TEST REPORT

TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: EB-4055

FCC ID: UCE111050A

To: OET Bulletin 65 Supplement C: (2001-01)

IEEE 1528: 2003

Test Report Serial No:
RFI-SAR-RP87983JD02A V2.0

Version 2.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals:	(APPROVED SIGNATORY)
Checked By: Richelieu Quoi	(APPROVED SIGNATORY)
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1. Customer Information

Company Name:	Panasonic Mobile Comms Dev of Europe Ltd
Address:	Panasonic House, Willoughby Road, Bracknell, Berkshire, RG12 8FP, United Kingdom

2. Equipment Under Test (EUT)

2.1. Identification of Equipment Under Test (EUT)

Description:	Single Mode UMTS Tablet Device with WLAN and *Bluetooth*
Brand Name:	NTT docomo
Model Name or Number:	EB-4055
Serial Number:	None Stated
IMEI Number:	3599-520400-36369
Hardware Version Number:	Rev C
Software Version Number:	ACPU: arrietty-ics-09-0417 CCPU: R1B_0_EC12_02_D00
Hardware Revision of GSM Module:	Not Applicable
Software Revision of GSM Module:	Not Applicable
FCC ID Number:	UCE111050A
Country of Manufacture:	Japan
Date of Receipt:	15 May 2012

Note(s):

This sample was used to perform WWAN and WLAN SAR evaluation measurements only.

Description:	Single Mode UMTS Tablet Device with WLAN and *Bluetooth*
Brand Name:	NTT docomo
Model Name or Number:	EB-4055
Serial Number:	None Stated
IMEI Number:	3599-520400-36385
Hardware Version Number:	Rev C
Software Version Number:	ACPU: arrietty-ics-09-0417 CCPU: R1B_0_EC12_02_D00
Hardware Revision of GSM Module:	Not Applicable
Software Revision of GSM Module:	Not Applicable
FCC ID Number:	UCE111050A
Country of Manufacture:	Japan
Date of Receipt:	15 May 2012

Note(s):

This sample was used to perform WWAN and WLAN Conducted power measurements only.

2.2. Description of EUT

The equipment under test was a single mode UMTS Tablet device operating in the UMTS FDD V and Wi-Fi 2450 bands. The EUT has UMTS FDD V HSPA, WiFi802.11b/g/n and *Bluetooth* capabilities

2.3. Modifications Incorporated in the EUT

EUT (IMEI: 3599-520400-36369) was used to perform WWAN and WLAN SAR test only.
EUT (IMEI: 3599-520400-36385) was used to perform WWAN and WLAN conducted power measurements only.

2.4. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Wireless Communication Test Set
Brand Name:	Agilent
Model Name or Number:	8960 Series 10
Serial Number:	GB46311280
Cable Length and Type:	~4.0m Utiflex Cable
Connected to Port:	RF (Input / Output) Air Link

2.5. Additional Information Related to Testing

Equipment Category	UMTS FDD V, WiFi802.11b/g/n		
Type of Unit	Portable Transceiver		
Intended Operating Environment:	Within UMTS , Wi-Fi and *Bluetooth* Coverage		
Transmitter Maximum Output Power Characteristics:	UMTS Band V	Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D01.	
	WiFi802.11b/g/n	Communication Test Set was configured to allow the EUT to transmit at a maximum power of up to 14.7 dBm.	
	Bluetooth	:= 2 dBm	
Transmitter Frequency Range:	UMTS Band V	826 to 847 MHz	
	WiFi802.11b/g/n	2412 to 2462 MHz	
Transmitter Frequency Allocation of EUT When Under Test:	**Channel Number**	**Channel Description**	**Frequency (MHz)**
	4132	Low	826.4
	4183	Middle	836.6
	4233	High	846.6
	1	Low	2412.0
	6	Middle	2437.0
	11	High	2462.0
Modulation(s):	QPSK(UMTS / HSDPA/HSPA):0Hz DBPSK, CCK (Wi-Fi): 0 Hz		
Modulation Scheme (Crest Factor):	DBPSK, CCK (Wi-Fi): 1 QPSK(UMTS FDD / HSPA): 1		
EUT Dimensions:	262 mm x 180 mm x 12.5 mm (L x W x H)		
EUT Diagonal Display Length:	318.0 mm (~12.5'')		
Antenna Type:	Internal integral		
Antenna Length:	Unknown		
Number of Antenna Positions:	2 fixed (WWAN and WLAN/*Bluetooth*) {See Photo for Schematics of Antenna ***PHT/87983JD02A/023,*** in Appendix 4}		
Power Supply Requirement:	3.7V		
Battery Type(s):	Li-ion		

3. Test Specification, Methods and Procedures

3.1. Test Specification

Reference:	OET Bulletin 65 Supplement C: (2001-01)
Title:	Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
Purpose of Test:	To determine whether the equipment met the basic restrictions as defined in OET Bulletin 65 Supplement C: (2001-01) using the SAR averaging method as described in the test specification above.

3.2. Methods and Procedures Reference Documentation

The methods and procedures used were as detailed in:

Federal Communications Commission, “Evaluating compliance with FCC Guidelines for human exposure to radio frequency electromagnetic fields”, OET Bulletin 65 Supplement C, FCC, Washington, D.C, 20554, 2001.

Thomas Schmid, Oliver Egger and Neils Kuster, “Automated E-field scanning system for dosimetric assessments”, IEEE Transaction on microwave theory and techniques,
Vol. 44, pp. 105-113, January 1996.

Neils Kuster, Ralph Kastle and Thomas Schmid, “Dosimetric evaluation of mobile communications equipment with known precision”, IEICE Transactions of communications, Vol. E80-B, No.5, pp. 645-652, May 1997.

KDB 248227 D01 "SAR measurements for 802.11a/b/g v01r02”

KDB 447498 D01 “Mobile Portable RF Exposure v04”

KDB 450824 SAR Prob Cal and Ver Meas v01r01

KDB 648474 D01 “SAR Handsets Multi Xmiter and Ant v01r05”

KDB 616217 D03 ‘’SAR Supp Note and Netbook Laptop v01‘’

KDB 941225 D01 "SAR test for 3G v02"

The version of DASY system used by RFI for SAR measurements is v4.7.

The SAR probe for the DASY v4.4 and higher has a validity of +/- 100 MHz from the spot frequency at which the system is calibrated.

The system validation performed at 900 MHz is valid for 800 MHz to 1000 MHz which covers the 850 MHz band. The probe calibration for SN3814 was performed at the spot frequencies of 750 MHz and 900 MHz. The SAR software selects the conversion factor based on the following attributes; 1. The operating frequency 2. The measured permittivity imported to the software and 3. The measured conductivity imported to the software.

The 900 MHz system check is applicable for the 850 band as this is within 100 MHz of the of the 850 MHz spot frequency.

