHz Body (IEEE802.11a):	April 02, 2014
	5500 MHz Body (IEEE802.11a):	April 04, 2014
	5800 MHz Body (IEEE802.11a):	April 07, 2014

Date of Measurement: March 18, 2014 - April 07, 2014
Data Stored: 7layers_60320_6140087
Contact: IMST GmbH
Carl-Friedrich-Gauß-Str. 2
D-47475 Kamp-Lintfort. Germany
Tel.: +49- 2842-981 378
Fax: +49- 2842-981 399
email: vandenBosch@imst.de

7.2 Device under Test and Test Conditions

MTE: Inari8-3GAN-1 from Aava Mobile Oy (production line unit)
Date of Receipt: March 12, 2014
IMEI: 866274011175118
FCC ID: 2ABVH-INARI81
IC: 11875A-INARI81
Equipment Class: Portable device
RF Exposure Environment: General Population/ Uncontrolled
Power Supply: Internal Battery
Antenna: integrated
Used Accessory: N.A.

Standard	TX Range [MHz]	RX Range [MHz]	Used Channels	Crest Factor	Phantom
GPRS 850	824.2 – 848.8	869.2 – 893.8	128, 190, 251	2.66	SAM Twin Phantom V4.0
GPRS 1900	1850.2 –1909.8	1930.2 – 1989.8	512, 661, 810	2.66	
WCDMA 5 (FDD)	826.4 – 846.6	871.4 – 891.6	4132, 4183, 4233	1	
WCDMA 4 (FDD)	1712.4 – 1752.6	2112.4 – 2152.6	1312, 1413, 1513	1	
WCDMA 2 (FDD)	1852.4 – 1907.6	1932.4 – 1987.6	9262, 9400, 9538	1	
IEEE 802.11 b/n	2412.0 – 2462.0	2412.0 – 2462.0	1, 6, 11	1	
IEEE 802.11 a/n	5180.0 – 5320.0	5180.0 – 5320.0	36, 48, 52, 64	1	
	5520.0 – 5680.0	5520.0 – 5680.0	104, 116, 136	1	
	5745.0 - 5805.0	5745.0 - 5805.0	149, 161	1	

Table 46: Used channels and crest factors during the test.

7.3 Tissue Recipes

The following recipes are provided in percentage by weight.

835 MHz Body:	52.40 %	De-Ionized Water
	01.50 %	Salt
	45.00 %	Sugar
	00.10 %	Preventol D7
	01.00 %	Hydroxyetyl-Cellulose
1750 MHz Body:	29.44 %	Diethylenglykol-monobutylether
	70.17 %	De-Ionized Water
	0.39 %	Salt
1900 MHz Body:	29.68 %	Diethylenglykol-monobutylether
	70.00 %	De-Ionized Water
	0.32 %	Salt
2450 MHz Body:	31.40 %	Diethylenglykol-monobutylether
	68.60 %	De-IonizedWater

The tissue simulating liquids for the frequency range from 3.5 GHz up to 5.8 GHz were delivered by SPEAG, therefore the detailed compositions are not available and only the included ingredients were listed and shown in Figure 16.

3500 MHz – 5800 MHz, Head / Body:	11.0 % - 36 %	Mineral Oil
	0.5 % - 15 %	Emulsifiers
	60.0 % - 78 %	Water
	0.4 % - 3.0 %	Additives and salt

7.4 Material Parameters

For the measurement of the following parameters the HP 85070B dielectric probe kit is used representing the open-ended coaxial probe measurement procedure. The measured values should be within ± 5% of the recommended values given by the FCC.

Tissue Simulating Liquids			
Frequency		ε_r	**σ [S/m]**
835 MHz Body (GPRS850)	Recommended Value	55.20 ± 2.70	0.97 ± 0.10
	Measured Value (Ch. 128)	55.40	0.97
	Measured Value (Ch. 190)	55.30	0.98
	Measured Value (Ch. 251)	55.20	0.99
1900 MHz Body (GPRS 1900)	Recommended Value	53.30 ± 2.70	1.52 ± 0.15
	Measured Value (Ch. 512)	54.20	1.45
	Measured Value (Ch. 661)	54.20	1.51
	Measured Value (Ch. 810)	54.40	1.57
835 MHz Body (WCDMA 5)	Recommended Value	55.20 ± 2.70	0.97 ± 0.10
	Measured Value (Ch. 4132)	55.40	0.97
	Measured Value (Ch. 4183)	55.30	0.98
	Measured Value (Ch. 4233)	55.20	0.99
1750 MHz Body (WCDMA 4)	Recommended Value	53.30 ± 2.70	1.49 ± 0.15
	Measured Value (Ch. 1312)	52.40	1.49
	Measured Value (Ch. 1413)	52.20	1.50
	Measured Value (Ch. 1513)	52.20	1.52
1900 MHz Body (WCDMA 2)	Recommended Value	53.30 ± 2.70	1.52 ± 0.15
	Measured Value (Ch. 9262)	54.20	1.45
	Measured Value (Ch. 9400)	54.20	1.51
	Measured Value (Ch. 9538)	54.40	1.57
2450 MHz Body (IEEE 802.11 b/n)	Recommended Value	52.70 ± 2.65	1.95 ± 0.09
	Measured Value (Ch. 1)	51.30	1.95
	Measured Value (Ch. 6)	51.00	1.98
	Measured Value (Ch. 11)	50.70	2.01
5200 MHz Body (IEEE 802.11 a/n)	Recommended Value	49.0 ± 2.45	5.30 ± 0.26
	Measured Value (Ch. 36)	48.20	5.18
	Measured Value (Ch. 48)	48.10	5.22
	Measured Value (Ch. 52)	47.80	5.15
	Measured Value (Ch. 64)	47.60	5.30
5500 MHz Body (IEEE 802.11 a/n)	Recommended Value	48.60 ± 2.40	5.65 ± 0.28
	Measured Value (Ch. 104)	47.20	5.65
	Measured Value (Ch. 116)	47.00	5.74
	Measured Value (Ch. 136)	46.80	5.91
5800 MHz Body (IEEE 802.11 a/n)	Recommended Value	48.20 ± 2.40	6.00 ± 0.30
	Measured Value (Ch. 149)	46.70	6.02
	Measured Value (Ch. 161)	46.60	6.10

Table 47: Parameters of the tissue simulating liquids.

7.5 Simplified Performance Checking

The simplified performance check was realized using the dipole validation kits. The input power of the dipole antennas were 250 mW (cw signal) and they were placed under the flat part of the SAM phantom. The target and measured results are listed in the Table 48 - 49 and shown in Figure 9 - 15. The target values were adopted from the calibration certificates which are attached in the appendix. Table 51 includes the uncertainty assessment for the system performance checking which was suggested by the [IEEE 1528-2003] and determined by Schmid & Partner Engineering AG. The expanded uncertainty (K=2) is assessed to be ± 16.8%.

Dipole Target Results					
Band	**Available Dipoles**		**SAR_{1g} [W/kg]**	**ε_r**	**σ [S/m]**
GPRS 850	D835V2, SN #437	Target Values Body	2.50	56.20	0.96
GPRS 1900	D1900V2, SN #5d051		9.53	55.00	1.51
WCDMA 5	D835V2, SN #437		2.50	56.20	0.96
WCDMA 4	D1750V2, SN#1005		8.78	53.80	1.51
WCDMA 2	D1900V2, SN #5d051		9.53	55.00	1.51
IEEE 802.11 b/n	D2450V2, SN #709		13.90	50.90	1.96
IEEE 802.11 a/n	D5200 MHz, SN #1028		20.50	48.00	5.19
	D5500 MHz, SN #1028		21.00	48.20	5.57
	D5800 MHz, SN #1028		19.60	47.90	6.19

Table 48: Dipole target results as given by the calibration certificates.

Dipole Validation Results					
Band	**Used Dipoles**		**SAR_{1g} [W/kg]**	**ε_r**	**σ [S/m]**
GPRS 850	835 MHz, SN: 437	Measured Values Body	2.62	55.30	0.98
GPRS 1900	1900 MHz, SN:5d051		9.89	54.30	1.55
WCDMA 5	835 MHz, SN: 437		2.62	55.30	0.98
WCDMA 4	D1750V2, SN#1005		9.14	52.20	1.52
WCDMA 2	1900 MHz, SN:5d051		9.89	54.30	1.55
IEEE 802.11 b/n	2450 MHz, SN:709		13.80	53.40	1.99
IEEE 802.11 a/n	5200 MHz, SN: 1028		21.90	48.20	5.22
	5500 MHz, SN: 1028		22.60	47.30	5.66
	5800 MHz, SN: 1028		20.90	46.60	6.10

Table 49: Measured dipole validation results.

Test Laboratory: IMST GmbH, DASY Blue (I); File Name: 190314_b_1579.da4

DUT: Dipole 835 MHz SN437; Type: D835V2; Serial: D835V2 - SN:437

Program Name: System Performance Check at 835 MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6R - SN1579; ConvF(6.25, 6.25, 6.25); Calibrated: 28.01.2014
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn335; Calibrated: 23.01.2014
- Phantom: SAM Sugar 1059; Type: Speag; Serial: 1059
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.82 mW/g
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.6 V/m; Power Drift = -0.129 dB
Peak SAR (extrapolated) = 3.74 W/kg
SAR(1 g) = 2.62 mW/g; SAR(10 g) = 1.73 mW/g
Maximum value of SAR (measured) = 2.83 mW/g

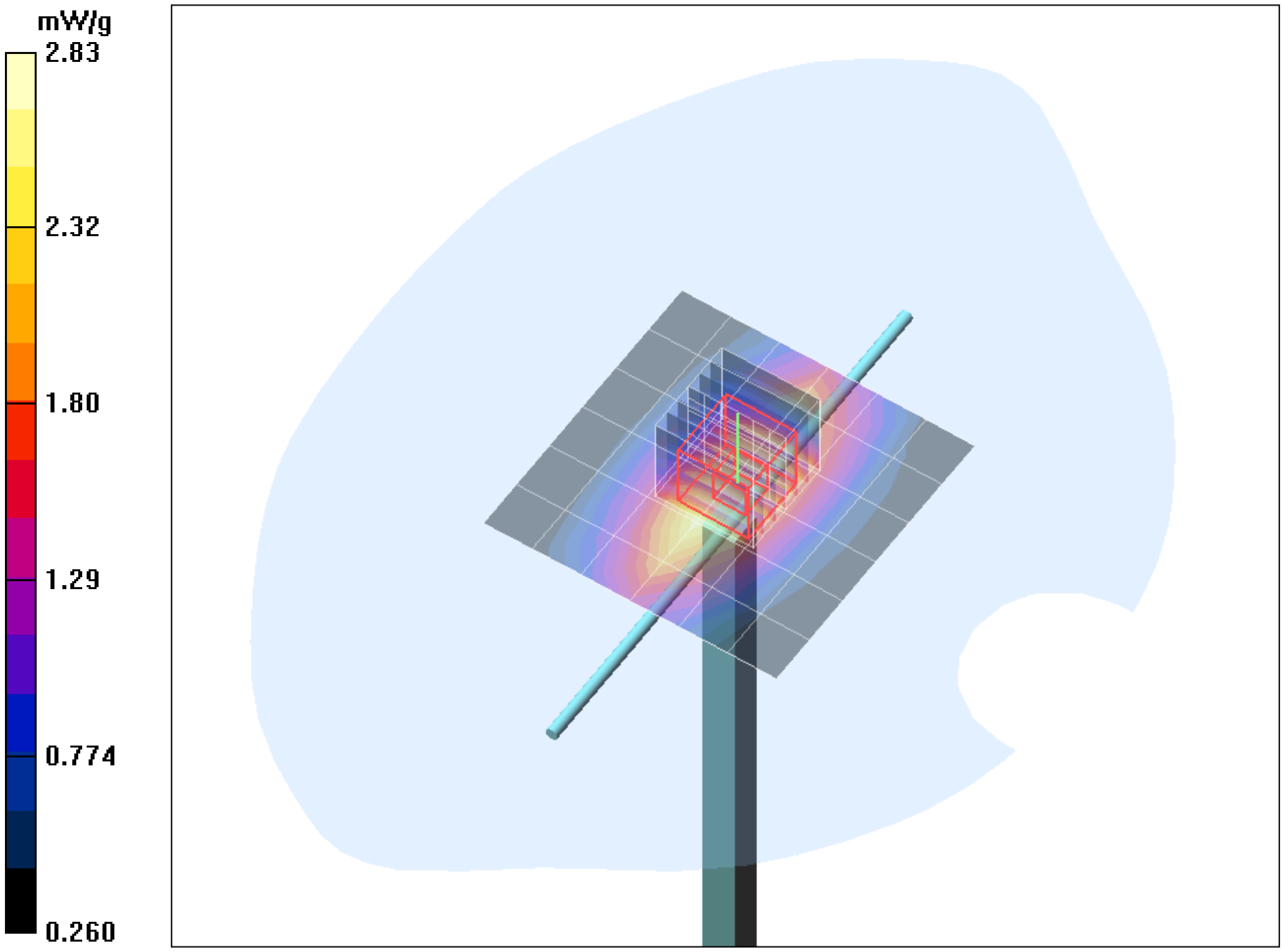


Fig. 9: Validation measurement 835 MHz Body (March 19. 2014), coarse grid.

Test Laboratory: Imst GmbH, DASY Yellow (II); File Name: 260314_y_1579.da4

DUT: Dipole 1900 MHz SN: 5d051; Type: D1900V2; Serial: D1900V2 - SN5d051
Program Name: System Performance Check at 1900 MHz

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6R - SN1579; ConvF(4.49, 4.49, 4.49); Calibrated: 28.01.2014
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn335; Calibrated: 23.01.2014
- Phantom: SAM Glycol 1340; Type: QD 000 P40 CB; Serial: TP-1340
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 11.3 mW/g
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.4 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 16.1 W/kg
SAR(1 g) = 9.89 mW/g; SAR(10 g) = 5.22 mW/g