As per FCC KDB pub 450824 for SAR probe calibration; The following procedures are recommended for DUT measurements at 150 MHz to 3 GHz to minimize probe calibration and tissue dielectric parameter discrepancies. Measurements exceeding 50 % of these intervals, in this case +/- 50 MHz, EUT frequency greater than or equal to 300 MHz, shall apply method 1 of the steps.
1) When the actual tissue dielectric parameters used for probe calibration are available the differences for relative permittivity and conductivity between probe calibration and routine measurements should each be less than or equal to 5 % while also satisfying the required +/- 5 % tolerances in target dielectric parameters.

The simulation liquid used satisfies both 835 MHz and 900 MHz target values for all channels in the GSM850 band. The SAR probe coverage and conversion factor has been calibrated to ensure this condition is met and the appropriate conversion factor is used in the frequency range for up to +/- 100 MHz.

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

4. Deviations from the Test Specification

Test was performed as per KDB 248227 D01 "SAR measurements for 802.11a/b/g v01r02", KDB 447498 D01 "Mobile Portable RF Exposure v04", KDB 648474 D01 "SAR Handsets Multi Xmiter and Ant v01r05", KDB 450824 SAR Prob Cal and Ver Meas v01r01, KDB 616217 D03 ''SAR Supp Note and Netbook Laptop v01'', KDB 941225 D01 "SAR test for 3G v02", according to the handset procedures in IEEE Std 1528-2003 and OET Bulletin 65 Supplement C 01-01.

The EUT has a 'Base' dimension of 262 mm x 180 mm x 12.5 mm; which is larger than the minimum SAM phantom flat section. To limit differences in the measured SAR due to coupling variations the EUT was divided into 2 regions that overlapped. The initial area scan was performed on the 2 regions at a separation distance of 0 mm was the closest separation achievable to find the maximum spatial peak SAR level. Once the maximum Spatial Peak location was located the final measurement was then performed concentrating on that region.

As per KDB447498 D01, Simultaneous transmission evaluation not required, even though the sum of the individual SAR for WWAN and WLAN was >1.6 W/kg, the antenna-to-antenna distance was > 5 cm and the SAR to peak location separation ratio of simultaneous transmitting antenna pair < 0.3 The calculation of Peak location separation distance are illustrated in SAR distribution Scan in the '***Section 7.2.3***'

As per FCC KDB 941225 - SAR is not required for RMC+HSPA (HSDPA/HSUPA) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding RMC channels.

As per FCC KDB 248227 - SAR is not required for 802.11g/n channels when the maximum average output power is equal to that measured on the corresponding 802.11b channels.

5. Operation and Configuration of the EUT during Testing

5.1. Operating Modes

The EUT was tested in the following operating mode(s) unless otherwise stated:

- UMTS FDD V Call allocated mode with Communication Test Set configured to allow the EUT to transmit at a maximum as per KDB 941225 D01.
- UMTS FDD V - RMC 12.2kbps + HSDPA with Test loop mode 1 and TPC bits configured to all "1's", Sub-test 1 with Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D01.
- UMTS FDD V - RMC 12.2kbps + HSUPA With Test loop mode 1 and TPC bits configured to all "1's", Sub-test 5, AG Index set to 21 and E-TFCI set to 81 with Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D01.
- WiFi802.11b/g/n Data allocated mode using 'FaCTA' software to excise mode ‘b’, ‘g’ and ‘n’, with maximum power of up to 14.9 dBm for ‘b’ mode and 13.4 dBm for ‘g’ and 13.2 dBm for ‘n’ modes.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration(s) unless otherwise stated:

- Standalone fully charged battery powered.
- Body-worn configurations were evaluated.
- The applied FCC body-worn orientations Base, Secondary-Edge Landscape, Primary-Edge Portrait and Secondary-Edge Portrait where the corresponding edge(s) closest to the user with the most conservative exposure condition were all evaluated at 0 mm from the body.

Body Configuration

a) The EUT was placed in a normal operating position where the centre of EUT was aligned with the centre reference point on the flat section of the 'SAM' phantom.

b) With the EUT touching the phantom at an imaginary centre line. The EUT was aligned with a marked plane (X and Y axis) consisting of two lines.

c) For the touch-safe position the EUT was gradually moved towards the flat section of the 'SAM' phantom until any point of the EUT touched the phantom.

d) For position(s) greater then 0mm separation the EUT was positioned as per the touch-safe position, and then the vertical height was decreased/adjusted as required.

e) SAR measurements were evaluated at maximum power and the unit was operated for an appropriate period prior to the evaluation in order to minimise the drift.

f) The device was keyed to operate continuously in the transmit mode for the duration of the test.

g) The location of the maximum spatial SAR distribution (hot spot) was determined relative to the EUT and its antenna.

h) The EUT was transmitting at full power throughout the duration of the test powered by a fully charged battery.

6. Summary of Test Results

Test Name	Specification Reference	Result
Specific Absorption Rate-UMTS FDD V Body Configuration 1g	OET Bulletin 65 Supplement C: (2001-01)	Complied
Specific Absorption Rate-Wi-Fi 2450 Body Configuration 1g	OET Bulletin 65 Supplement C: (2001-01)	Complied

SAR Individual Transmitter Evaluation

device, mode	Frequency, (MHz)	P_x (mW)	P_{REF} (mW)	single SAR, W/kg	Remarks
WWAN, UMTS	850	224	60/f	1.070	Routine Evaluation
WLAN, Wi-Fi802.11	2450	31	12	0.854	Routine Evaluation
BT, *Bluetooth*	2400	~ 2	12	:=0	{$P_{BT} \leq 2P_{REF}$} {$d_{WWAN, BT} > 5cm$}

SAR Simultaneous Transmitter Evaluation

(x,y)	D(x,y) cm	L(x,y, z) cm	$SPLSR_{xyz}$ cm	Sim-Tx SAR	Remarks
($WWAN_{UMTS}$, BT)	>5	N/A	N/A	N/A	{no stand-alone SAR for BT}
($WWAN_{UMTS}$, Wi-Fi)	>5	19.8	0.097	N/A	{D(x,y) > 5 } & SPLSR < 0.3 {$\Sigma_{WWAN, WLAN} > 1.6$ W/kg}

Note(s):

1. As per FCC KDB447498 D01, even though the sum of the individual SAR for WWAN and WLAN was >1.6 W/kg, the antenna-to-antenna distance was > 5 cm and the SAR to peak location separation ratio of simultaneous transmitting antenna pair < 0.3, Simultaneous transmission evaluation is not required,
2. *Bluetooth* transmitter thresholds output power "P_{Ref} = 12 mW as listed in KDB 648474.
3. Px: power level measured by RFI.
4. Single SAR value measured by RFI.
5. The "Antenna-to-Antenna distance and Antenna-to-User distance were provided by the customer.

6.1. Location of Tests

All the measurements described in this report were performed at the premises of
RFI Global Services Ltd, Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG United Kingdom

7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to section 8 for details of measurement uncertainties.