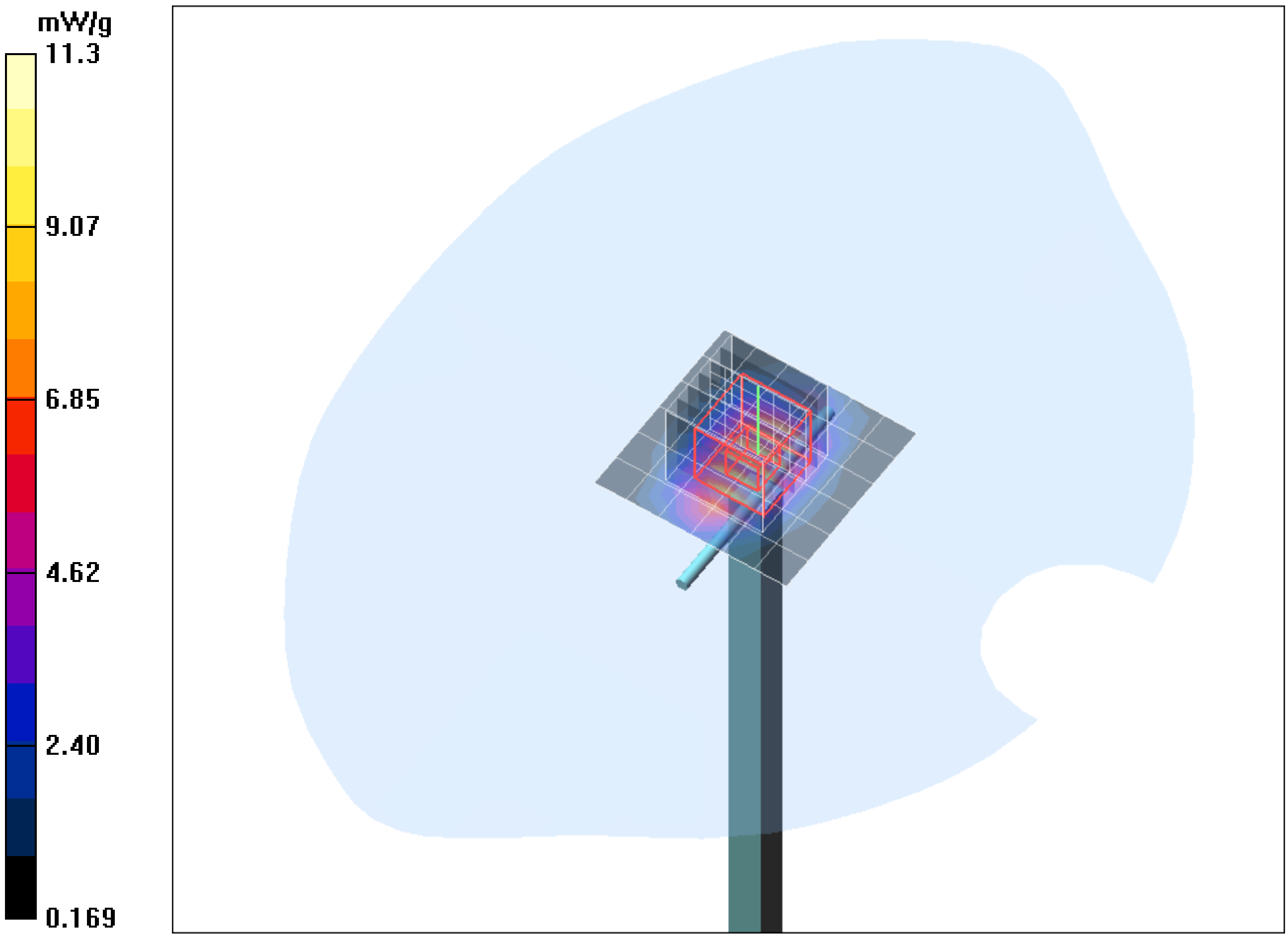


Fig. 10: Validation measurement 1900 MHz Body (March 26. 2014), coarse grid.

Test Laboratory: Imst GmbH, DASY Yellow (II); File Name: 270314_y_1579.da4

DUT: Dipole 1750 MHz SN: 1005; Type: D1750V2; Serial: D1750V2 - SN:1005
Program Name: System Performance Check at 1750 MHz

Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1750 MHz; σ = 1.52 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6R - SN1579; ConvF(4.75, 4.75, 4.75); Calibrated: 28.01.2014
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn335; Calibrated: 23.01.2014
- Phantom: SAM Glycol 1340; Type: QD 000 P40 CB; Serial: TP-1340
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 10.5 mW/g
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.0 V/m; Power Drift = -0.005 dB
Peak SAR (extrapolated) = 14.9 W/kg
SAR(1 g) = 9.14 mW/g; SAR(10 g) = 4.84 mW/g
Maximum value of SAR (measured) = 10.3 mW/g

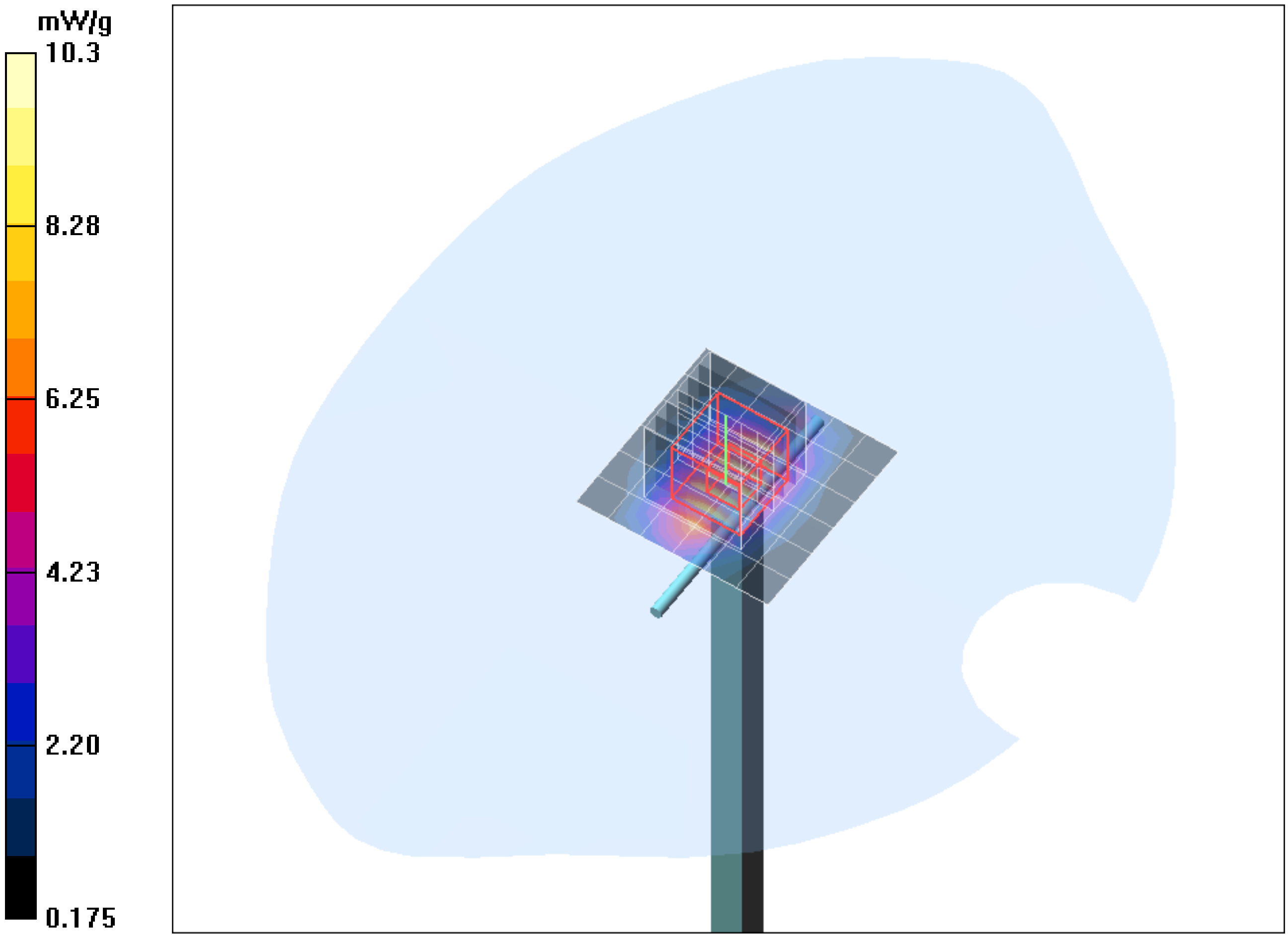


Fig. 11: Validation measurement 1750 MHz Body (March 26. 2014), coarse grid.