7.2. Test Results

For All SAR measurement in this report the SAR limit tested to is 1.6 W/kg

7.2.1.Specific Absorption Rate - UMTS-FDD V Body Configuration 1g Test Summary:

Tissue Volume:	1g
Maximum Level (W/kg):	1.070
Environmental Conditions:	
Temperature Variation in Lab (°C):	24.0 to 24.0
Temperature Variation in Liquid (°C):	22.5 to 22.5

Results:

EUT Position	Phantom Configuration	Channel Number	Meas. Avg. Power (dBm)	MPR (dB)	Meas. Level (W/Kg)	Note(s)	Mod.
Base of EUT Antenna Retracted	Flat (SAM)	4183	23.4	N/A	1.060	1, 2	QPSK
Base of EUT Antenna Retracted	Flat (SAM)	4132	23.4	N/A	1.040	1, 2	QPSK
Base of EUT Antenna Retracted	Flat (SAM)	4233	23.5	N/A	1.070	1, 2	QPSK
Base of EUT Antenna Extended	Flat (SAM)	4183	23.4	N/A	1.040	1, 2	QPSK
Base of EUT Antenna Extended	Flat (SAM)	4132	23.4	N/A	1.040	1, 2	QPSK
Base of EUT Antenna Extended	Flat (SAM)	4233	23.5	N/A	1.060	1, 2	QPSK
Secondary-Edge Landscape of EUT Antenna Retracted	Flat (SAM)	4183	23.4	N/A	0.225	1, 2	QPSK

Specific Absorption Rate - UMTS-FDD V Body Configuration 1g (Continued)							
EUT Position	**Phantom Configuration**	**Channel Number**	**Meas. Avg. Power (dBm)**	**MPR (dB)**	**Meas. Level (W/Kg)**	**Note(s)**	**Mod.**
Secondary-Edge Landscape of EUT Antenna Extended	Flat (SAM)	4183	23.4	N/A	0.138	1, 2	QPSK
Secondary-Edge Portrait of EUT Antenna Retracted	Flat (SAM)	4183	23.4	N/A	0.081	1, 2	QPSK

Note(s):

1. SAR measurements were performed with the closest edge of the EUT at a separation distance of 0mm from the 'SAM' phantom flat section.
2. Circuit Switch (CS) - RMC 12.2kbps with Test loop mode 1 and TPC bits configured to All "1's"

* Primary-Edge Landscape and Primary-Edge Portrait of EUT Antenna Retracted was not tested, as Antenna to the edge distance is >10 cm.

* Secondary-Edge Portrait of EUT Antenna Extended was not tested, as this configuration was not achievable.

*KDB 941225 - SAR is not required for RMC+HSPA (HSDPA/HSUPA) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding RMC channels.

Results of the 2 regions UMTS-FDD V Body: Peak SAR level for the area scans (For Information Purpose Only)

EUT Position	Phantom Configuration	Channel Number	Peak Level (W/kg)	Note(s)
Base of EUT Facing Phantom (REGION 1)	Flat (SAM)	4183	0.222	1
Base of EUT Facing Phantom (REGION 2)	Flat (SAM)	4183	1.420	1

Note(s):

1. SAR measurements were performed with EUT at a separation distance of 0mm from 'SAM' phantom flat section.

7.2.2.Specific Absorption Rate – Wi-Fi 2450 Body Configuration 1g
Test Summary:

Tissue Volume:	1g
Maximum Level (W/kg):	0.854
Environmental Conditions:	
Temperature Variation in Lab (°C):	24.0 to 24.0
Temperature Variation in Liquid (°C):	23.0 to 23.0

Results:

EUT Position	Phantom Configuration	Channel Number	Meas. Avg. Power (dBm)	MPR (dB)	Meas. Level (W/Kg)	Note(s)	Mod.
Base of EUT Antenna Retracted	Flat (SAM)	6	14.7	N/A	0.836	1, 2	DBPSK
Base of EUT Antenna Retracted	Flat (SAM)	1	14.9	N/A	0.854	1, 2	DBPSK
Base of EUT Antenna Retracted	Flat (SAM)	11	14.3	N/A	0.804	1, 2	DBPSK
Base of EUT Antenna Extended	Flat (SAM)	6	14.7	N/A	0.840	1, 2	DBPSK
Base of EUT Antenna Extended	Flat (SAM)	1	14.9	N/A	0.850	1, 2	DBPSK
Base of EUT Antenna Extended	Flat (SAM)	11	14.3	N/A	0.799	1, 2	DBPSK
Secondary-Edge Landscape of EUT Antenna Retracted	Flat (SAM)	6	14.7	N/A	0.124	1, 2	DBPSK

Specific Absorption Rate - Wi-Fi 2450 Body Configuration 1g (Continued)							
EUT Position	**Phantom Configuration**	**Channel Number**	**Meas. Avg. Power (dBm)**	**MPR (dB)**	**Meas. Level (W/Kg)**	**Note(s)**	**Mod.**
Secondary-Edge Landscape of EUT Antenna Extended	Flat (SAM)	6	14.7	N/A	0.123	1, 2	DBPSK
Primary-Edge Portrait of EUT Antenna Retracted	Flat (SAM)	6	14.7	N/A	0.087	1, 2	DBPSK

Note(s):

1. SAR measurements were performed with the closest edge of the EUT at a separation distance of 0mm from the 'SAM' phantom flat section.
2. WLAN 802.11b 1Mbps

* Primary-Edge Landscape and Secondary-Edge Portrait of EUT Antenna Retracted was not tested, as Antenna to the edge distance is >10 cm.

* Primary-Edge Portrait of EUT Antenna Extended was not tested, as this configuration was not tested as the UHF Antenna to the Primary-Edge Portrait was at distance >10 cm.

*KDB 248227 - SAR is not required for 802.11g/n channels when the maximum average output power is equal to that measured on the corresponding 802.11b channels.

Results of the 2 regions Wi-Fi 2450 Body: Peak SAR level for the area scans (For Information Purpose Only)

EUT Position	Phantom Configuration	Channel Number	Peak Level (W/kg)	Note(s)
Base of EUT Facing Phantom (REGION 1)	Flat (SAM)	6	1.840	1
Base of EUT Facing Phantom (REGION 2)	Flat (SAM)	6	0.137	1

Note(s):

1. SAR measurements were performed with EUT at a separation distance of 0mm from 'SAM' phantom flat section.

7.2.3. SAR to Peak Location Separation Ratio (SPLSR):

EUT Configuration		Base of EUT Antenna Retracted			Base of EUT Antenna Extended		
	Channel Number	1	6	11	1	6	11
Base of EUT Antenna Retracted	4132	0.095	0.094	0.093	N/A	N/A	N/A
	4183	0.096	0.094	0.094	N/A	N/A	N/A
	4233	0.097	0.096	0.094	N/A	N/A	N/A
Base of EUT Antenna Extended	4132	N/A	N/A	N/A	0.095	0.094	0.092
	4183	N/A	N/A	N/A	0.095	0.094	0.092
	4233	N/A	N/A	N/A	0.096	0.095	0.093

Note(s):

As per FCC KDB 447498 D01, Simultaneous transmission evaluation not required, even though the sum of the individual SAR for WWAN and WLAN was >1.6 W/kg, the antenna-to-antenna distance was > 5 cm and the SAR to peak location separation ratio of simultaneous transmitting antenna pair < 0.3

SAR to Peak Location Separation Ratio (SPLSR) Calculation:

WWAN (FDD V CH4233)			WLAN (802.11b 1Mbps CH1)		
Peak Co-ordinates			Peak Co-ordinates		
X_1 (m)	Y_1 (m)	Z_1 (m)	X_1 (m)	Y_1 (m)	Z_1 (m)
-0.0270	-0.0990	-0.2034	-0.0330	0.0990	-0.2039

$X=(X_2- X_1)^2$	$Y=(Y_2- Y_1)^2$	$Z=(Z_2- Z_1)^2$	Distance between WWAN and WLAN Peak Co-ordinates {Square Root of Sum of x, y, z (m)}
0.0000360	0.0392119	0.0000003	0.1981115

SPLSR = Sum of PEAK WWAN and WLAN SAR (W/Kg) / Distance between Peak's Calculated (cm)

= (1.070 + 0.854) / 19.811150

= 0.0971170 < 0.3

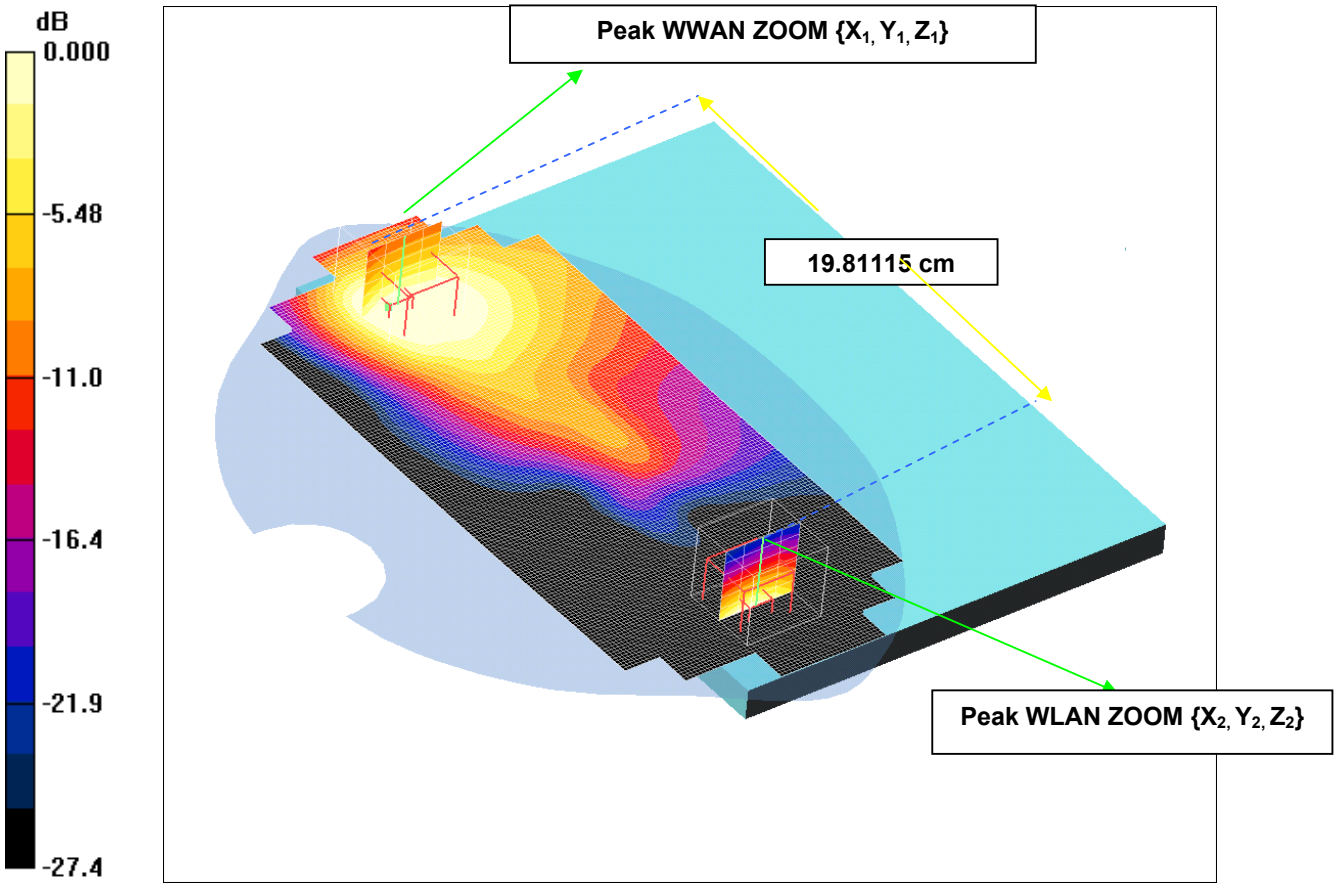
Conclusion: As per FCC KDB 447498 D01, Simultaneous transmission evaluation not required, even though the sum of the individual SAR for WWAN and WLAN was >1.6 W/kg, the antenna-to-antenna distance was > 5 cm and the SAR to peak location separation ratio of simultaneous transmitting antenna pair < 0.3

Note(s):

The above SPLSR calculation is only presented for worst case SAR measure on WWAN (Base of EUT with Antenna Retracted facing Phantom UMTS FDD V CH4233) and WLAN (Base of EUT with Antenna Retracted facing WLAN 802.11b 1Mbps CH1). The complete list of all possible SPLSR is given in section 7.2.3.

Graphics: SAR to Peak Location Separation Ratio (SPLSR) Calculation:

Base of EUT Antenna Retracted Facing Phantom SAR to Peak Location Separation Ratio of Simultaneous Transmitting Antenna Pair
DUT: Panasonic Mobile Comms Dev of Europe; Type: D21BR2 Tablet Sample C11; Serial: 359952040036369



0 dB = 0.936mW/g

Note: The above SPLSR calculation is only presented for worst case SAR measure on WWAN (Base of EUT with Antenna Retracted facing Phantom UMTS FDD V CH4233) and WLAN (Base of EUT with Antenna Retracted facing WLAN 802.11b 1Mbps CH1). The complete list of all possible SPLSR is given in section 7.2.3.

7.2.4.Conducted Average Power Measurement: 3G

Modes		HSDPA				HSPA					WCDMA
Sets		1	2	3	4	1	2	3	4	5	Voice / RMC 12.2kbps
Band	Channel	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]
UMTS FDD V (850 MHz)	4132 4357	22.9	22.4	21.8	21.8	21.9	22.6	21.3	22.9	21.9	23.4
	4183 4408	22.9	22.4	21.9	21.8	21.9	22.6	21.4	22.9	21.9	23.4
	4233 4458	23.0	22.5	22.0	21.9	22.0	22.7	21.5	23.0	22.0	23.5
ßc		2	12	15	15	11	6	15	2	15	
ßd		15	15	8	4	15	15	9	15	15	
ΔACK, ΔNACK, ΔCQI		8	8	8	8	8	8	8	8	8	
AGV		-	-	-	-	20	12	15	17	21	

The module power levels were measured in both HSPA and 3G RMC 12.2kbps modes and compared to ensure the correct mode of operation had been established.