Test Laboratory: Imst GmbH, DASY Yellow (II); File Name: 180314_y_3860_2450.da4

DUT: Dipole 2450 MHz SN: 709; Type: D2450V2; Serial: D2450V2 - SN:709
Program Name: System Performance Check at 2450 MHz

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3860; ConvF(7.47, 7.47, 7.47); Calibrated: 29.07.2013
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn631; Calibrated: 23.09.2013
- Phantom: SAM Glycol 1340; Type: QD 000 P40 CB; Serial: TP-1340
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 15.5 mW/g
d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.3 V/m; Power Drift = 0.009 dB
Peak SAR (extrapolated) = 30.5 W/kg
SAR(1 g) = 13.8 mW/g; SAR(10 g) = 6.12 mW/g

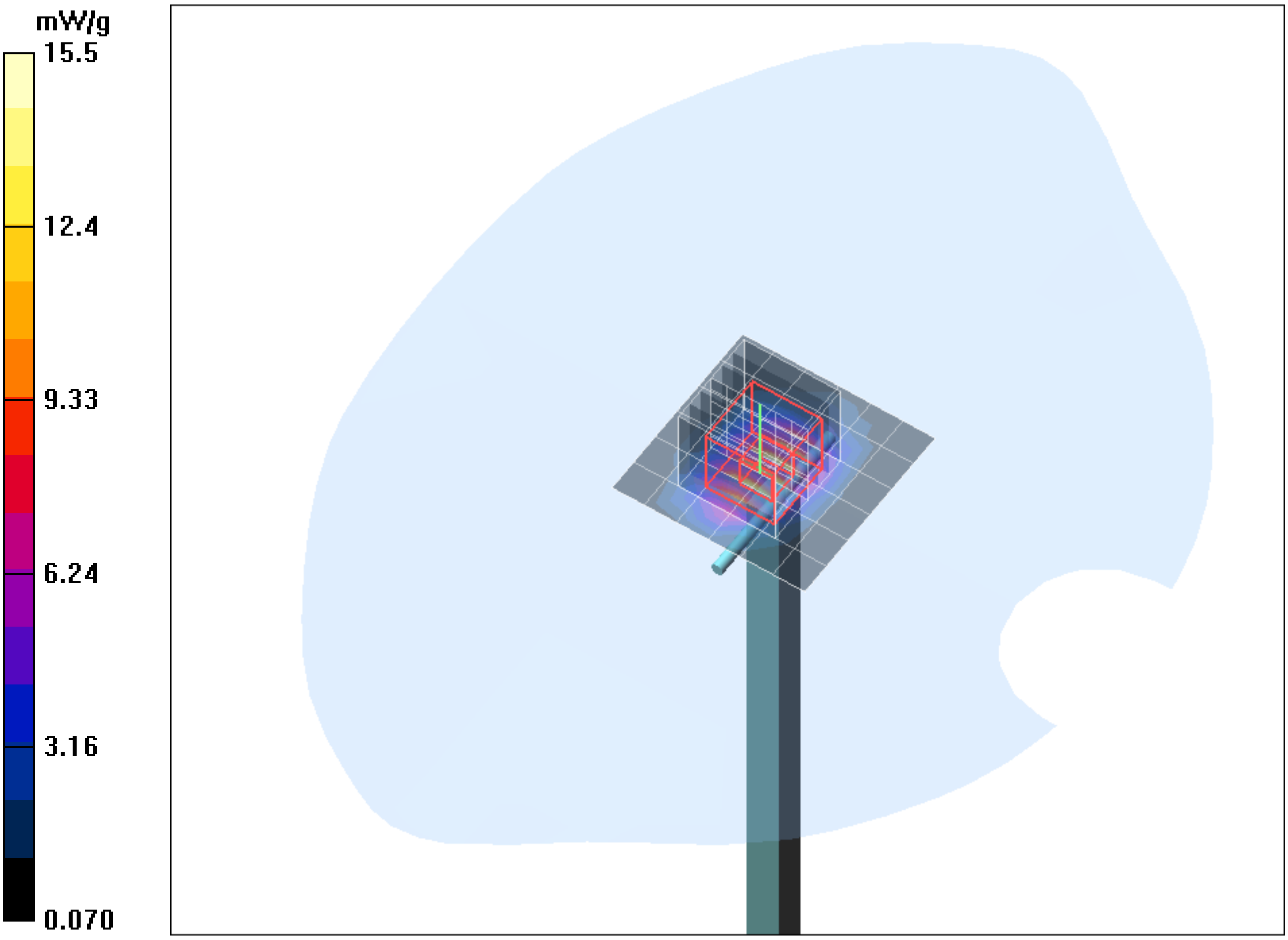


Fig. 12: Validation measurement 2450 MHz Body (March 18, 2014), coarse grid.

Test Laboratory: Imst GmbH, DASY Yellow (II); File Name: 020414_y_3860_5200.da4

DUT: Dipole 5GHz SN: 1028; Type: D5GHzV2; Serial: D5GHzV2 - SN:1028
Program Name: System Performance Check at 5200 MHz

Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.22 mho/m; ε_r = 48.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3860; ConvF(4.5, 4.5, 4.5); Calibrated: 29.07.2013
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn335; Calibrated: 23.01.2014
- Phantom: SAM Sugar 1341; Type: QD 000 P40 CB; Serial: TP-1341
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (11x11x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 39.7 mW/g
d=10mm, Pin=250mW/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 86.8 V/m; Power Drift = 0.096 dB
Peak SAR (extrapolated) = 80.5 W/kg
SAR(1 g) = 21.9 mW/g; SAR(10 g) = 6.29 mW/g
Maximum value of SAR (measured) = 42.7 mW/g