The following tables taken from FCC 3G SAR procedures (KDB 941225 D01 SAR test for 3G devices v02) below were applied using an communications test set which supports 3G / HSDPA release 5 / HSPA release 6.

Sub-test Setup for Release 5 HSDPA

Sub-test	β_c	β_d	B_d *(SF)*	β_c/β_d	β_{hs} (1)	SM (dB) (2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 (3)	15/15 (3)	64	12/15 (3)	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ A_{hs} = β_{hs}/β_c = 30/15 ⇔ β_{hs} = 30/15 * β_c

Note 2: CM = 1 for β_c/β_d = 12/15, B_{hs}/β_c = 24/15

Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15

Sub-test Setup for Release 6 HSPA

Sub-test	β_c	β_d	B_d *(SF)*	β_c/β_d	β_{hs} (1)	B_{oc}	B_{od}	B_{od} *(SF)*	B_{od} *(codes)*	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	31/15	B_{al1}: 47/15 B_{al2}: 47/15	4	1	2.0	1.0	15	92
4	2/15	15/15	64	2/15	2/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	24/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 $\Leftrightarrow$ A_{hs} = β_{hs}/β_c = 30/15 $\Leftrightarrow$ β_{hs} = 30/15 * β_c

Note 2: CM = 1 for β_c/β_d = 12/15, B_{hs}/β_c = 24/15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH AND E-DPCCH for the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Tavle 5.1g.

Note 6: B_{od} can not be set directly; it is set by Absolute Grant Value.

7.2.5. Conducted Average Power Measurement: Wi-Fi802.11b/g/n

802.11b/g

Channel Number	Frequency (MHz)	TX Power before Test (dBm)	Note
1	2412.0	14.9	**2.4GHz 802.11b** (1Mbps)
6	2437.0	14.7	
11	2462.0	14.3	
1	2412.0	14.4	**2.4GHz 802.11b** (11Mbps)
6	2437.0	14.1	
11	2462.0	13.8	
1	2412.0	13.4	**2.4GHz 802.11g** (6Mbps)
6	2437.0	13.4	
11	2462.0	13.0	
1	2412.0	12.4	**2.4GHz 802.11g** (54Mbps)
6	2437.0	12.5	
11	2462.0	12.1	

802.11n.

Channel Number	Frequency (MHz)	TX Power before Test (dBm)	Note
1	2412.0	13.2	**2.4GHz 802.11n** (6.5Mbps (MCS0))
6	2437.0	13.2	
11	2462.0	12.8	
1	2412.0	11.3	**2.4GHz 802.11n** (65.0 Mbps (MCS7))
6	2437.0	11.2	
11	2462.0	11.0	

8. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Test Name	Confidence Level	Calculated Uncertainty
Specific Absorption Rate-UMTS-FDD V Body Configuration 1g	95%	20.07
Specific Absorption Rate-Wi-Fi 2450 Body Configuration 1g	95%	19.90

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

8.1. Specific Absorption Rate-UMTS FDD V Body Configuration 1g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\ (10g)}$	Standard Uncertainty		υ_i or υ_{eff}
							+ u (%)	- u (%)	
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration /Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.900	2.900	normal (k=1)	1.0000	1.0000	2.900	2.900	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	4.690	4.690	normal (k=1)	1.0000	0.6400	3.002	3.002	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	4.860	4.860	normal (k=1)	1.0000	0.6000	2.916	2.916	5
	Combined standard uncertainty			t-distribution			10.24	10.24	>250
	Expanded uncertainty			k = 1.96			20.07	20.07	>250

8.2. Specific Absorption Rate-Wi-Fi 2450 Body Configuration 1g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\ (10g)}$	Standard Uncertainty		υ_i or υ_{eff}
							+ u (%)	- u (%)	
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration / Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.570	2.570	normal (k=1)	1.0000	1.0000	2.570	2.570	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	4.900	4.900	normal (k=1)	1.0000	0.6400	3.136	3.136	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	4.920	4.920	normal (k=1)	1.0000	0.6000	2.952	2.952	5
	Combined standard uncertainty			t-distribution			10.15	10.15	>250
	Expanded uncertainty			k = 1.96			19.90	19.90	>250

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A034	Narda 20W Termination	Narda	374BNM	8706	Calibrated as part of system	-
A1097	SMA Directional Coupler	MiDISCO	MDC6223-30	None	Calibrated as part of system	-
A1137	3dB Attenuator	Narda	779	04690	Calibrated as part of system	-
A1174	Dielectric Probe Kit	Agilent Technologies	85070C	Us99360072	Calibrated before use	-
A1328	Handset Positioner	Schmid & Partner Engineering AG	Modification	SD 000 H01 DA	-	-
A1182	Handset Positioner	Schmid & Partner Engineering AG	V3.0	None	-	-
A1184	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE3	394	26 Jan 2012	12
A2077	Probe	Schmid & Partner Engineering AG	EX3 DV4	3814	22 Sep 2011	12
A1235	900 MHz Dipole Kit	Schmid & Partner Engineering AG	D900V2	124	09 Feb 2011	24
A1322	2450 MHz Dipole Kit	Schmid & Partner Engineering AG	D2450V2	725	08 Feb 2011	24
A1497	Amplifier	Mini-Circuits	zhl-42w (sma)	e020105	Calibrated as part of system	-
A1566	SAM Phantom	Schmid & Partner Engineering AG	SAM a (Site 56)	002	Calibrated before use	-
A1238	SAM Phantom	Schmid & Partner Engineering AG	SAM b (Site 56)	001	Calibrated before use	-
A215	20 dB Attenuator	Narda	766-20	9402	Calibrated as part of system	-
A1531	Antenna	AARONIA AG	7025	02458	-	-
M1015	Network Analyser	Agilent Technologies	8753ES	US39172406	27 Sept 2011	12
C1145	Cable	Rosenberger MICRO-COAX	FA147A F003003030	41843-1	Calibrated as part of system	-
C1146	Cable	Rosenberger MICRO-COAX	FA147A F030003030	41752-1	Calibrated as part of system	-
G0528	Robot Power Supply	Schmid & Partner Engineering AG	DASY4	None	Calibrated before use	-

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
G087	PSU	Thurlby Thandar	CPX200	100701	Calibrated before use	-
M1047	Robot Arm	Staubli	RX908 L	F00/SD8 9A1/A/01	Calibrated before use	-
M1159	Signal Generator	Agilent Technologies	E8241A	US42110332	Internal Checked 14 Apr 2012	4
M1071	Spectrum Analyzer	Agilent	HP8590E	3647U00514	(Monitoring use only)	-
M509	Thermometer	Testo 110 Immersion Probe & Thermometer	Testo 110	03100047	25 May 2011	13
M1270	Digital Thermometer	RS	N/A	N/A	Internal Checked 13 May 2012	12
S256	SAR Lab	RFI	Site 56	N/A	Calibrated before use	-

Note: All the assets were in calibration during the course of testing.

A.1.1. Calibration Certificates

This section contains the calibration certificates and data for the Probe(s) and Dipole(s) used, which are not included in the total number of pages for this report.

The following information is justification to why the listed dipoles calibration period has been extended. This address FCC KDB 450824 D02

Cal Date	Dipole Calibration History									
	Dipole SN: 124, Frequency 900 MHz									
	Head Parameters					Body Parameters				
	1g (W/Kg)	10g (W/Kg)	Return loss (dB)	Real (Ω)	Imaginary (Ω)	1g (W/Kg)	10g (W/Kg)	Return loss (dB)	Real (Ω)	Imaginary (Ω)
27-Jun-12	Lab Annual Check of dipole		-24.73	49.56	-7.4	Lab Annual Check of dipole		-21.92	48.18	-8.03
09-Feb-11	11.00	7.01	-21.60	48.90	-8.20	11.10	7.14	-20.20	46.10	-8.60
23-Aug-07	10.20	6.56	-21.20	48.60	-8.50	10.50	6.89	-20.20	45.40	-8.10
31-Aug-05	10.60	6.78	-24.70	49.10	-5.70	10.50	6.77	-18.90	44.90	-8.90
13-May-03	10.60	6.76	-24.00	50.30	-6.40	11.00	7.12	-20.60	46.20	-8.20
03-Aug-01	11.28	7.16	-25.40	50.80	-5.60	Dipole calibrated for Head only				
Standard Deviation	**0.42**	**0.23**	**1.77**	**0.85**	**1.25**	**0.32**	**0.18**	**1.08**	**1.25**	**0.37**
|Mean Value|	**10.74**	**6.85**	**23.61**			**10.78**	**6.98**	**20.36**		
Relative standard deviation %	**3.87%**	**3.41%**	**7.49%**			**2.97%**	**2.58%**	**5.31%**		

Cal Date	Dipole Calibration History									
	Dipole SN: 725, Frequency 2450 MHz									
	Head Parameters					Body Parameters				
	1g (W/Kg)	10g (W/Kg)	Return loss (dB)	Real (Ω)	Imaginary (Ω)	1g (W/Kg)	10g (W/Kg)	Return loss (dB)	Real (Ω)	Imaginary (Ω)
02-July-12	Lab Annual Check of dipole		-20.37	47.27	8.65	Lab Annual Check of dipole		-21.04	48.52	8.72
08-Feb-11	52.90	24.70	-20.50	45.60	7.90	51.90	24.10	-20.20	49.50	9.70
08-Jan-09	52.10	24.30	-23.70	54.40	5.30	52.20	24.70	-23.40	49.00	6.70
17-Jan-07	53.30	24.80	-22.10	52.40	7.70	53.30	24.50	-21.80	47.80	7.70
04-Jan-05	54.5	24.70	-22.30	53.50	7.20	52.90	24.50	-22.20	48.50	7.50
17-Jan-03	54.70	24.50	-22.60	53.00	7.00	52.10	24.10	-21.70	49.00	8.10
Standard Deviation	**1.10**	**0.20**	**1.28**	**3.66**	**1.14**	**0.59**	**0.27**	**1.08**	**0.58**	**1.04**
|Mean Value|	**53.50**	**24.60**	**21.93**			**52.48**	**24.38**	**21.72**		
Relative standard deviation %	**2.05%**	**0.81%**	**5.85%**			**1.13%**	**1.10%**	**4.97%**		

Note:

1. SAR lab has more than one dipole, the 900 MHz calibration gap is 24 months from 2007 and a second dipole was use after this period.
2. The dipole history shows that the measured SAR relative standard deviation was all less than 10% for the calibration period. The return loss relative standard deviation was all less than 10 %. And the real and imaginary impedance standard deviation is within 5 **(Ω).**

27-SEPT-2011
Checked by R. Dinn

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

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

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Accreditation No.: SCS 108

Client RFI

Certificate No: EX3-3814_Sep11

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3814

Calibration procedure(s): QA CAL-01.v8, QA CAL-12.v7, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: September 22, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Fin Bomholt	R&D Director	

Issued: September 22, 2011

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

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3814

Manufactured: September 2, 2011
Calibrated: September 22, 2011

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3814

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.52	0.51	0.44	± 10.1 %
DCP (mV)[B]	100.8	96.5	101.1	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	121.7	±2.7 %
			Y	0.00	0.00	1.00	115.0	
			Z	0.00	0.00	1.00	105.3	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3814

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	43.5	0.87	9.55	9.55	9.55	0.12	1.00	± 13.4 %
750	41.9	0.89	9.26	9.26	9.26	0.80	0.67	± 12.0 %
900	41.5	0.97	8.75	8.75	8.75	0.71	0.73	± 12.0 %
1750	40.1	1.37	8.13	8.13	8.13	0.80	0.62	± 12.0 %
1900	40.0	1.40	7.78	7.78	7.78	0.80	0.61	± 12.0 %
2450	39.2	1.80	7.02	7.02	7.02	0.80	0.60	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

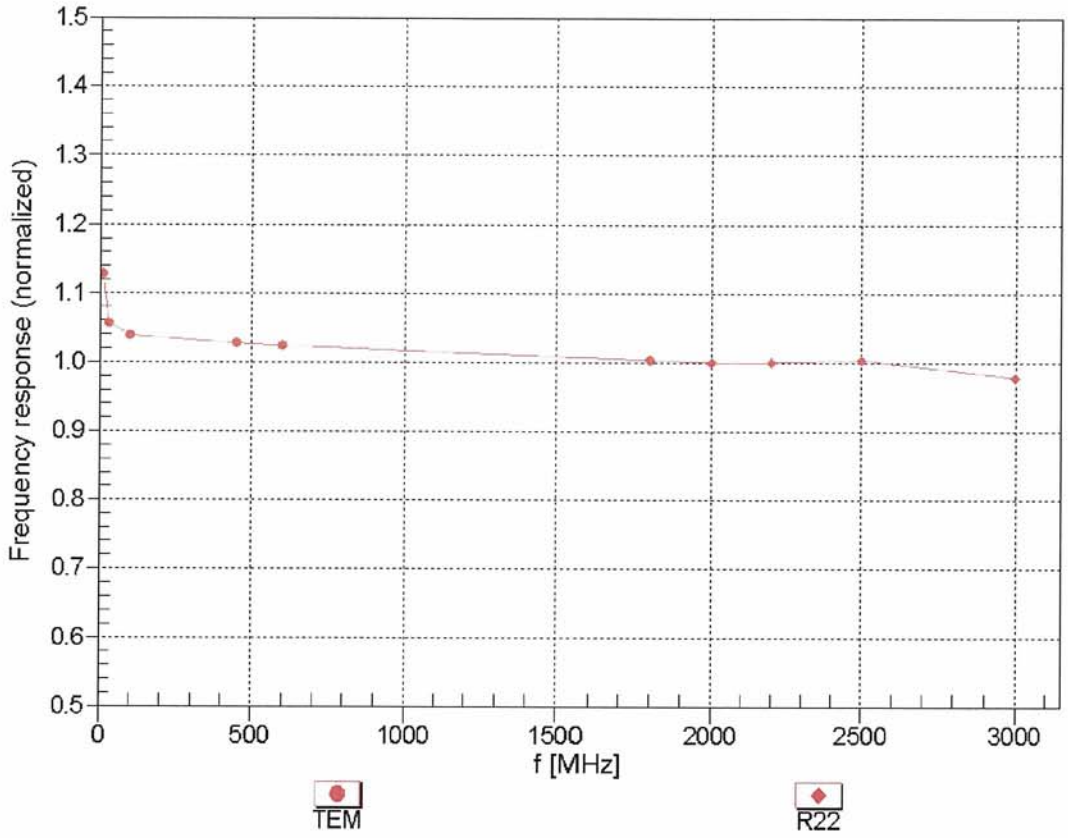
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3814