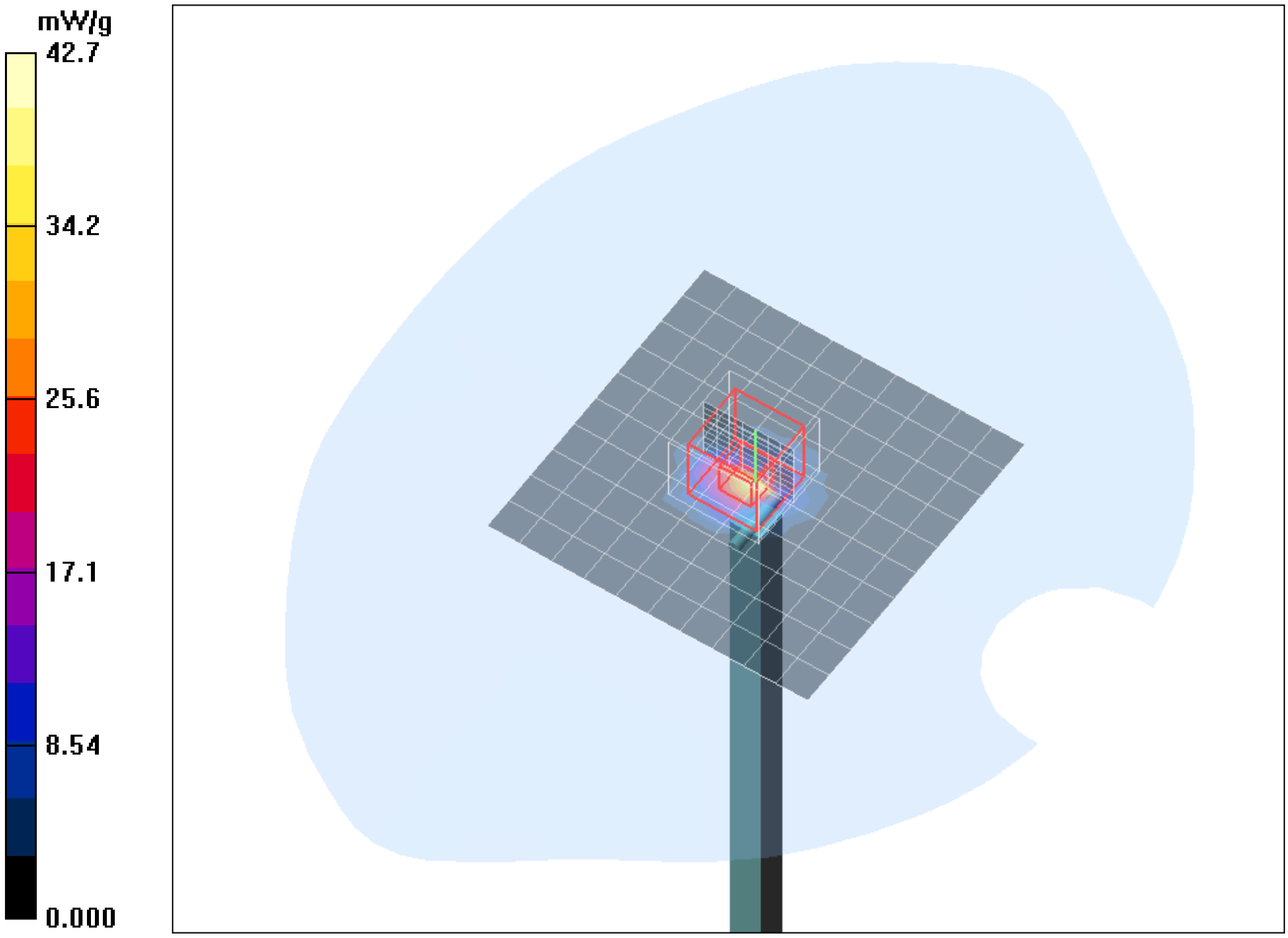


Fig. 13: Validation measurement 5200 MHz Body (April 02, 2014), coarse grid.

Test Laboratory: Imst GmbH, DASY Yellow (II); File Name: 040414_y_3860_5500.da4

DUT: Dipole 5GHz SN: 1028; Type: D5GHzV2; Serial: D5GHzV2 - SN:1028
Program Name: System Performance Check at 5500 MHz

Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 5.66 mho/m; ε_r = 47.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3860; ConvF(3.78, 3.78, 3.78); Calibrated: 29.07.2013
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn335; Calibrated: 23.01.2014
- Phantom: SAM Sugar 1341; Type: QD 000 P40 CB; Serial: TP-1341
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (11x11x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 37.7 mW/g
d=10mm, Pin=250mW/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 81.1 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 87.3 W/kg
SAR(1 g) = 22.6 mW/g; SAR(10 g) = 6.36 mW/g
Maximum value of SAR (measured) = 44.3 mW/g

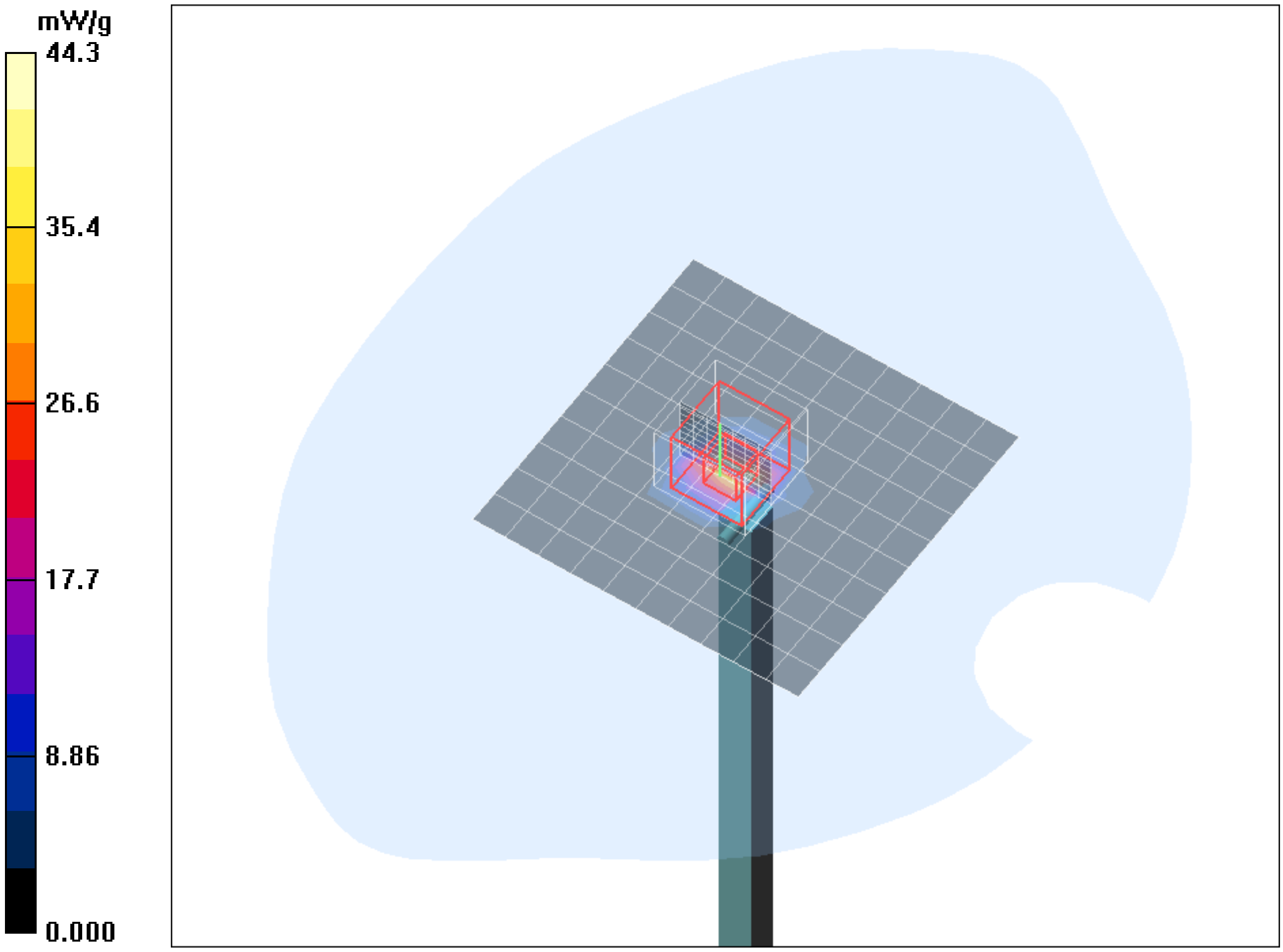


Fig. 14: Validation measurement 5500 MHz Body (April 04, 2014), coarse grid.

Test Laboratory: Imst GmbH, DASY Yellow (II); File Name: 070414_y_3860_5800.da4

DUT: Dipole 5GHz SN: 1028; Type: D5GHzV2; Serial: D5GHzV2 - SN:1028

Program Name: System Performance Check at 5800 MHz

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 6.1 mho/m; ε_r = 46.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3860; ConvF(3.76, 3.76, 3.76); Calibrated: 29.07.2013
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn335; Calibrated: 23.01.2014
- Phantom: SAM Sugar 1341; Type: QD 000 P40 CB; Serial: TP-1341
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (11x11x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 40.0 mW/g
d=10mm, Pin=250mW/Zoom Scan (8x8x10)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 82.4 V/m; Power Drift = 0.122 dB
Peak SAR (extrapolated) = 84.0 W/kg
SAR(1 g) = 20.9 mW/g; SAR(10 g) = 5.81 mW/g
Maximum value of SAR (measured) = 41.8 mW/g

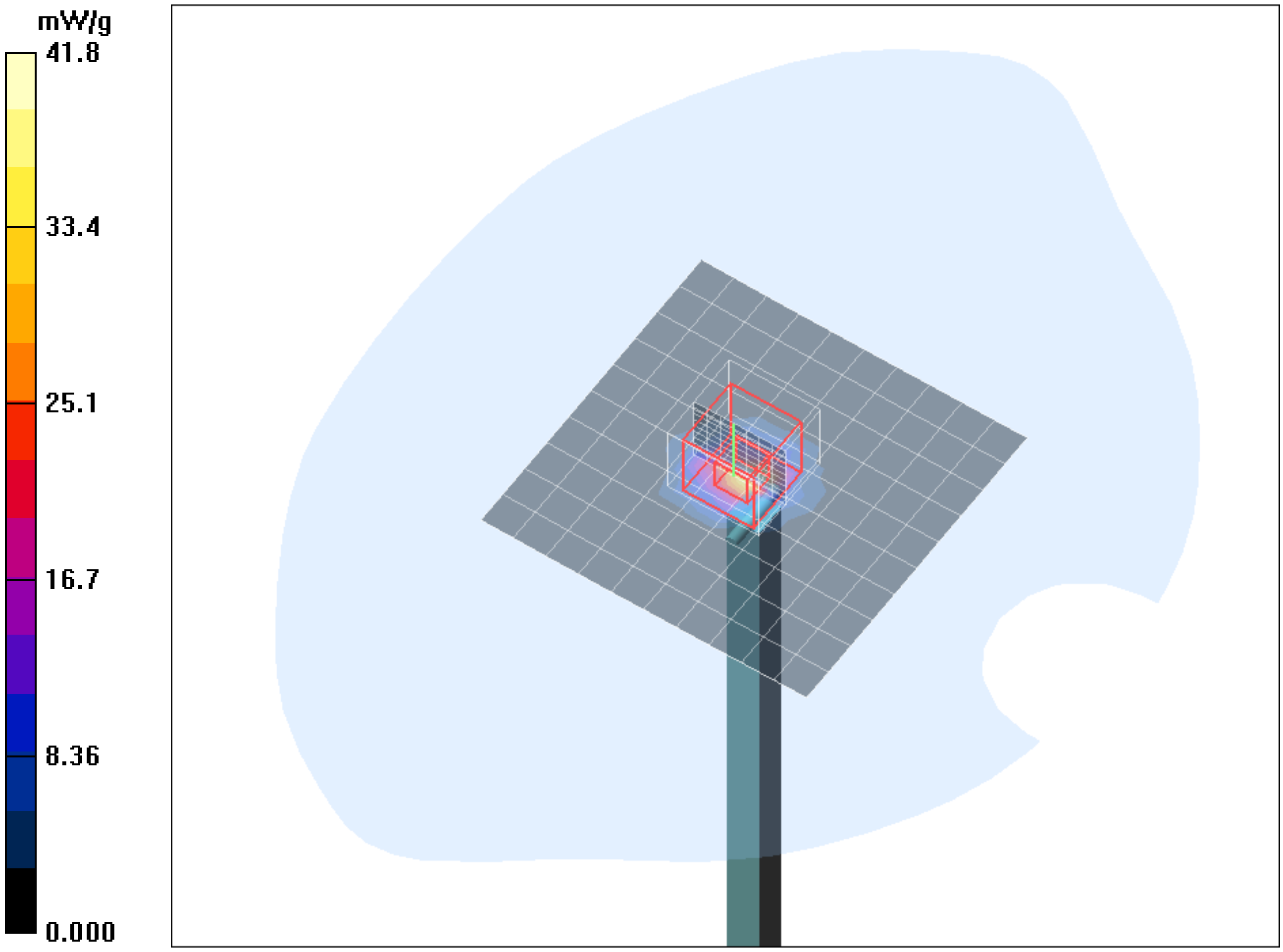


Fig. 15: Validation measurement 5800 MHz Body (April 07, 2014), coarse grid.

Uncertainty Budget up to 3 GHz						
Error Sources	**Uncertainty Value**	**Probability Distribution**	**Divisor**	**c_i**	**Standard Uncertainty**	**v_i^2 or v_{eff}**
Measurement System						
Probe calibration	± 5.9 %	Normal	1	1	± 5.9 %	∞
Axial isotropy	± 4.7 %	Rectangular	√3	1	± 2.7 %	∞
Hemispherical isotropy	± 0 %	Rectangular	√3	1	± 0 %	∞
Boundary effects	± 1.0 %	Rectangular	√3	1	± 0.6 %	∞
Linearity	± 4.7 %	Rectangular	√3	1	± 2.7 %	∞
System detection limit	± 1.0 %	Rectangular	√3	1	± 0.6 %	∞
Readout electronics	± 0.3 %	Normal	1	1	± 0.3 %	∞
Response time	± 0 %	Rectangular	√3	1	± 0 %	∞
Integration time	± 0%	Rectangular	√3	1	± 0 %	∞
RF ambient conditions	± 3.0 %	Rectangular	√3	1	± 1.7 %	∞
Probe positioner	± 0.4 %	Rectangular	√3	1	± 0.2 %	∞
Probe positioning	± 2.9 %	Rectangular	√3	1	± 1.7 %	∞
Algorithms for max SAR eval.	± 1.0 %	Rectangular	√3	1	± 0.6 %	∞
Dipole						
Dipole Axis to Liquid Distance	± 2.0 %	Rectangular	1	1	± 1.2 %	∞
Input power and SAR drift mea.	± 4.7 %	Rectangular	√3	1	± 2.7 %	∞
Phantom and Set-up						
Phantom uncertainty	± 4.0 %	Rectangular	√3	1	± 2.3 %	∞
Liquid conductivity (target)	± 5.0 %	Rectangular	√3	0.64	± 1.8 %	∞
Liquid conductivity (meas.)	± 2.5 %	Normal	1	0.64	± 1.6 %	∞
Liquid permittivity (target)	± 5.0 %	Rectangular	√3	0.6	± 1.7 %	∞
Liquid permittivity (meas.)	± 2.5 %	Normal	1	0.6	± 1.5 %	∞
Combined Uncertainty					± 9.2 %	

Table 50: Uncertainty budget for the system performance check up to 3 GHz.

Uncertainty Budget from 3 GHz to 6 GHz						
Error Sources	**Uncertainty Value**	**Probability Distribution**	**Divisor**	**c_i**	**Standard Uncertainty**	**v_i^2 or v_{eff}**
Measurement System						
Probe calibration	± 6.8 %	Normal	1	1	± 6.8 %	∞
Axial isotropy	± 4.7 %	Rectangular	√3	1	± 2.7 %	∞
Hemispherical isotropy	± 0 %	Rectangular	√3	1	± 0 %	∞
Boundary effects	± 1.0 %	Rectangular	√3	1	± 0.6 %	∞
Linearity	± 4.7 %	Rectangular	√3	1	± 2.7 %	∞
System detection limit	± 1.0 %	Rectangular	√3	1	± 0.6 %	∞
Readout electronics	± 0.3 %	Normal	1	1	± 0.3 %	∞
Response time	± 0 %	Rectangular	√3	1	± 0 %	∞
Integration time	± 0%	Rectangular	√3	1	± 0 %	∞
RF ambient conditions	± 3.0 %	Rectangular	√3	1	± 1.7 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√3	1	± 1.7 %	∞
Probe positioner	± 0.4 %	Rectangular	√3	1	± 0.2 %	∞
Probe positioning	± 2.9 %	Rectangular	√3	1	± 1.7 %	∞
Algorithms for max SAR eval.	± 1.0 %	Rectangular	√3	1	± 0.6 %	∞
Dipole						
Dipole Axis to Liquid Distance	± 2.0 %	Rectangular	1	1	± 1.2 %	∞
Input power and SAR drift mea.	± 4.7 %	Rectangular	√3	1	± 2.7 %	∞
Phantom and Set-up						
Phantom uncertainty	± 4.0 %	Rectangular	√3	1	± 2.3 %	∞
Liquid conductivity (target)	± 5.0 %	Rectangular	√3	0.64	± 1.8 %	∞
Liquid conductivity (meas.)	± 2.5 %	Normal	1	0.64	± 1.6 %	∞
Liquid permittivity (target)	± 5.0 %	Rectangular	√3	0.6	± 1.7 %	∞
Liquid permittivity (meas.)	± 2.5 %	Normal	1	0.6	± 1.5 %	∞
Combined Uncertainty					± 9.8 %	

Table 51: Uncertainty budget for the system performance check from 3 GHz to 6 GHz.

7.6 Environment

To comply with the required noise level (less than 12 mW/kg) periodically measurements without a DUT were conducted.

Humidity: 40% ± 5 %

7.7 Test Equipment

SAR Equipment				
Test Equipment	**Model**	**Serial Number**	**Last Calibration**	**Next Calibration**
DASY4 Systems				
Software Versions DASY4	V4.7	N/A	N/A	N/A
Software Versions SEMCAD	V1.8	N/A	N/A	N/A
Dosimetric E-Field Probe	ET3DV6	1579	01/2014	01/2015
Dosimetric E-Field Probe	EX3DV4	3860	07/2013	07/2014
Data Acquisition Electronics	DAE 3	335	01/2014	01/2015
Data Acquisition Electronics	DAE 4	631	09/2013	09/2014
Phantom	SAM	1059	N/A	N/A
Phantom	SAM	1176	N/A	N/A
Phantom	SAM	1340	N/A	N/A
Phantom	SAM	1341	N/A	N/A
Dipoles				
Validation Dipole	D835V2	437	02/2014	02/2016
Validation Dipole	D1750V2	1005	02/2014	02/2016
Validation Dipole	D1900V2	5d051	09/2013	09/2015
Validation Dipole	D2450V2	709	09/2013	09/2015
Validation Dipole	D5GHzV2	1028	04/2012	04/2014
Material Measurement				
Network Analyzer	E5071C	MY46103220	07/2013	07/2015
Dielectric Probe Kit	HP85070B	US33020263	N/A	N/A

Table 52: SAR equipment.

Test Equipment				
Test Equipment	**Model**	**Serial Number**	**Last Calibration**	**Next Calibration**
Power Meters				
Power Meter. Agilent	E4416A	GB41050414	12/2012	12/2014
Power Meter. Agilent	E4417A	GB41050441	12/2012	12/2014
Power Meter. Anritsu	ML2487A	6K00002319	02/2014	02/2016
Power Meter. Anritsu	ML2488A	6K00002078	02/2014	02/2016
Power Sensors				
Power Sensor. Agilent	E9301H	US40010212	12/2012	12/2014
Power Sensor. Agilent	E9301A	MY41495584	12/2012	12/2014
Power Sensor. Anritsu	MA2481B	031600	02/2014	02/2016
Power Sensor. Anritsu	MA2490A	031565	02/2014	02/2016
RF Sources				
Network Analyzer	E5071C	MY46103220	07/2013	07/2015
Rohde & Schwarz	SME300	100142	N/A	N/A
Amplifiers				
Mini Circuits	ZHL-42	D012296	N/A	N/A
Mini Circuits	ZHL-42	D031104#01	N/A	N/A
Mini Circuits	ZVE-8G	D031004	N/A	N/A
Radio Tester				
Rohde & Schwarz	CMU200	835305/050	N/A	N/A

Table 53: Test equipment.

7.8 Certificates of Conformity

Schmid & Partner Engineering AG **s p e a g**

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, http://www.speag.com

Certificate of conformity

Item	Dosimetric Assessment System DASY4
Type No	SD 000 401A, SD 000 402A
Software Version No	DASY 4.7
Manufacturer / Origin	Schmid & Partner Engineering AG Zeughausstrasse 43, CH-8004 Zürich, Switzerland

References

[1] 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, December 2003

[2] EN 50361:2001, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz – 3 GHz)", July 2001

[3] IEC 62209 – 1, "Specific Absorption Rate (SAR) in the frequency range of 300 MHz to 3 GHz – Measurement Procedure, Part 1: Hand-held mobile wireless communication devices", February 2005

[4] IEC 62209 – 2, Draft Version 0.9, "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", December 2004

[5] OET Bulletin 65, Supplement C, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", Edition 01-01

[6] ANSI-C63.19-2006, "American National Standard for Methods of Measurement of Compatibility between Wireless Communication Devices and Hearing Aids", June 2006

[7] ANSI-C63.19-2007, "American National Standard for Methods of Measurement of Compatibility between Wireless Communication Devices and Hearing Aids", June 2007

Conformity

We certify that this **system is designed to be fully compliant** with the standards [1 – 7] for RF emission tests of wireless devices.

Uncertainty

The uncertainty of the measurements with this system was evaluated according to the above standards and is documented in the applicable chapters of the DASY4 system handbook.
The uncertainty values represent current state of methodology and are subject to changes. They are applicable to all laboratories using DASY4 provided the following requirements are met (responsibility of the system end user):

1) the system is used by an experienced engineer who follows the manual and the guidelines taught during the training provided by SPEAG,
2) the probe and validation dipoles have been calibrated for the relevant frequency bands and media within the requested period,
3) the DAE has been calibrated within the requested period,
4) the "minimum distance" between probe sensor and inner phantom shell and the radiation source is selected properly,
5) the system performance check has been successful,
6) the operational mode of the DUT is CW, CDMA, FDMA or TDMA (GSM, DCS, PCS, IS136, PDC) and the measurement/integration time per point is ≥ 500 ms,
7) if applicable, the probe modulation factor is evaluated and applied according to field level, modulation and frequency,
8) the dielectric parameters of the liquid are conformant with the standard requirement,
9) the DUT has been positioned as described in the manual.
10) the uncertainty values from the calibration certificates, and the laboratory and measurement equipment dependent uncertainties, are updated by end user accordingly.

Date 24.4.2008 **Signature / Stamp**

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Fig. 16: Certificate of conformity for the used DASY4 system

Schmid & Partner
Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 BA
Series No	TP-1002 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

Tests

The series production process used allows the limitation to test of first articles.
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

Standards

[1] CENELEC EN 50361
[2] IEEE P1528-200x draft 6.5
[3] IEC PT 62209 draft 0.9
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date 18.11.2001

Signature / Stamp Schmid & Partner Engineering AG
Zeughausstrasse 43, CH-8004 Zurich
Tel. +41 1 245 97 00, Fax +41 1 245 97 79

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Fig. 17: Certificate of conformity for the used SAM phantom.

7.9 Pictures of the Device under Test

Fig. 18 - 20 show the device under test.

Fig. 18: Front and back view of the Inari8-3GAN-1 from Aava Mobile Oy.

Fig. 19: Side view of the Inari8-3GAN-1 from Aava Mobile Oy.

Fig. 20: Picture of the Inari8-3GAN-1 with antenna location and separation distances.

7.10 Test Positions for the Device under Test

Figure 21 - 25 show the test positions for the SAR measurements for WWAN antenna.

Fig. 21: Back side of Inari8-3GAN-1, 14 mm distance, WWAN antenna, proximity sensor OFF.

Fig. 22: Top edge of Inari8-3GAN-1, 12 mm distance, WWAN antenna, proximity sensor OFF.

Fig. 23: Left edge of Inari8-3GAN-1, 0 mm distance, WWAN antenna, proximity sensor OFF.

Fig. 24: Back side of Inari8-3GAN-1, 0 mm distance, WWAN antenna, proximity sensor ON.

Fig. 25: Top edge of Inari8-3GAN-1, 0 mm distance, WWAN antenna, proximity sensor ON.

Figure 26 - 29 show the test positions for the SAR measurements for WLAN antennas.

Fig. 26: Back side of Inari8-3GAN-1, 0 mm distance, WLAN MAIN antenna.

Fig. 27: Back side of Inari8-3GAN-1, 0 mm distance, WLAN AUX antenna.

Fig. 28: Right edge of Inari8-3GAN-1, 0 mm distance, WLAN MAIN antenna.

Fig. 29: Right edge of Inari8-3GAN-1, 0 mm distance, WWAN AUX antenna.

7.11 Pictures to Demonstrate the Required Liquid Depth

Figure 30 - 34 show the liquid depth in the used SAM phantom.

Fig. 30: Liquid depth for GPRS 850 and WCDMA 5 body measurements.

Fig. 31: Liquid depth for GPRS 1900 and WCDMA2 body measurements.

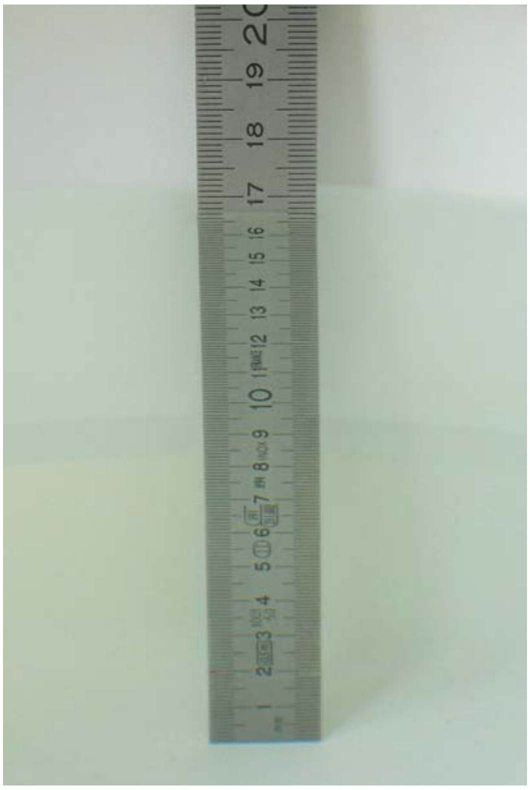

Fig. 32: Liquid depth for WCDMA 4 body measurements.

Fig. 33: Liquid depth for IEEE 802.11b/n body measurements.

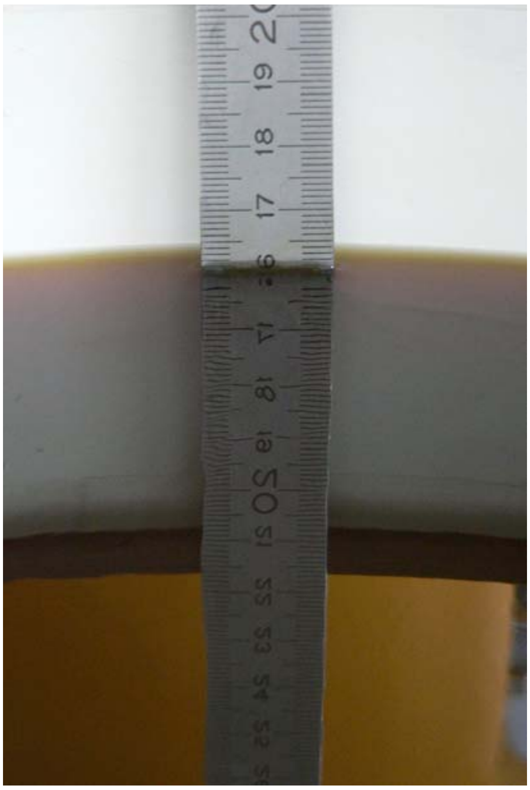

Fig. 34: Liquid depth for IEEE 802.11a/n body measurements.

8 References

[OET 65]	Federal Communications Commission: Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01). FCC. 2001.
[IEEE C95.1-1999]	IEEE Std C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields. 3 kHz to 300 GHz. Inst. of Electrical and Electronics Engineers. Inc.. 1999.
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[KDB 648474]	648474 D01 SAR Handsets Multi Xmiter and Ant. v01r05 . SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas
[KDB 447498]	447498 D01 v05r01 General RF Exposure Guidance v05. May 28. 2013
[KDB 865664]	865664 D01 v01r01 SAR measurement 100 MHz to 6 GHz. May 28. 2013
[47 CFR]	Code of Federal Regulations; Title 47. Telecommunications