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	10.39	10.39	10.39	0.04	1.00	± 13.4 %
750	55.5	0.96	9.28	9.28	9.28	0.80	0.65	± 12.0 %
900	55.0	1.05	8.92	8.92	8.92	0.80	0.65	± 12.0 %
1750	53.4	1.49	7.58	7.58	7.58	0.80	0.67	± 12.0 %
1900	53.3	1.52	7.31	7.31	7.31	0.80	0.68	± 12.0 %
2150	53.1	1.66	7.38	7.38	7.38	0.80	0.65	± 12.0 %
2450	52.7	1.95	7.15	7.15	7.15	0.80	0.50	± 12.0 %
2600	52.5	2.16	7.02	7.02	7.02	0.80	0.50	± 12.0 %
3700	51.0	3.55	6.35	6.35	6.35	0.26	1.68	± 13.1 %
5200	49.0	5.30	4.19	4.19	4.19	0.60	1.95	± 13.1 %
5500	48.6	5.65	3.86	3.86	3.86	0.60	1.95	± 13.1 %
5800	48.2	6.00	3.94	3.94	3.94	0.60	1.95	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

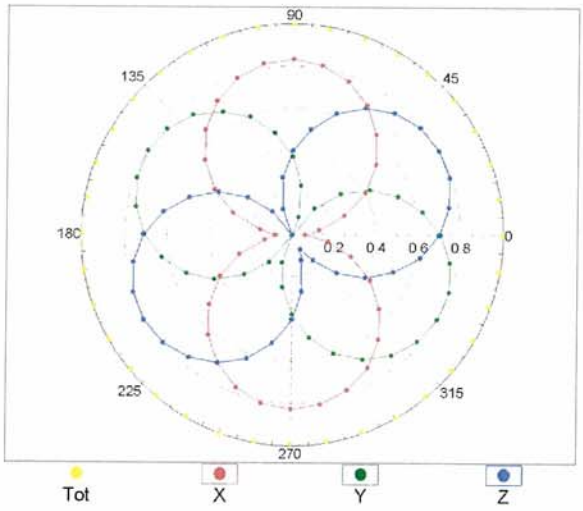
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



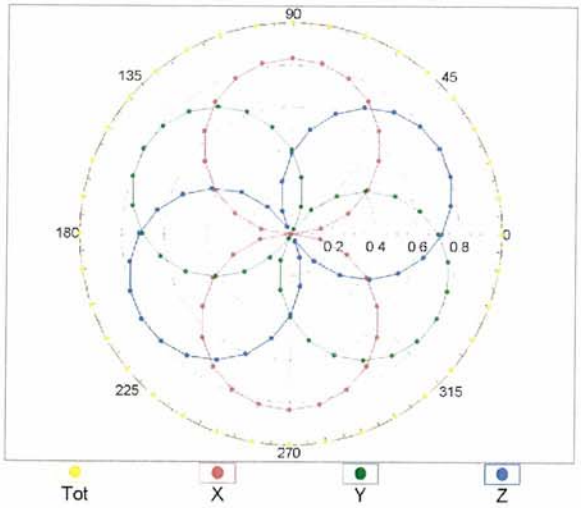
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

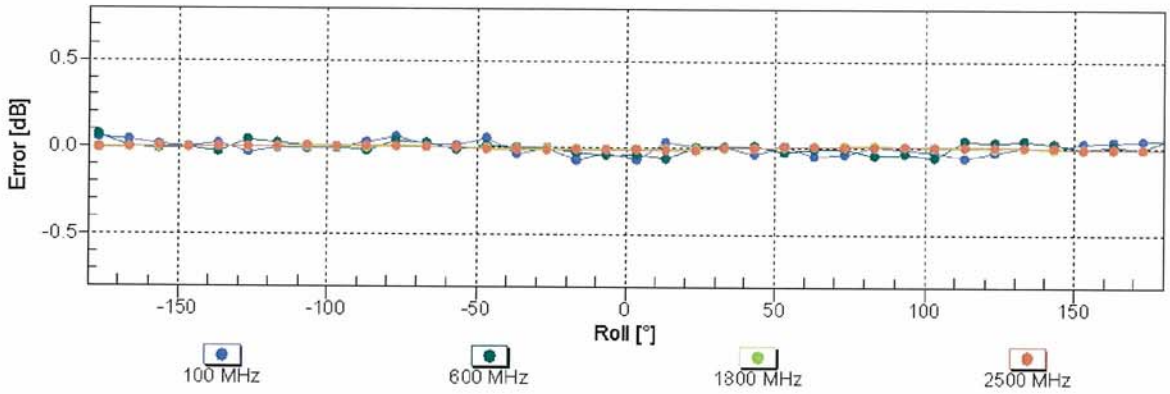
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



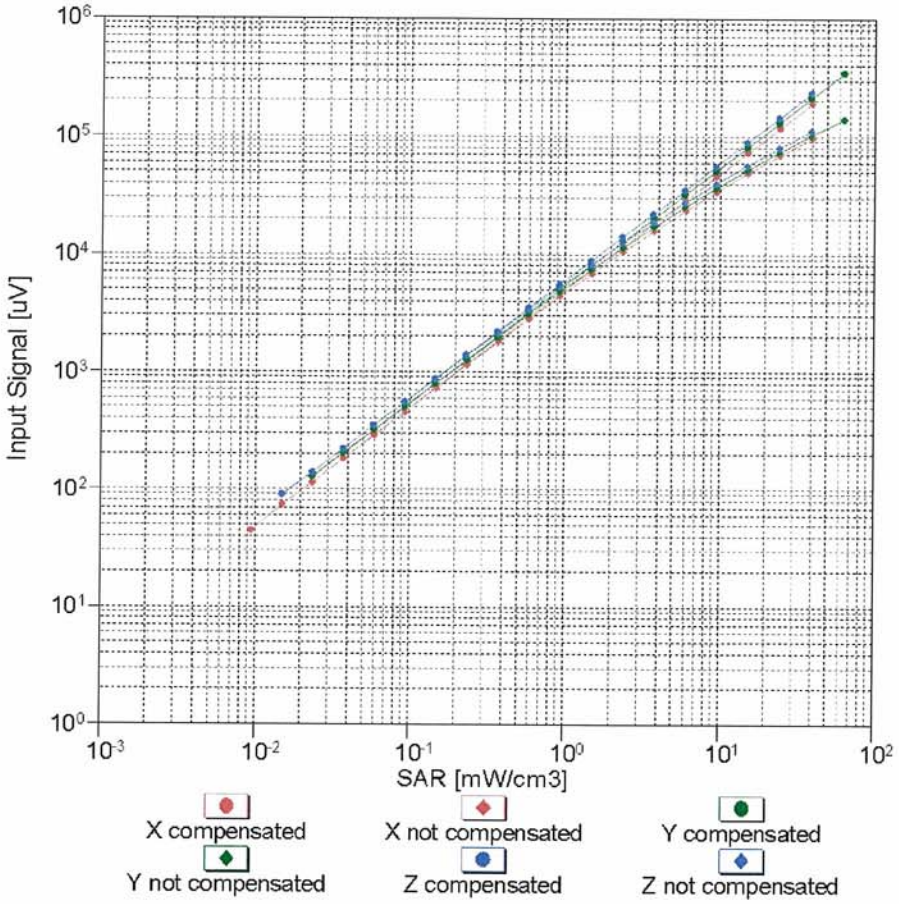
f=1800 MHz,R22

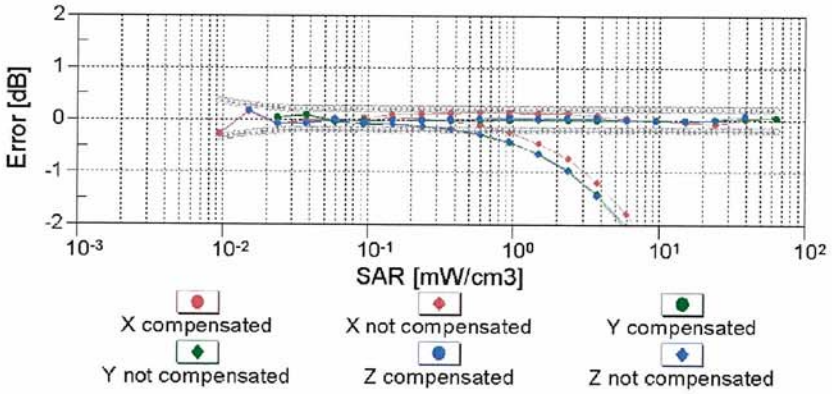




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)

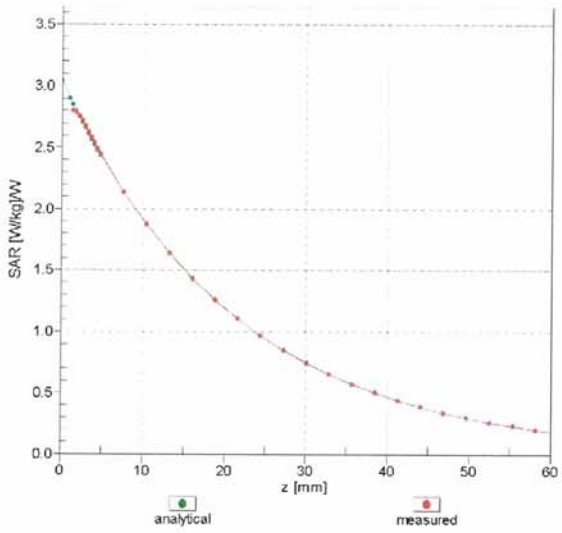




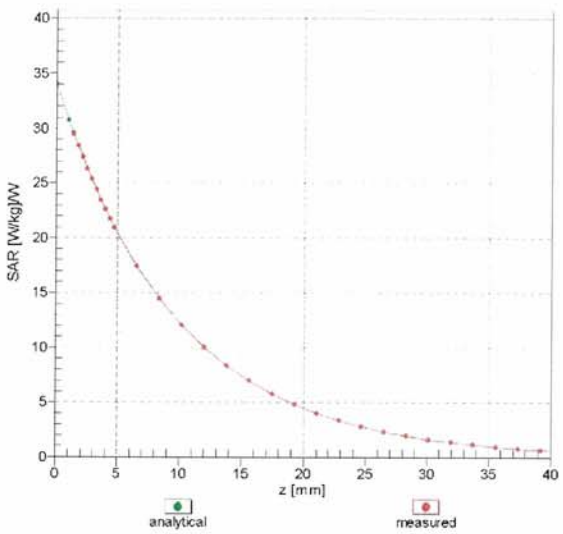
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 750 MHz,WGLS R9 (H_convF)

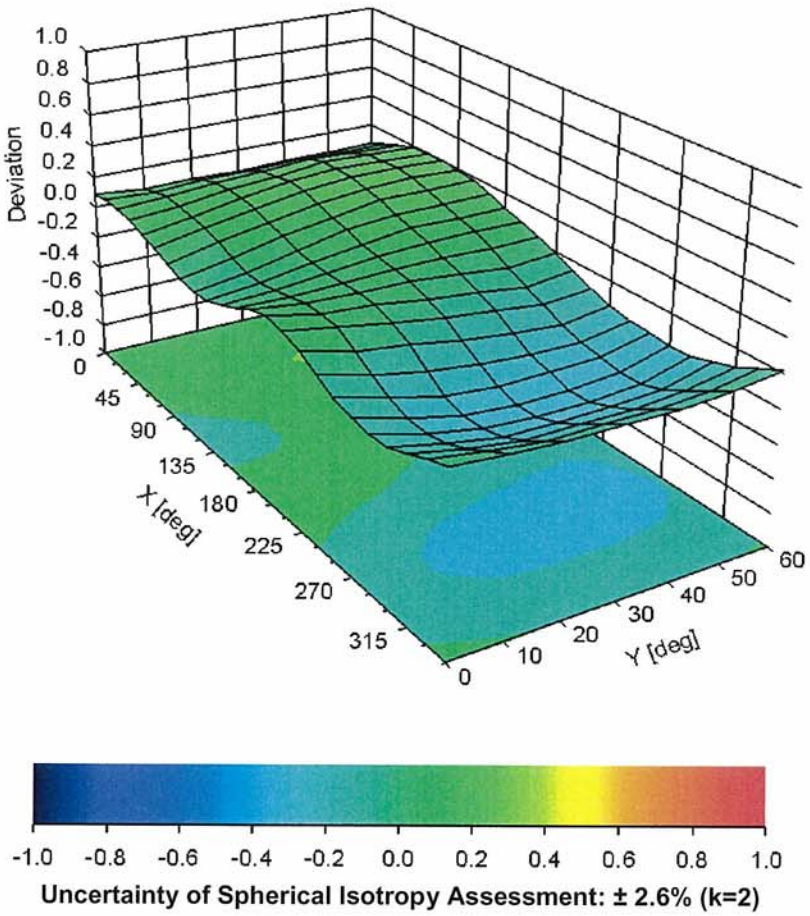


f = 2450 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3814

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm