

Report No. : E5/2017/90023 Page : 1 of 274

# SAR TEST REPORT



The following samples were submitted and identified on behalf of the client as:

Equipment Under Test	Smart Phone
Brand Name	Nokia
Model No.	TA-1035
Company Name	HMD Global Oy
Company Address	Karaportti 2, 02610 Espoo, Finland
Standards	IEEE/ANSI C95.1-1992, IEEE 1528-2013,
	KDB248227D01v02r02,KDB865664D01v01r04,
	KDB865664D02v01r02,KDB941225D01v03r01,
	KDB941225D05v02r05,KDB941225D06v02r01,
	KDB447498D01v06,KDB648474D04v01r03,
FCC ID	2AJOTTA-1035
Date of Receipt	Jun. 24, 2017
Date of Test(s)	Jun. 28, 2017 ~ Aug. 25, 2017
	Oct. 05, 2017 ~ Oct. 12, 2017
Date of Issue	Oct. 16, 2017

In the configuration tested, the EUT complied with the standards specified above. **Remarks:** 

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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#### Signed on behalf of SGS

Engineer

Bond Tsai

Supervisor

John Teh

John Yeh Date: Oct. 16, 2017

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# **Revision History**

Report Number	Revision	Description	Issue Date
E5/2017/90023	Rev.00	Initial creation of document	Oct. 16, 2017

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# **1. General Information**

# **1.1 Testing Laboratory**

SGS Taiwan Ltd. Electronics & Communication Laboratory			
No. 2, Keji 1st Rd., Guishan Township, Taoyuan County, 33383, Taiwan			
Tel	+886-2-2299-3279		
Fax +886-2-2298-0488			
Internet	http://www.tw.sgs.com/		

# **1.2 Details of Applicant**

Company Name	HMD Global Oy
Company Address	Karaportti 2, 02610 Espoo, Finland

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# **1.3 Description of EUT**

EUT Name	Smart Phone					
Brand Name	Nokia	Nokia				
Model No.	TA-1035					
FCC ID	2AJOTTA-1	035				
	<b>T</b> A 4005	WWAN 35604108000	3175 / 356041080003167			
	TA-1035	WLAN 35604108000	3092 / 356041080003084			
IMEI	2 <sup>nd</sup> solution	356041080008620 / 35 356041080008687 / 35				
	⊠GSM					
			A+ 🖾 DC-HSDPA			
Mode of Operation						
	Bluetoot	n 🖾 WLAN802.11 b/g/	'n(20M)			
	GSM (DTM multi	class B)	1/8.3			
	GPRS (support mu	ulti class 12 max)	1/2 (1Dn4UP) 1/2.76 (1Dn3UP) 1/4.1 (1Dn2UP) 1/8.3 (1Dn1UP)			
Duty Cycle	EDGE (support mu	ulti class 12 max)	1/2 (1Dn4UP) 1/2.76 (1Dn3UP) 1/4.1 (1Dn2UP) 1/8.3 (1Dn1UP)			
	LTE FDD (LTE Relea	se Version: R8)	1			
	· ·	se Version: R8)	0.633			
	WCDMA (HSDPA Ca (HSUPA Ca	<b>U I I</b>	1			
	WLAN802.	11 b/g/n(20M)	1			
	Bluetooth		1			

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	GSM850	824	_	849
	GSM1900	1850	_	1910
	WCDMA Band II	1850	—	1910
	WCDMA Band IV	1710	_	1755
	WCDMA Band V	824	_	849
	LTE FDD Band 2	1850	—	1910
TX Frequency Range	LTE FDD Band 4	1710	—	1755
(MHz)	LTE FDD Band 5	824	—	849
	LTE FDD Band 7	2500	_	2570
	LTE FDD Band 12	699	_	716
	LTE FDD Band 17	704	—	716
	LTE TDD Band 38	2570		2620
	WLAN802.11 b/g/n(20M)	2412	_	2462
	Bluetooth	2402	_	2480
	GSM850	128	—	251
	GSM1900	512	—	810
	WCDMA Band II	9262	—	9538
	WCDMA Band IV	1312	—	1513
	WCDMA Band V	4132	—	4233
	LTE FDD Band 2	18607	—	19193
Channel Number	LTE FDD Band 4	19957	_	20393
(ARFCN)	LTE FDD Band 7	20775	—	21425
	LTE FDD Band 5	20407	—	20643
	LTE FDD Band 12	23017	_	23173
	LTE FDD Band 17	23755	_	23825
	LTE TDD Band 38	37775		38225
	WLAN802.11 b/g/n(20M)	1		11
	Bluetooth	0		78

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Max. SAR (1 g) (Unit: W/Kg)				
Mode	Band	Measured	Reported	Position / Channel
	GSM 850	0.26	0.32	⊠Left ☐Right ⊠Cheek ☐Tilt <u>190</u> Channel
	GSM 1900	0.14	0.17	☐Left ⊠Right ⊠Cheek ☐Tilt <u>810</u> Channel
	WCDMA Band II	0.16	0.16	☐Left ⊠Right ⊠Cheek ☐Tilt <u>9262</u> Channel
	WCDMA Band IV	0.25	0.26	☐Left ⊠Right ⊠Cheek ☐Tilt <u>1412</u> Channel
	WCDMA Band V	0.31	0.34	☐Left ☐Right ☐Cheek ☐Tilt 4233 Channel
Head	LTE FDD Band 2	0.16	0.16	□Left ⊠Right ⊠Cheek □Tilt 18700 Channel
	LTE FDD Band 4	0.23	0.27	☐Left ⊠Right ⊠Cheek ☐Tilt 20050 Channel
	LTE FDD Band 5	0.27	0.30	⊠Left □Right ⊠Cheek □Tilt <u>20450</u> Channel
	LTE FDD Band 7	0.10	0.10	⊠Left □Right ⊠Cheek □Tilt <u>21350</u> Channel
	LTE FDD Band 12	0.21	0.21	□Left ⊠Right ⊠Cheek □Tilt <u>23130</u> Channel
	LTE FDD Band 17	0.21	0.21	☐Left ⊠Right ⊠Cheek ☐Tilt 23780 Channel

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Max. SAR (1 g) (Unit: W/Kg)				
Mode	Band	Measured	Reported	Position / Channel
	LTE TDD Band 38	0.06	0.06	Left Right Cheek Tilt <u>38000</u> Channel
Head	WLAN802.11 b	0.46	0.48	□Left ⊠Right ⊠Cheek □Tilt <u>1</u> Channel

Max. SAR (1 g) (Unit: W/Kg)					
Mode	Band	Measured	Reported	Position / Channel	
	GSM 850	0.26	0.32	⊠Front ⊡Back <u>190</u> Channel	
Body-worn (15mm)	GSM 1900	0.21	0.24	⊠Front ⊡Back <u>810</u> Channel	
	WCDMA Band IV	0.47	0.49	⊠Front ⊡Back <u>1412</u> Channel	
	LTE FDD Band 4	0.39	0.46	⊠Front □Back 20050 Channel	
	LTE FDD Band 7	0.36	0.37	⊠Front ⊡Back <u>21350</u> Channel	

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Max. SAR (1 g) (Unit: W/Kg)					
Mode	Band	Measured	Reported	Position / Channel	
	GPRS 850 (1Dn1UP)	0.45	0.54	Front Back Bottom Right Left <u>190</u> Channel	
	GPRS 1900 (1Dn4UP)	0.72	0.88	☐Front ☐Back ⊠Bottom ☐Right ☐Left <u>512</u> Channel	
	WCDMA Band II	1.11	1.23	☐Front ☐Back ☐Bottom ☐Right ☐Left 9400 Channel	
	WCDMA Band IV	1.21	1.28	☐Front ☐Back ⊠Bottom ☐Right ☐Left <u>1312</u> Channel	
Hotspot Mode (10mm)	WCDMA Band V	0.53	0.58	Front Back Bottom Right Left <u>4233</u> Channel	
	LTE FDD Band 2	1.10	1.26	Front Back Bottom Right Left <u>19100</u> Channel	
	LTE FDD Band 4	1.15	1.25	Front Back Bottom Right Left <u>20175</u> Channel	
	LTE FDD Band 5	0.36	0.40	Front Back Bottom Right Left 20450 Channel	
	LTE FDD Band 7	1.17	1.21	☐Front ☐Back ⊠Bottom ☐Right ☐Left 21350 Channel	

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Max. SAR (1 g) (Unit: W/Kg)					
Mode	Band	Measured	Reported	Position / Channel	
	LTE FDD Band 12	0.44	0.44	Front Back Bottom Right Left 23130 Channel	
Hotspot	LTE FDD Band 17	0.44	0.45	Front Back Bottom Right Left 23780 Channel	
Mode (10mm)	LTE TDD Band 38	0.69	0.72	☐Front ☐Back ⊠Bottom ☐Right ☐Left 38000 Channel	
	WLAN802.11 b	0.21	0.22	☐Front ⊠Back ☐Bottom ☐Right ☐Left <u>1</u> Channel	

# Change Note

The major change filed under this application is:

- 1. Hardware changes in order to improve performance without impact on RF characteristics, please refer to attachment for details of this modification.
- 2. The Radio parameters, PCB layout, RF active components and antenna are remained no changed in this modification.
- 3. WWAN antenna matching components are changed in order to improve operation performance, all other components are kept as same as the exhibitions in original certification.

The antenna is remained equivalent, therefore radiated performance in the intentional frequency bands is expected to be equal to that measured in the original certification.

For SAR evaluation in this modified device, worst case SAR is measured in each exposure/band and the highest SAR of the modified device for each configuration is less than the highest SAR for the original device under similar test configurations.

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## GSM 850 - conducted power table:

			Max.		Source	
			Rated	Burst	-based	
	Frequency		Avg.	average	time	
EUT mode	(MHz)	CH	Power +	power	average	
	(11112)		Max.		power	
			Tolerance	Avg.	Avg.	
			(dBm)	(dBm)	(dBm)	
0014050	824.2	128	34.5	33.54	24.51	
GSM850 (GMSK)	836.6	190	34.5	33.67	24.64	
	848.8	251	34.5	33.63	24.6	
The di	vision facto	r compared	to the numb	per of TX tir	ne slot	
	Divisio		1 TX time slot			
	DIVISIO		-9.03			

# GPRS 850 - conducted power table:

	Burst average power									
	ted Avg. Power olerance (dBr		34.5 30 28.5		27.5					
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP				
EUT mode	mode Frequency CH		Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)				
GPRS	824.2	128	33.54	29.18	28.21	26.93				
850	836.6	190	33.67	29.31	28.33	26.82				
000	848.8 251		33.63	29.07	28.31	26.92				
		Sc	ource-based tim	e average powe	er					
GPRS	824.2	128	24.51	23.16	23.95	23.92				
850	836.6	190	24.64	23.29	24.07	23.81				
050	848.8	251	24.60	23.05	24.05	23.91				
	The div	ision fa	ctor compared	to the number o	of TX time slot					
Div	vision factor		1 TX time slot -9.03	2 TX time slot -6.02	3 TX time slot -4.26	4 TX time slot -3.01				

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# EDGE 850 - conducted power table:

	Burst average power									
	ted Avg. Powe olerance (dBr		27	26	25	23.5				
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP				
EUT mode	Frequency (MHz) CH		A∨g. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)				
EDGE	824.2	128	26.98	25.95	24.88	23.46				
850	836.6	190	26.89	25.91	24.25	23.04				
050	848.8	251	26.84	25.88	24.25	22.95				
		Sc	ource-based tim	e average powe	er					
EDGE	824.2	128	17.95	19.93	20.62	20.45				
850	836.6	190	17.86	19.89	19.99	20.03				
050	848.8	251	17.81	19.86	19.99	19.94				
	The div	ision fa	ctor compared	to the number c	of TX time slot					
Div	ision factor		1 TX time slot	2 TX time slot	3 TX time slot	4 TX time slot				
			-9.03	-6.02	-4.26	-3.01				

# GSM 1900 - conducted power table:

			Max.		Source					
			Rated	Burst	-based					
	Frequency	,	Avg.	average	time					
EUT mode	(MHz)	СН	Power +	power	average					
	(101112)		Max.		power					
			Tolerance	Avg.	Avg.					
			(dBm)	(dBm)	(dBm)					
CCM4000	1850.2	512	31.5	30.07	21.04					
GSM1900 (GMSK)	1800	661	31.5	30.44	21.41					
	1909.8	810	31.5	30.82	21.79					
The di	The division factor compared to the number of TX time slot									
	Divisio		1 TX time slot							
	DIVISIO	Παυισι		-9.03						

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### GPRS 1900 - conducted power table:

	Burst average power									
	ted Avg. Powe olerance (dBr		31.5	29	27.5	26.5				
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP				
EUT mode	ode Frequency CH		Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)				
GPRS	1850.2	1850.2 512		27.99	26.87	25.61				
1900	1880	661	30.44	28.44	26.75	25.46				
1900	1909.8 810		30.82	28.50	26.88	25.54				
		Sc	ource-based tim	e average powe	er					
GPRS	1850.2	512	21.04	21.97	22.61	22.60				
1900	1880	661	21.41	22.42	22.49	22.45				
1900	1909.8	810	21.79	22.48	22.62	22.53				
	The div	ision fa	ctor compared	to the number c	of TX time slot					
Div	ision factor			2 TX time slot						
			-9.03	-6.02	-4.26	-3.01				

# EDGE 1900 - conducted power table:

			Burst avera	age power		
	ted Avg. Powe olerance (dBr		26.5	25.5	24	22.5
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP
EUT mode	Frequency (MHz) CH		Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)
EDGE	1850.2	1850.2 512		25.14	23.92	22.42
1900	1880	661	26.04	25.34	23.68	22.29
1900	1909.8 810		26.24	25.47	23.70	22.41
		So	ource-based tim	e average powe	er	
EDGE	1850.2	512	16.63	19.12	19.66	19.41
1900	1880	661	17.01	19.32	19.42	19.28
1900	1909.8	810	17.21	19.45	19.44	19.40
	The div	ision fa	ctor compared	to the number c	of TX time slot	
Div	ision factor		1 TX time slot	2 TX time slot	3 TX time slot	4 TX time slot
DI			-9.03	-6.02	-4.26	-3.01

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# WCDMA Band II - HSDPA / HSUPA / HSPA+ / DC-HSDPA Conducted power table (Unit: dBm):

	Band	V	VCDMA	
	TX Channel	9262	9400	9538
	equency (MHz)	1852.4	1880	1907.6
Max. Rated Avg. I		23.50		
3GPP Rel 99	RMC 12.2Kbps	23.43	23.05	22.91
Max. Rated Avg. I	Power+Max. Tolerance (dBm)		22.50	
3GPP Rel 5	HSDPA Subtest-1	22.35	22.06	21.87
	HSDPA Subtest-2	21.83	21.57	21.47
	HSDPA Subtest-3	21.98	21.73	21.44
	HSDPA Subtest-4	21.97	21.71	21.43
	HSUPA Subtest-1	22.42	21.70	21.26
	HSUPA Subtest-2	21.44	21.02	20.85
3GPP Rel 6	HSUPA Subtest-3	21.08	21.05	20.96
	HSUPA Subtest-4	21.56	21.01	20.96
	HSUPA Subtest-5	22.40	21.90	21.70
3GPP Rel 7	HSPA+ Subtest-1	22.05	21.43	21.08
	DC-HSDPA Subtest-1	22.00	21.90	21.72
3GPP Rel 8	DC-HSDPA Subtest-2	21.59	21.52	21.44
	DC-HSDPA Subtest-3	21.63	21.60	21.49
	DC-HSDPA Subtest-4	21.60	21.53	21.46

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# WCDMA Band IV – HSDPA / HSUPA / HSPA+ / DC-HSDPA (Hotspot OFF) Conducted power table (Unit: dBm):

	Band	V	VCDMA I	V
	TX Channel	1312	1412	1513
Fre	equency (MHz)	1712.4	1732.4	1752.6
Max. Rated Avg.	Power+Max. Tolerance (dBm)		24.50	
3GPP Rel 99	RMC 12.2Kbps	24.30	24.32	24.24
Max. Rated Avg.	Power+Max. Tolerance (dBm)		23.50	
3GPP Rel 5	HSDPA Subtest-1	23.16	23.14	23.31
	HSDPA Subtest-2	22.73	22.61	22.80
	HSDPA Subtest-3	22.77	22.75	22.83
	HSDPA Subtest-4	22.66	22.75	22.95
	HSUPA Subtest-1	23.01	23.11	23.14
	HSUPA Subtest-2	22.51	22.54	22.73
3GPP Rel 6	HSUPA Subtest-3	23.14	23.08	23.04
	HSUPA Subtest-4	23.02	23.03	23.18
	HSUPA Subtest-5	23.10	23.12	23.19
3GPP Rel 7	HSPA+ Subtest-1	22.92	22.98	23.04
	DC-HSDPA Subtest-1	22.92	22.85	22.98
3GPP Rel 8	DC-HSDPA Subtest-2	22.44	22.40	22.47
JUFF Nel O	DC-HSDPA Subtest-3	22.49	22.45	22.52
	DC-HSDPA Subtest-4	22.34	22.31	22.39

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# WCDMA Band IV – HSDPA / HSUPA / HSPA+ / DC-HSDPA (Hotspot ON) Conducted power table (Unit: dBm):

	Band	V	VCDMA I	V		
	TX Channel	1312	1412	1513		
	equency (MHz)	1712.4	1732.4	1752.6		
Max. Rated Avg.	Max. Rated Avg. Power+Max. Tolerance (dBm)					
3GPP Rel 99	RMC 12.2Kbps	22.76	22.80	22.93		
Max. Rated Avg.	Power+Max. Tolerance (dBm)		22.00			
	HSDPA Subtest-1	21.79	21.88	21.97		
3GPP Rel 5	HSDPA Subtest-2	21.71	21.81	21.86		
	HSDPA Subtest-3	21.17	21.22	21.26		
	HSDPA Subtest-4	21.18	21.25	21.29		
	HSUPA Subtest-1	21.75	21.75	21.81		
	HSUPA Subtest-2	21.20	21.24	21.30		
3GPP Rel 6	HSUPA Subtest-3	21.72	21.73	21.82		
	HSUPA Subtest-4	21.71	21.72	21.79		
	HSUPA Subtest-5	21.78	21.76	21.85		
3GPP Rel 7	HSPA+ Subtest-1	21.67	21.68	21.73		
	DC-HSDPA Subtest-1	21.55	21.61	21.72		
3GPP Rel 8	DC-HSDPA Subtest-2	21.50	21.52	21.59		
JUFF IVELO	DC-HSDPA Subtest-3	21.00	21.05	21.13		
	DC-HSDPA Subtest-4	21.02	21.08	21.13		

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# WCDMA Band V - HSDPA / HSUPA / HSPA+ / DC-HSDPA Conducted power table (Unit: dBm):

	Band	۱. N	VCDMA '	V		
	TX Channel	4132	4183	4233		
Fre	equency (MHz)	826.4	836.6	846.6		
Max. Rated Avg. I	Max. Rated Avg. Power+Max. Tolerance (dBm)					
3GPP Rel 99	RMC 12.2Kbps	24.54	24.55	24.63		
Max. Rated Avg.	Power+Max. Tolerance (dBm)		24.00			
	HSDPA Subtest-1	23.40	23.30	23.45		
3GPP Rel 5	HSDPA Subtest-2	23.21	23.12	23.17		
	HSDPA Subtest-3	23.14	23.13	23.06		
	HSDPA Subtest-4	23.14	23.13	23.06		
	HSUPA Subtest-1	23.33	23.23	23.28		
	HSUPA Subtest-2	23.03	23.01	23.03		
3GPP Rel 6	HSUPA Subtest-3	23.25	23.15	23.29		
	HSUPA Subtest-4	23.36	23.21	23.33		
	HSUPA Subtest-5	23.39	23.27	23.34		
3GPP Rel 7	HSPA+ Subtest-1	23.24	23.13	23.17		
	DC-HSDPA Subtest-1	23.19	23.10	23.25		
3GPP Rel 8	DC-HSDPA Subtest-2	23.05	23.00	22.08		
JUFF REIO	DC-HSDPA Subtest-3	23.01	22.92	23.05		
	DC-HSDPA Subtest-4	22.91	22.85	22.99		

# Subtests for WCDMA Release 5 HSDPA

SUB-TEST	β <sub>c</sub>	$\beta_d$	β <sub>d</sub> (SF)	β <sub>c</sub> /β <sub>d</sub>	β <sub>HS</sub> (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15	15/15	64	12/15	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	<mark>6</mark> 4	15/4	30/15	1.5	0.5

# Subtests for WCDMA Release 6 HSUPA

SUB-TEST	βc	βd	β₀ (SF)	β <sub>o</sub> /β <sub>d</sub>	β <sub>HS</sub> (Note1)	β <sub>ec</sub>	<sup>β<sub>ed</sub> (Note 5) (Note 6)</sup>	β <sub>ed</sub> (SF)	β <sub>ed</sub> (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15	15/15	64	11/15	22/15	209/225	1309/225	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	<mark>9/15</mark>	64	15/9	30/15	30/15	β <sub>ed</sub> 1: 47/15 β <sub>ed</sub> 2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	15/15	64	15/15	30/15	24/15	134/15	4	1	1.0	0.0	21	81

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FDD Band 2										
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)		
				1860	18700	23.41	23.5	0		
			0	1880	18900	22.89	23.5	0		
				1900	19100	22.87	23.5	0		
				1860	18700	23.48	23.5	0		
		1 RB	50	1880	18900	23.03	23.5	0		
				1900	19100	22.67	23.5	0		
				1860	18700	22.99	23.5	0		
			99	1880	18900	22.84	23.5	0		
				1900	19100	22.50	23.5	0		
				1860	18700	22.30	22.5	0-1		
	QPSK		0	1880	18900	21.82	22.5	0-1		
				1900	19100	21.72	22.5	0-1		
				1860	18700	22.22	22.5	0-1		
		50 RB	25	1880	18900	21.84	22.5	0-1		
				1900	19100	21.71	22.5	0-1		
				1860	18700	22.06	22.5	0-1		
			50	1880	18900	21.88	22.5	0-1		
				1900	19100	21.63	22.5	0-1		
				1860	18700	22.05	22.5	0-1		
		100	ORB	1880	18900	21.78	22.5	0-1		
20			•	1900	19100	21.74	22.5	0-1		
				1860	18700	22.48	22.5	0-1		
			0	1880	18900	21.90	22.5	0-1		
				1900	19100	22.05	22.5	0-1		
				1860	18700	22.38	22.5	0-1		
		1 RB	50	1880	18900	21.96	22.5	0-1		
				1900	19100	22.34	22.5	0-1		
				1860	18700	21.29	22.5	0-1		
			99	1880	18900	22.06	22.5	0-1		
				1900	19100	22.21	22.5	0-1		
	10.0114		0	1860	18700	21.31	21.5	0-2		
	16-QAM		0	1880	18900	20.82	21.5	0-2		
				1900	19100	20.73	21.5	0-2		
			05	1860	18700	21.09	21.5	0-2		
		50 RB	25	1880	18900	20.94	21.5	0-2		
				1900	19100	20.61	21.5	0-2		
			50	1860	18700	21.09	21.5	0-2		
			50	1880	18900	20.85	21.5	0-2		
				1900	19100 18700	20.54 21.17	21.5	0-2		
		100	)RB	1860			21.5	0-2		
		100		1880	18900	20.90	21.5	0-2		
				1900	19100	20.63	21.5	0-2		

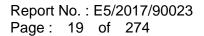
# LTE FDD Band 2 - conducted power table:

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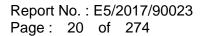
				FDD Band 2				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				1857.5	18675	23.26	23.5	0
			0	1880	18900	22.89	23.5	0
				1902.5	19125	22.77	23.5	0
				1857.5	18675	23.24	23.5	0
		1 RB	36	1880	18900	22.91	23.5	0
				1902.5	19125	22.62	23.5	0
				1857.5	18675	23.09	23.5	0
			74	1880	18900	22.83	23.5	0
				1902.5	19125	22.85	23.5	0
				1857.5	18675	22.26	22.5	0-1
	QPSK		0	1880	18900	21.97	22.5	0-1
				1902.5	19125	21.75	22.5	0-1
				1857.5	18675	22.19	22.5	0-1
		36 RB	18	1880	18900	21.86	22.5	0-1
				1902.5	19125	21.74	22.5	0-1
				1857.5	18675	22.10	22.5	0-1
			37	1880	18900	21.89	22.5	0-1
				1902.5	19125	21.72	22.5	0-1
				1857.5	18675	22.16	22.5	0-1
		75	RB	1880	18900	21.85	22.5	0-1
15				1902.5	19125	21.78	22.5	0-1
15				1857.5	18675	22.50	22.5	0-1
			0	1880	18900	21.87	22.5	0-1
				1902.5	19125	22.12	22.5	0-1
				1857.5	18675	22.45	22.5	0-1
		1 RB	36	1880	18900	22.43	22.5	0-1
				1902.5	19125	21.66	22.5	0-1
				1857.5	18675	22.47	22.5	0-1
			74	1880	18900	22.03	22.5	0-1
				1902.5	19125	21.95	22.5	0-1
				1857.5	18675	21.32	21.5	0-2
	16-QAM		0	1880	18900	20.97	21.5	0-2
				1902.5	19125	20.66	21.5	0-2
				1857.5	18675	21.27	21.5	0-2
		36 RB	18	1880	18900	20.84	21.5	0-2
				1902.5	19125	20.71	21.5	0-2
				1857.5	18675	21.17	21.5	0-2
			37	1880	18900	20.92	21.5	0-2
				1902.5	19125	20.72	21.5	0-2
				1857.5	18675	21.32	21.5	0-2
		75	RB	1880	18900	20.90	21.5	0-2
				1902.5	19125	20.73	21.5	0-2

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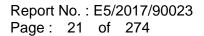
				FDD Band 2				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				1855	18650	23.09	23.5	0
			0	1880	18900	22.91	23.5	0
				1905	19150	22.60	23.5	0
				1855	18650	22.40	23.5	0
		1 RB	25	1880	18900	23.04	23.5	0
				1905	19150	22.93	23.5	0
				1855	18650	23.40	23.5	0
			49	1880	18900	22.94	23.5	0
				1905	19150	22.85	23.5	0
				1855	18650	22.28	22.5	0-1
	QPSK		0	1880	18900	21.91	22.5	0-1
				1905	19150	21.86	22.5	0-1
				1855	18650	22.20	22.5	0-1
		25 RB	12	1880	18900	21.96	22.5	0-1
				1905	19150	21.81	22.5	0-1
				1855	18650	22.22	22.5	0-1
			25	1880	18900	21.92	22.5	0-1
				1905	19150	21.78	22.5	0-1
				1855	18650	22.22	22.5	0-1
		50	RB	1880	18900	21.95	22.5	0-1
10			-	1905	19150	21.77	22.5	0-1
10				1855	18650	22.37	22.5	0-1
			0	1880	18900	21.70	22.5	0-1
				1905	19150	21.76	22.5	0-1
				1855	18650	22.36	22.5	0-1
		1 RB	25	1880	18900	22.40	22.5	0-1
				1905	19150	22.33	22.5	0-1
				1855	18650	22.45	22.5	0-1
			49	1880	18900	22.41	22.5	0-1
				1905	19150	21.99	22.5	0-1
				1855	18650	21.23	21.5	0-2
	16-QAM		0	1880	18900	21.06	21.5	0-2
				1905	19150	20.71	21.5	0-2
				1855	18650	21.30	21.5	0-2
		25 RB	12	1880	18900	21.14	21.5	0-2
				1905	19150	20.67	21.5	0-2
				1855	18650	21.35	21.5	0-2
			25	1880	18900	21.22	21.5	0-2
				1905	19150	20.57	21.5	0-2
				1855	18650	21.39	21.5	0-2
		50	RB	1880	18900	20.96	21.5	0-2
				1905	19150	20.73	21.5	0-2

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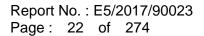


				FDD Band 2				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				1852.5	18625	23.19	23.5	0
			0	1880	18900	22.93	23.5	0
				1907.5	19175	22.63	23.5	0
				1852.5	18625	23.31	23.5	0
		1 RB	12	1880	18900	22.87	23.5	0
				1907.5	19175	23.00	23.5	0
				1852.5	18625	23.18	23.5	0
			24	1880	18900	22.89	23.5	0
				1907.5	19175	22.87	23.5	0
				1852.5	18625	22.16	22.5	0-1
	QPSK		0	1880	18900	21.85	22.5	0-1
				1907.5	19175	21.66	22.5	0-1
				1852.5	18625	22.21	22.5	0-1
		12 RB	6	1880	18900	21.88	22.5	0-1
				1907.5	19175	21.65	22.5	0-1
				1852.5	18625	22.22	22.5	0-1
			13	1880	18900	21.96	22.5	0-1
				1907.5	19175	21.71	22.5	0-1
				1852.5	18625	22.18	22.5	0-1
		25	RB	1880	18900	21.86	22.5	0-1
5				1907.5	19175	21.68	22.5	0-1
5				1852.5	18625	22.29	22.5	0-1
			0	1880	18900	22.49	22.5	0-1
				1907.5	19175	21.71	22.5	0-1
				1852.5	18625	22.07	22.5	0-1
		1 RB	12	1880	18900	22.05	22.5	0-1
				1907.5	19175	21.67	22.5	0-1
				1852.5	18625	22.14	22.5	0-1
			24	1880	18900	21.83	22.5	0-1
				1907.5	19175	22.25	22.5	0-1
				1852.5	18625	21.03	21.5	0-2
	16-QAM		0	1880	18900	20.78	21.5	0-2
				1907.5	19175	20.95	21.5	0-2
				1852.5	18625	21.21	21.5	0-2
		12 RB	6	1880	18900	20.84	21.5	0-2
				1907.5	19175	20.61	21.5	0-2
				1852.5	18625	21.17	21.5	0-2
			13	1880	18900	20.80	21.5	0-2
				1907.5	19175	20.54	21.5	0-2
1				1852.5	18625	21.16	21.5	0-2
1	25R		RB	1880	18900	20.84	21.5	0-2
				1907.5	19175	20.80	21.5	0-2

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				FDD Band 2				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				1851.5	18615	22.93	23.5	0
			0	1880	18900	22.88	23.5	0
				1908.5	19185	22.64	23.5	0
				1851.5	18615	23.05	23.5	0
		1 RB	7	1880	18900	23.12	23.5	0
				1908.5	19185	22.73	23.5	0
				1851.5	18615	23.18	23.5	0
			14	1880	18900	22.89	23.5	0
				1908.5	19185	22.74	23.5	0
				1851.5	18615	22.09	22.5	0-1
	QPSK		0	1880	18900	21.88	22.5	0-1
				1908.5	19185	21.72	22.5	0-1
				1851.5	18615	22.22	22.5	0-1
		8 RB	4	1880	18900	21.89	22.5	0-1
				1908.5	19185	21.77	22.5	0-1
				1851.5	18615	22.26	22.5	0-1
			7	1880	18900	21.93	22.5	0-1
				1908.5	19185	21.70	22.5	0-1
				1851.5	18615	22.13	22.5	0-1
		15	RB	1880	18900	21.88	22.5	0-1
3				1908.5	19185	21.65	22.5	0-1
U				1851.5	18615	22.04	22.5	0-1
			0	1880	18900	22.09	22.5	0-1
				1908.5	19185	22.14	22.5	0-1
				1851.5	18615	22.10	22.5	0-1
		1 RB	7	1880	18900	22.21	22.5	0-1
				1908.5	19185	21.56	22.5	0-1
				1851.5	18615	22.17	22.5	0-1
			14	1880	18900	21.87	22.5	0-1
				1908.5	19185	21.46	22.5	0-1
				1851.5	18615	21.25	21.5	0-2
	16-QAM		0	1880	18900	20.77	21.5	0-2
				1908.5	19185	20.85	21.5	0-2
				1851.5	18615	21.27	21.5	0-2
		8 RB	4	1880	18900	21.02	21.5	0-2
				1908.5	19185	20.99	21.5	0-2
			_	1851.5	18615	21.24	21.5	0-2
			7	1880	18900	21.07	21.5	0-2
				1908.5	19185	20.85	21.5	0-2
				1851.5	18615	21.17	21.5	0-2
	15R		КВ	1880	18900	20.87	21.5	0-2
				1908.5	19185	20.84	21.5	0-2

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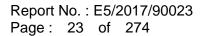
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				FDD Band 2				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				1850.7	18607	23.18	23.5	0
			0	1880	18900	22.89	23.5	0
				1909.3	19193	22.77	23.5	0
				1850.7	18607	23.39	23.5	0
		1 RB	2	1880	18900	22.96	23.5	0
				1909.3	19193	22.69	23.5	0
				1850.7	18607	23.23	23.5	0
			5	1880	18900	23.02	23.5	0
				1909.3	19193	22.64	23.5	0
				1850.7	18607	23.23	23.5	0
	QPSK		0	1880	18900	23.04	23.5	0
				1909.3	19193	22.82	23.5	0
				1850.7	18607	23.34	23.5	0
		3 RB	2	1880	18900	22.99	23.5	0
				1909.3	19193	22.67	23.5	0
				1850.7	18607	23.30	23.5	0
			3	1880	18900	22.97	23.5	0
				1909.3	19193	22.68	23.5	0
				1850.7	18607	22.26	22.5	0-1
		6F	RB	1880	18900	21.92	22.5	0-1
1.4				1909.3	19193	21.67	22.5	0-1
1.4				1850.7	18607	21.98	22.5	0-1
			0	1880	18900	22.37	22.5	0-1
				1909.3	19193	21.52	22.5	0-1
				1850.7	18607	22.42	22.5	0-1
		1 RB	2	1880	18900	21.87	22.5	0-1
				1909.3	19193	22.04	22.5	0-1
				1850.7	18607	22.39	22.5	0-1
			5	1880	18900	21.48	22.5	0-1
				1909.3	19193	22.04	22.5	0-1
				1850.7	18607	22.43	22.5	0-1
	16-QAM		0	1880	18900	21.93	22.5	0-1
				1909.3	19193	22.03	22.5	0-1
				1850.7	18607	22.42	22.5	0-1
		3 RB	2	1880	18900	22.10	22.5	0-1
				1909.3	19193	22.10	22.5	0-1
				1850.7	18607	22.50	22.5	0-1
			3	1880	18900	22.00	22.5	0-1
				1909.3	19193	21.98	22.5	0-1
				1850.7	18607	21.21	21.5	0-2
	6R		RB	1880	18900	20.69	21.5	0-2
				1909.3	19193	20.58	21.5	0-2

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FDD Band 4 (Hotspot OFF)										
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)		
				1720	20050	22.93	24	0		
			0	1732.5	20175	23.14	24	0		
				1745	20300	23.06	24	0		
				1720	20050	23.35	24	0		
		1 RB	50	1732.5	20175	22.97	24	0		
				1745	20300	23.02	24	0		
				1720	20050	22.92	24	0		
			99	1732.5	20175	22.83	24	0		
				1745	20300	22.82	24	0		
				1720	20050	22.33	23	0-1		
	QPSK		0	1732.5	20175	22.23	23	0-1		
				1745	20300	22.17	23	0-1		
				1720	20050	22.16	23	0-1		
		50 RB	25	1732.5	20175	22.01	23	0-1		
				1745	20300	22.18	23	0-1		
				1720	20050	22.15	23	0-1		
			50	1732.5	20175	22.00	23	0-1		
				1745	20300	22.03	23	0-1		
				1720	20050	22.08	23	0-1		
		100	ORB	1732.5	20175	22.07	23	0-1		
20				1745	20300	22.06	23	0-1		
				1720	20050	22.56	23			
			0	1732.5	20175	22.38	23			
				1745	20300	22.12	23			
				1720	20050	22.99	23			
		1 RB	50	1732.5	20175	21.92	23			
				1745	20300	22.64	23			
				1720	20050	22.05	23			
			99	1732.5	20175	21.58	23			
				1745	20300	22.12	23			
				1720	20050	21.18	22			
	16-QAM		0	1732.5	20175	21.18	22			
				1745	20300	21.20	22			
			05	1720	20050	21.09	22			
		50 RB	25	1732.5	20175	20.99	22			
				1745	20300	21.07	22			
			50	1720	20050	21.18	22			
			50	1732.5	20175	20.88	22	0 0 0 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-		
				1745	20300	20.93	22			
		100	)RB	1720	20050	21.10	22			
		100		1732.5	20175	21.10	22			
				1745	20300	21.12	22	0-2		

#### LTE FDD Band 4 - conducted power table (Hotspot OFF):

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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FDD Band 4 (Hotspot OFF)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
				1717.5	20025	23.11	24	0			
			0	1732.5	20175	23.15	24	0			
				1747.5	20325	23.05	24	0			
				1717.5	20025	23.15	24	0			
		1 RB	36	1732.5	20175	22.78	24	0			
				1747.5	20325	22.92	24	0			
				1717.5	20025	23.15	24	0			
			74	1732.5	20175	22.81	24	0			
				1747.5	20325	23.05	24	0			
				1717.5	20025	22.19	23	0-1			
	QPSK		0	1732.5	20175	22.22	23	0-1			
				1747.5	20325	22.15	23	0-1			
				1717.5	20025	22.23	23	0-1			
		36 RB	18	1732.5	20175	21.98	23	0-1			
				1747.5	20325	22.12	23	0-1			
				1717.5	20025	22.17	23	0-1			
			37	1732.5	20175	21.96	23	0-1			
				1747.5	20325	22.11	23	0-1			
				1717.5	20025	22.31	23	0-1			
		75	RB	1732.5	20175	22.01	23	0-1			
15				1747.5	20325	22.14	23	0-1			
				1717.5	20025	22.49	23	0           0           0           0           0           0           0           0           0           0           0           0           0           0-1           0-2           0-2           0-2           0-2           0-2           0-2			
			0	1732.5	20175	22.74	23	0-1			
				1747.5	20325	22.24	23	0-1			
				1717.5	20025	22.39	23	0-1			
		1 RB	36	1732.5	20175	22.04	23	0-1			
				1747.5	20325	22.32	23				
			_	1717.5	20025	22.44	23				
			74	1732.5	20175	21.92	23				
				1747.5	20325	22.17	23				
			_	1717.5	20025	21.03	22				
	16-QAM		0	1732.5	20175	21.25	22				
				1747.5	20325	21.06	22				
				1717.5	20025	21.26	22				
		36 RB	18	1732.5	20175	21.03	22				
				1747.5	20325	21.16	22				
			_	1717.5	20025	21.10	22				
			37	1732.5	20175	21.03	22	0-2			
				1747.5	20325	21.14	22	0-2			
				1717.5	20025	21.17	22	0-2			
		75RB		1732.5	20175	21.13	22	0-2			
				1747.5	20325	21.09	22	0-2			

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FDD Band 4 (Hotspot OFF)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
				1715	20000	23.09	24	0			
			0	1732.5	20175	22.92	24	0			
				1750	20350	23.12	24	0			
				1715	20000	23.23	24	0			
		1 RB	25	1732.5	20175	22.93	24	0			
				1750	20350	23.16	24	0			
				1715	20000	23.24	24	0			
			49	1732.5	20175	22.72	24	0			
				1750	20350	22.99	24	0			
				1715	20000	22.16	23	0-1			
	QPSK		0	1732.5	20175	22.12	23	0-1			
				1750	20350	22.18	23	0-1			
				1715	20000	22.22	23	0-1			
		25 RB	12	1732.5	20175	22.09	23	0-1			
				1750	20350	22.14	23	0-1			
				1715	20000	22.11	23	0-1			
			25	1732.5	20175	21.99	23	0-1			
				1750	20350	22.00	23	0-1			
				1715	20000	22.07	23	0-1			
		50	RB	1732.5	20175	22.05	23	0-1			
10				1750	20350	22.04	23	0-1			
				1715	20000	21.81	23	0-1			
			0	1732.5	20175	21.89	23	0-1			
				1750	20350	22.52	23	0-1			
				1715	20000	22.27	23	0-1			
		1 RB	25	1732.5	20175	21.84	23	0-1			
				1750	20350	22.94	23	0-1			
				1715	20000	22.66	23	0-1			
			49	1732.5	20175	21.83	23	0-1			
				1750	20350	22.16	23	0-1			
			-	1715	20000	21.09	22	0-2			
	16-QAM		0	1732.5	20175	21.31	22	0-2			
				1750	20350	20.96	22	0-2			
				1715	20000	21.20	22	0-2			
		25 RB	12	1732.5	20175	21.25	22	0-2			
				1750	20350	21.08	22	0-2			
				1715	20000	21.09	22	0-2			
			25	1732.5	20175	21.21	22	0-2			
				1750	20350	21.09	22	0-2			
				1715	20000	21.17	22	0-2			
		50RB		1732.5 1750	20175	21.05	22	0-2			
					20350	21.12	22	0-2			

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FDD Band 4 (Hotspot OFF)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
				1712.5	19975	23.13	24	0			
			0	1732.5	20175	22.96	24	0			
				1752.5	20375	22.89	24	0			
				1712.5	19975	23.34	24	0			
		1 RB	12	1732.5	20175	22.97	24	0			
				1752.5	20375	23.26	24	0			
				1712.5	19975	23.09	24	0			
			24	1732.5	20175	22.91	24	0			
				1752.5	20375	23.07	24	0			
				1712.5	19975	22.12	23	0-1			
	QPSK		0	1732.5	20175	22.07	23	0-1			
				1752.5	20375	22.16	23	0-1			
				1712.5	19975	22.00	23	0-1			
		12 RB	6	1732.5	20175	21.94	23	0-1			
				1752.5	20375	22.15	23	0-1			
				1712.5	19975	22.08	23	0-1			
			13	1732.5	20175	21.91	23	0-1			
				1752.5	20375	22.14	23	0-1			
				1712.5	19975	22.08	23	0-1			
		25	RB	1732.5	20175	21.98	23	0-1			
5				1752.5	20375	22.07	23	0-1			
5				1712.5	19975	21.98	23	0-1			
			0	1732.5	20175	22.73	23	0-1			
				1752.5	20375	22.46	23	0-1			
				1712.5	19975	22.67	23	0-1			
		1 RB	12	1732.5	20175	22.43	23	0-1			
				1752.5	20375	22.48	23	0-1			
				1712.5	19975	22.38	23	0-1			
			24	1732.5	20175	22.31	23	0-1			
				1752.5	20375	22.67	23	0-1			
				1712.5	19975	21.00	22	0-2			
	16-QAM		0	1732.5	20175	21.08	22	0-2			
				1752.5	20375	21.02	22	0-2			
				1712.5	19975	21.11	22	0-2			
		12 RB	6	1732.5	20175	20.97	22	0-2			
				1752.5	20375	21.10	22	0-2			
				1712.5	19975	21.22	22	0-2			
			13	1732.5	20175	20.94	22	0-2			
				1752.5	20375	21.05	22	0-2			
				1712.5	19975	21.32	22	0-2			
		25RB		1732.5	20175	21.03	22	0-2			
				1752.5	20375	21.28	22	0-2			

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FDD Band 4 (Hotspot OFF)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
				1711.5	19965	23.28	24	0			
			0	1732.5	20175	23.00	24	0			
				1753.5	20385	23.06	24	0			
				1711.5	19965	23.28	24	0			
		1 RB	7	1732.5	20175	22.94	24	0			
				1753.5	20385	23.16	24	0			
				1711.5	19965	23.20	24	0			
			14	1732.5	20175	22.88	24	0			
				1753.5	20385	23.12	24	0			
				1711.5	19965	22.19	23	0-1			
QPS	QPSK		0	1732.5	20175	22.13	23	0-1			
				1753.5	20385	22.24	23	0-1			
				1711.5	19965	22.07	23	0-1			
		8 RB	4	1732.5	20175	22.08	23	0-1			
				1753.5	20385	22.14	23	0-1			
				1711.5	19965	22.09	23	0-1			
			7	1732.5	20175	22.07	23	0-1			
				1753.5	20385	22.05	23	0-1			
				1711.5	19965	21.98	23	0-1			
		15	RB	1732.5	20175	22.08	23	0-1			
3				1753.5	20385	22.07	23	0-1			
_				1711.5	19965	22.50	23	0-1			
			0	1732.5	20175	22.53	23	0-1			
				1753.5	20385	22.74	23	0-1			
				1711.5	19965	22.24	23	0-1			
		1 RB	7	1732.5	20175	22.03	23	0-1			
				1753.5	20385	22.20	23	0-1			
				1711.5	19965	22.18	23	0-1			
			14	1732.5	20175	22.01	23	0-1			
				1753.5	20385	22.23	23	0-1			
				1711.5	19965	20.93	22	0-2			
	16-QAM		0	1732.5	20175	20.88	22	0-2			
				1753.5	20385	21.20	22	0-2			
		0.55		1711.5	19965	20.81	22	0-2			
		8 RB	4	1732.5	20175	20.86	22	0-2			
				1753.5	20385	21.28	22	0-2			
			_	1711.5	19965	20.97	22	0-2			
			7	1732.5	20175	21.08	22	0-2			
				1753.5	20385	21.16	22	0-2			
		4.5	חח	1711.5	19965	20.99	22	0-2			
		15RB		1732.5	20175	21.23	22	0-2			
				1753.5	20385	21.35	22	0-2			

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FDD Band 4 (Hotspot OFF)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
				1710.7	19957	22.96	24	0			
			0	1732.5	20175	22.91	24	0			
				1754.3	20393	22.99	24	0			
				1710.7	19957	23.00	24	0			
		1 RB	2	1732.5	20175	22.99	24	0			
				1754.3	20393	23.03	24	0			
				1710.7	19957	22.90	24	0			
			5	1732.5	20175	22.81	24	0			
				1754.3	20393	22.98	24	0			
				1710.7	19957	22.99	24	0			
	QPSK		0	1732.5	20175	22.93	24	0			
				1754.3	20393	23.03	24	0			
				1710.7	19957	23.02	24	0			
		3 RB	2	1732.5	20175	23.02	24	0			
				1754.3	20393	23.04	24	0			
				1710.7	19957	22.98	24	0			
			3	1732.5	20175	23.03	24	0			
				1754.3	20393	23.01	24	0			
				1710.7	19957	22.06	23	0-1			
		61	RB	1732.5	20175	22.09	23	0-1			
1.4				1754.3	20393	22.16	23	0-1			
				1710.7	19957	22.07	23	0-1			
			0	1732.5	20175	22.06	23	0-1			
				1754.3	20393	22.36	23	0-1			
				1710.7	19957	21.91	23	0-1			
		1 RB	2	1732.5	20175	22.30	23	0-1			
				1754.3	20393	22.43	23				
			_	1710.7	19957	22.06	23	0-1			
			5	1732.5	20175	21.67	23				
				1754.3	20393	22.44	23				
				1710.7	19957	21.87	23	0-1			
	16-QAM		0	1732.5	20175	21.74	23	0-1			
				1754.3	20393	22.11	23	1			
			_	1710.7	19957	21.90	23	0-1			
		3 RB	2	1732.5	20175	21.80	23	0-1			
				1754.3	20393	22.12	23				
			_	1710.7	19957	21.79	23	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
			3	1732.5	20175	21.79	23				
				1754.3	20393	22.10	23				
				1710.7	19957	20.85	22				
		6RB		1732.5	20175	20.85	22				
				1754.3	20393	20.92	22	0-2			

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FDD Band 4 (Hotspot ON)									
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)	
				1720	20050	22.62	23	0	
			0	1732.5	20175	22.57	23	0	
				1745	20300	22.70	23	0	
				1720	20050	22.98	23	0	
		1 RB	50	1732.5	20175	22.63	23	0	
				1745	20300	22.73	23	0	
				1720	20050	22.48	23	0	
			99	1732.5	20175	22.27	23	0	
				1745	20300	22.72	23	0	
				1720	20050	22.03	23	0	
	QPSK		0	1732.5	20175	21.77	23	0	
				1745	20300	21.98	23	0	
				1720	20050	21.88	23	0	
		50 RB	25	1732.5	20175	21.93	23	0	
				1745	20300	22.05	23	0	
			50	1720	20050	21.87	23	0	
				1732.5	20175	21.74	23	0	
				1745	20300	22.01	23	0	
		100RB		1720	20050	21.91	23	0	
				1732.5	20175	21.84	23	0	
20				1745	20300	22.10	23	0	
_0		0 1 RB 50 99		1720	20050	22.01	23	0	
			1732.5	20175	22.39	23	0		
				1745	20300	22.20	23	0	
				1720	20050	21.46	23	0	
				1732.5	20175	21.46	23	0	
				1745	20300	22.61	23	0	
				1720	20050	21.82	23	0	
			99	1732.5	20175	21.81	23	0	
			Ļ	1745	20300	22.91	23	0	
				1720	20050	21.04	22	0-1	
	16-QAM		0	1732.5	20175	20.98	22	0-1	
				1745	20300	21.04	22	0-1	
			05	1720	20050	21.02	22	0-1	
		50 RB	25	1732.5	20175	20.71	22	0-1	
				1745	20300	20.95	22	0-1	
			50	1720	20050	20.99	22	0-1	
			50	1732.5	20175	20.81	22	0-1	
				1745	20300	21.05	22	0-1	
		4.00	חחו	1720	20050	20.93	22	0-1	
		100	)RB	1732.5	20175	20.80	22	0-1	
					1745	20300	21.16	22	0-1

## LTE FDD Band 4 - conducted power table (Hotspot ON):

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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FDD Band 4 (Hotspot ON)									
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)	
				1717.5	20025	22.71	23	0	
			0	1732.5	20175	22.80	23	0	
				1747.5	20325	22.76	23	0	
				1717.5	20025	22.39	23	0	
		1 RB	36	1732.5	20175	22.28	23	0	
				1747.5	20325	22.71	23	0	
				1717.5	20025	22.59	23	0	
			74	1732.5	20175	22.44	23	0	
				1747.5	20325	22.83	23	0	
				1717.5	20025	21.92	23	0	
	QPSK		0	1732.5	20175	22.04	23	0	
				1747.5	20325	22.11	23	0	
			18	1717.5	20025	21.93	23	0	
		36 RB		1732.5	20175	21.78	23	0	
				1747.5	20325	22.04	23	0	
			37	1717.5	20025	21.88	23	0	
				1732.5	20175	21.83	23	0	
				1747.5	20325	22.02	23	0	
		75RB		1717.5	20025	21.90	23	0	
				1732.5	20175	21.93	23	0	
15				1747.5	20325	22.12	23	0	
10		1 RB	0	1717.5	20025	22.29	23	0	
				1732.5	20175	21.95	23	0	
				1747.5	20325	22.41	23	0	
			36	1717.5	20025	21.53	23	0	
				1732.5	20175	21.98	23	0	
				1747.5	20325	22.01	23	0	
				1717.5	20025	21.65	23	0	
			74	1732.5	20175	21.43	23	0	
				1747.5	20325	22.28	23	0	
				1717.5	20025	21.01	22	0-1	
	16-QAM		0	1732.5	20175	20.93	22	0-1	
				1747.5	20325	21.15	22	0-1	
				1717.5	20025	20.95	22	0-1	
		36 RB	18	1732.5	20175	20.74	22	0-1	
				1747.5	20325	21.21	22	0-1	
			c=	1717.5	20025	20.94	22	0-1	
			37	1732.5	20175	20.90	22	0-1	
				1747.5	20325	21.07	22	0-1	
				1717.5	20025	20.95	22	0-1	
		75	RB	1732.5	20175	20.81	22	0-1	
				1747.5	20325	21.08	22	0-1	

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FDD Band 4 (Hotspot ON)									
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)	
				1715	20000	22.63	23	0	
			0	1732.5	20175	22.76	23	0	
				1750	20350	22.81	23	0	
				1715	20000	22.83	23	0	
		1 RB	25	1732.5	20175	22.63	23	0	
				1750	20350	22.95	23	0	
				1715	20000	22.58	23	0	
			49	1732.5	20175	22.49	23	0	
				1750	20350	22.92	23	0	
				1715	20000	21.85	23	0	
	QPSK		0	1732.5	20175	21.98	23	0	
				1750	20350	22.20	23	0	
				1715	20000	21.89	23	0	
		25 RB	12	1732.5	20175	21.93	23	0	
				1750	20350	22.11	23	0	
			25	1715	20000	21.87	23	0	
				1732.5	20175	21.83	23	0	
				1750	20350	22.08	23	0	
		50RB		1715	20000	21.98	23	0	
				1732.5	20175	21.97	23	0	
10				1750	20350	22.20	23	0	
10		1 RB	0	1715	20000	22.35	23	0	
				1732.5	20175	22.31	23	0	
				1750	20350	22.10	23	0	
			25	1715	20000	22.66	23	0	
				1732.5	20175	21.98	23	0	
				1750	20350	22.40	23	0	
			49	1715	20000	22.17	23	0	
				1732.5	20175	21.38	23	0	
				1750	20350	22.72	23	0	
				1715	20000	21.30	22	0-1	
	16-QAM		0	1732.5	20175	21.18	22	0-1	
				1750	20350	21.10	22	0-1	
				1715	20000	21.25	22	0-1	
		25 RB	12	1732.5	20175	20.97	22	0-1	
				1750	20350	21.08	22	0-1	
			_	1715	20000	21.32	22	0-1	
			25	1732.5	20175	20.74	22	0-1	
				1750	20350	20.91	22	0-1	
				1715	20000	21.16	22	0-1	
		50	RB	1732.5	20175	20.89	22	0-1	
			1750	20350	21.11	22	0-1		

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FDD Band 4 (Hotspot ON)									
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)	
				1712.5	19975	22.39	23	0	
			0	1732.5	20175	22.77	23	0	
				1752.5	20375	22.76	23	0	
				1712.5	19975	22.39	23	0	
		1 RB	12	1732.5	20175	22.97	23	0	
				1752.5	20375	22.79	23	0	
				1712.5	19975	22.44	23	0	
			24	1732.5	20175	22.59	23	0	
				1752.5	20375	22.71	23	0	
				1712.5	19975	21.67	23	0	
	QPSK		0	1732.5	20175	21.93	23	0	
				1752.5	20375	22.05	23	0	
				1712.5	19975	21.81	23	0	
		12 RB	6	1732.5	20175	21.89	23	0	
				1752.5	20375	22.12	23	0	
			13	1712.5	19975	21.77	23	0	
				1732.5	20175	21.83	23	0	
				1752.5	20375	22.22	23	0	
		25RB		1712.5	19975	21.76	23	0	
				1732.5	20175	21.94	23	0	
5				1752.5	20375	22.06	23	0	
Ű		1 RB		1712.5	19975	21.96	23	0	
			0	1732.5	20175	22.78	23	0	
				1752.5	20375	22.58	23	0	
			12	1712.5	19975	21.76	23	0	
				1732.5	20175	22.41	23	0	
				1752.5	20375	22.36	23	0	
				1712.5	19975	21.48	23	0	
			24	1732.5	20175	22.36	23	0	
				1752.5	20375	22.19	23	0	
				1712.5	19975	20.70	22	0-1	
	16-QAM		0	1732.5	20175	20.94	22	0-1	
				1752.5	20375	20.95	22	0-1	
				1712.5	19975	20.77	22	0-1	
		12 RB	6	1732.5	20175	20.98	22	0-1	
				1752.5	20375	21.02	22	0-1	
				1712.5	19975	20.72	22	0-1	
			13	1732.5	20175	20.93	22	0-1	
				1752.5	20375	21.07	22	0-1	
				1712.5	19975	20.74	22	0-1	
		25	RB	1732.5	20175	20.98	22	0-1	
				1752.5	20375	21.08	22	0-1	

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FDD Band 4 (Hotspot ON)									
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)	
				1711.5	19965	22.83	23	0	
			0	1732.5	20175	22.78	23	0	
				1753.5	20385	22.77	23	0	
				1711.5	19965	22.84	23	0	
		1 RB	7	1732.5	20175	22.96	23	0	
				1753.5	20385	22.81	23	0	
				1711.5	19965	22.80	23	0	
			14	1732.5	20175	22.55	23	0	
				1753.5	20385	22.85	23	0	
				1711.5	19965	21.89	23	0	
	QPSK		0	1732.5	20175	21.98	23	0	
				1753.5	20385	22.11	23	0	
				1711.5	19965	21.88	23	0	
		8 RB	4	1732.5	20175	21.94	23	0	
				1753.5	20385	22.21	23	0	
			7	1711.5	19965	21.83	23	0	
				1732.5	20175	21.90	23	0	
				1753.5	20385	22.14	23	0	
		15RB		1711.5	19965	21.78	23	0	
				1732.5	20175	21.94	23	0	
3				1753.5	20385	22.24	23	0	
Ű		1 RB	0	1711.5	19965	22.34	23	0	
				1732.5	20175	22.29	23	0	
				1753.5	20385	22.12	23	0	
			7	1711.5	19965	21.95	23	0	
				1732.5	20175	22.01	23	0	
				1753.5	20385	22.11	23	0	
				1711.5	19965	22.20	23	0	
			14	1732.5	20175	21.98	23	0	
				1753.5	20385	22.11	23	0	
				1711.5	19965	20.92	22	0-1	
	16-QAM		0	1732.5	20175	20.82	22	0-1	
				1753.5	20385	20.97	22	0-1	
				1711.5	19965	21.13	22	0-1	
		8 RB	4	1732.5	20175	20.71	22	0-1	
				1753.5	20385	21.02	22	0-1	
			_	1711.5	19965	21.13	22	0-1	
			7	1732.5	20175	20.83	22	0-1	
				1753.5	20385	21.03	22	0-1	
				1711.5	19965	20.98	22	0-1	
		15	RB	1732.5	20175	20.78	22	0-1	
					1753.5	20385	21.35	22	0-1

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FDD Band 4 (Hotspot ON)									
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)	
				1710.7	19957	22.58	23	0	
			0	1732.5	20175	22.68	23	0	
				1754.3	20393	22.70	23	0	
				1710.7	19957	22.66	23	0	
		1 RB	2	1732.5	20175	22.86	23	0	
				1754.3	20393	22.68	23	0	
				1710.7	19957	22.57	23	0	
			5	1732.5	20175	22.60	23	0	
				1754.3	20393	22.79	23	0	
				1710.7	19957	22.63	23	0	
	QPSK		0	1732.5	20175	22.63	23	0	
				1754.3	20393	22.87	23	0	
				1710.7	19957	22.51	23	0	
		3 RB	2	1732.5	20175	22.62	23	0	
				1754.3	20393	22.87	23	0	
			3	1710.7	19957	22.46	23	0	
				1732.5	20175	22.70	23	0	
				1754.3	20393	22.85	23	0	
		6RB		1710.7	19957	21.78	23	0	
				1732.5	20175	21.98	23	0	
1.4				1754.3	20393	22.19	23	0	
1.4		0 1 RB 2	0	1710.7	19957	22.01	23	0	
				1732.5	20175	22.35	23	0	
			1754.3	20393	21.99	23	0		
			2	1710.7	19957	22.15	23	0	
				1732.5	20175	22.36	23	0	
				1754.3	20393	22.33	23	0	
				1710.7	19957	22.14	23	0	
				1732.5	20175	22.36	23	0	
				1754.3	20393	21.97	23	0	
				1710.7	19957	22.07	23	0	
	16-QAM		0	1732.5	20175	22.10	23	0	
				1754.3	20393	22.03	23	0	
				1710.7	19957	21.99	23	0	
		3 RB	2	1732.5	20175	21.84	23	0	
				1754.3	20393	22.32	23	0	
			_	1710.7	19957	21.91	23	0	
			3	1732.5	20175	22.00	23	0	
				1754.3	20393	22.13	23	0	
				1710.7	19957	20.86	22	0-1	
		61	RB	1732.5	20175	20.97	22	0-1	
				1754.3	20393	20.99	22	0-1	

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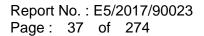
FDD Band 5									
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)	
				829	20450	23.27	24	0	
			0	836.5	20525	23.33	24	0	
				844	20600	23.34	24	0	
				829	20450	23.55	24	0	
		1 RB	25	836.5	20525	23.07	24	0	
				844	20600	23.48	24	0	
				829	20450	22.98	24	0	
			49	836.5	20525	23.05	24	0	
				844	20600	23.17	24	0	
				829	20450	22.37	23	0-1	
	QPSK		0	836.5	20525	22.18	23	0-1	
				844	20600	22.24	23	0-1	
				829	20450	22.39	23	0-1	
		25 RB	12	836.5	20525	22.18	23	0-1	
				844	20600	22.42	23	0-1	
			25	829	20450	22.24	23	0-1	
				836.5	20525	22.22	23	0-1	
				844	20600	22.29	23	0-1	
		50RB		829	20450	22.38	23	0-1	
				836.5	20525	22.17	23	0-1	
10				844	20600	22.31	23	0-1	
-		1 RB	0	829	20450	22.47	23	0-1	
				836.5	20525	22.81	23	0-1	
				844	20600	22.73	23	0-1	
			25	829	20450	22.53	23	0-1	
				836.5	20525	22.63	23	0-1	
				844	20600	22.89	23	0-1	
			10	829	20450	22.24	23	0-1	
			49	836.5	20525	22.14	23	0-1	
				844	20600	22.33	23	0-1	
	16 0 4 14		0	829	20450	21.36	22	0-2	
	16-QAM		0	836.5	20525	21.28	22	0-2	
				844	20600	21.40	22	0-2	
		25 RB	12	829	20450	21.33	22	0-2	
		20 KD	12	836.5	20525	21.24	22	0-2	
				844	20600	21.55	22	0-2	
			25	829 836.5	20450 20525	21.13 21.22	22 22	0-2 0-2	
			25	836.5 844			22	0-2	
					20600	21.48			
		500	)RB	829 836.5	20450 20525	21.35 21.08	22 22	0-2 0-2	
		500							
				844	20600	21.16	22	0-2	

### LTE FDD Band 5 - conducted power table:

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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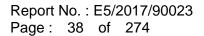
				FDD Band 5				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				826.5	20425	23.05	24	0
			0	836.5	20525	23.18	24	0
				846.5	20625	23.19	24	0
				826.5	20425	23.10	24	0
		1 RB	12	836.5	20525	23.30	24	0
				846.5	20625	23.51	24	0
				826.5	20425	23.32	24	0
			24	836.5	20525	23.42	24	0
				846.5	20625	23.45	24	0
				826.5	20425	22.34	23	0-1
	QPSK		0	836.5	20525	22.17	23	0-1
				846.5	20625	22.33	23	0-1
				826.5	20425	22.28	23	0-1
		12 RB	6	836.5	20525	22.21	23	0-1
				846.5	20625	22.23	23	0-1
				826.5	20425	22.34	23	0-1
			13	836.5	20525	22.11	23	0-1
				846.5	20625	22.32	23	0-1
				826.5	20425	22.36	23	0-1
		25	RB	836.5	20525	22.24	23	0-1
5				846.5	20625	22.29	23	0-1
5				826.5	20425	22.34	23	0-1
			0	836.5	20525	22.39	23	0-1
				846.5	20625	22.69	23	0-1
				826.5	20425	22.25	23	0-1
		1 RB	12	836.5	20525	22.19	23	0-1
				846.5	20625	22.39	23	0-1
				826.5	20425	22.29	23	0-1
			24	836.5	20525	22.19	23	0-1
				846.5	20625	22.59	23	0-1
				826.5	20425	21.16	22	0-2
	16-QAM		0	836.5	20525	21.23	22	0-2
				846.5	20625	21.30	22	0-2
				826.5	20425	21.28	22	0-2
		12 RB	6	836.5	20525	21.06	22	0-2
				846.5	20625	21.23	22	0-2
				826.5	20425	21.47	22	0-2
			13	836.5	20525	21.16	22	0-2
				846.5	20625	21.26	22	0-2
				826.5	20425	21.38	22	0-2
		25R		836.5	20525	21.25	22	0-2
				846.5	20625	21.36	22	0-2

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				FDD Band 5						
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)		
				825.5	20415	23.41	24	0		
			0	836.5	20525	23.18	24	0		
				847.5	20635	23.50	24	0		
				825.5	20415	23.35	24	0		
		1 RB	7	836.5	20525	23.27	24	0		
				847.5	20635	23.44	24	0		
				825.5	20415	23.38	24	0		
			14	836.5	20525	23.37	24	0		
				847.5	20635	23.50	24	0		
				825.5	20415	22.28	23	0-1		
	QPSK		0	836.5	20525	22.19	23	0-1		
				847.5	20635	22.41	23	0-1		
				825.5	20415	22.27	23	0-1		
		8 RB	4	836.5	20525	22.16	23	0-1		
				847.5	20635	22.33	23	0-1		
				825.5	20415	22.16	23	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
			7	836.5	20525	22.13	23	0-1		
				847.5	20635	22.36	23	0-1		
				825.5	20415	22.29	23	0-1		
		15	RB	836.5	20525	22.13	23	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
3				847.5	20635	22.36	23	0-1		
5				825.5	20415	22.48	23	0-1		
			0	836.5	20525	22.55	23	0-1		
				847.5	20635	22.77	23	0-1		
				825.5	20415	22.53	23	0-1		
		1 RB	7	836.5	20525	22.17	23	0-1		
				847.5	20635	22.65	23	0-1		
				825.5	20415	22.51	23	0-1		
			14	836.5	20525	22.46	23	0-1		
				847.5	20635	22.45	23	0-1		
				825.5	20415	21.03	22	0-2		
	16-QAM		0	836.5	20525	21.04	22	0-2		
				847.5	20635	21.49	22	0-2		
				825.5	20415	20.95	22	0-2		
		8 RB	4	836.5	20525	21.12	22	0-2		
				847.5	20635	21.26	22	0-2		
				825.5	20415	20.96	22	0-2		
			7	836.5	20525	21.08	22	0-2		
				847.5	20635	21.08	22	0-2		
1				825.5	20415	21.03	22	0-2		
	15R		RB	836.5	20525	21.18	22	0-2		
				847.5	20635	21.21	22	0-2		

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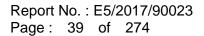
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				FDD Band 5						
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)		
				824.7	20407	23.12	24	0		
			0	836.5	20525	23.03	24	0		
				848.3	20643	23.30	24	0		
				824.7	20407	23.25	24	0		
		1 RB	2	836.5	20525	23.27	24	0		
				848.3	20643	23.29	24	0		
				824.7	20407	23.15	24	0		
			5	836.5	20525	23.22	24	0		
				848.3	20643	23.19	24	0		
				824.7	20407	22.80	23	0		
	QPSK		0	836.5	20525	22.88	23	0		
				848.3	20643	22.97	23	0		
				824.7	20407	22.81	23	0		
		3 RB	2	836.5	20525	22.90	23	0		
				848.3	20643	22.83	23	0		
				824.7	20407	22.96	23	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
			3	836.5	20525	22.85	23	0		
				848.3	20643	22.82	23	0		
				824.7	20407	22.27	23	0-1		
		61	RB	836.5	20525	22.17	23	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
1.4				848.3	20643	22.14	23	0-1		
1.4				824.7	20407	22.51	23	0-1		
			0	836.5	20525	21.89	23	0-1		
				848.3	20643	22.57	23	0-1		
				824.7	20407	22.62	23	0-1		
		1 RB	2	836.5	20525	22.46	23	0-1		
				848.3	20643	22.66	23	0-1		
				824.7	20407	22.12	23	0-1		
			5	836.5	20525	22.37	23	0-1		
				848.3	20643	22.77	23	0-1		
				824.7	20407	21.79	22	0-1		
	16-QAM		0	836.5	20525	21.98	22	0-1		
				848.3	20643	21.92	22	0-1		
				824.7	20407	21.82	22	0-1		
		3 RB	2	836.5	20525	21.97	22	0           0           0           0           0-1		
				848.3	20643	21.97	22			
				824.7	20407	21.87	22	0-1		
			3	836.5	20525	21.90	22	0-1		
				848.3	20643	21.92	22	0-1		
				824.7	20407	20.93	22			
	6RI	RB	836.5	20525	20.86	22	0-2			
				848.3	20643	21.08	22	0-2		

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FDD Band 7 (Hotspot OFF)										
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)		
				2510	20850	22.41	23	0		
			0	2535	21100	22.88	23	0		
				2560	21350	22.80	23	0		
				2510	20850	22.81	23	0		
		1 RB	50	2535	21100	22.72	23	0		
				2560	21350	22.55	23	0		
				2510	20850	22.38	23	0		
			99	2535	21100	22.62	23	0		
				2560	21350	22.93	23	0		
				2510	20850	21.71	22	0-1		
	QPSK		0	2535	21100	21.80	22	0-1		
				2560	21350	21.86	22	0-1		
				2510	20850	21.64	22	0-1		
		50 RB	25	2535	21100	21.62	22	0-1		
				2560	21350	21.87	22	0-1		
				2510	20850	21.70	22	0-1		
			50	2535	21100	21.63	22	0-1		
				2560	21350	21.85	22	0-1		
				2510	20850	21.69	22	0-1		
		100	ORB	2535	21100	21.61	22	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
20			-	2560	21350	21.98	22	0-1		
20				2510	20850	21.80	22	0-1		
			0	2535	21100	21.67	22	0-1		
				2560	21350	21.52	22	0-1		
				2510	20850	21.96	22			
		1 RB	50	2535	21100	21.86	22	0-1		
				2560	21350	21.97	22			
				2510	20850	21.82	22	0-1		
			99	2535	21100	21.39	22	-		
				2560	21350	21.56	22			
				2510	20850	20.83	21			
	16-QAM		0	2535	21100	20.79	21			
				2560	21350	20.86	21			
				2510	20850	20.72	21	0-1           0-2           0-2		
		50 RB	25	2535	21100	20.78	21			
				2560	21350	20.93	21			
			<b>F</b> 0	2510	20850	20.56	21			
			50	2535	21100	20.83	21			
				2560	21350	20.88	21			
				2510	20850	20.69	21			
		100	ORB	2535	21100	20.70	21			
				2560	21350	20.85	21	0-2		

# LTE FDD Band 7 - conducted power table (Hotspot OFF):

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	FDD Band 7 (Hotspot OFF)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)				
				2507.5	20825	22.47	23	0				
			0	2535	21100	22.44	23	0				
				2562.5	21375	22.42	23	0				
				2507.5	20825	22.33	23	0				
		1 RB	36	2535	21100	22.12	23	0				
				2562.5	21375	22.32	23	0				
				2507.5	20825	22.41	23	0				
			74	2535	21100	22.25	23	0				
				2562.5	21375	22.45	23	0				
				2507.5	20825	21.35	22	0-1				
	QPSK		0	2535	21100	21.35	22	0-1				
				2562.5	21375	21.49	22	0-1				
				2507.5	20825	21.26	22	0-1				
		36 RB	18	2535	21100	21.31	22	0-1				
				2562.5	21375	21.50	22	0-1				
				2507.5	20825	21.37	22	0-1				
			37	2535	21100	21.31	22	0-1				
				2562.5	21375	21.50	22	0-1				
				2507.5	20825	21.33	22	0-1				
		75	RB	2535	21100	21.28	22					
15				2562.5	21375	21.46	22					
			0	2507.5	20825	21.51	22					
			0	2535	21100	21.64	22					
				2562.5	21375	21.30	22					
		( 55		2507.5	20825	21.13	22					
		1 RB	36	2535	21100	20.90	22					
				2562.5	21375	21.84	22					
			- 4	2507.5	20825	21.63	22					
			74	2535	21100	20.94	22					
				2562.5	21375	21.38	22					
	16 0 4 14		0	2507.5	20825	20.41	21					
	16-QAM		0	2535	21100	20.31	21					
				2562.5	21375	20.43	21					
		36 RB	18	2507.5	20825	20.32	21	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0-1 0-1				
		JUKD	IÖ	2535	21100	20.20	21					
				2562.5	21375 20825	20.44	21					
			37	2507.5		20.38	21	0-1 0-1 0-1 0-1 0-1 0-2 0-2 0-2 0-2 0-2 0-2 0-2 0-2				
			3/	2535	21100	20.30	21					
				2562.5	21375	20.38	21					
		75	RB	2507.5 2535	20825 21100	20.25 20.26	21 21					
		75RE		2535	21100		21					
					213/3	20.51	21	0-2				

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FDD Band 7 (Hotspot OFF)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
				2505	20800	22.52	23	0			
			0	2535	21100	22.33	23	0			
				2565	21400	22.35	23	0			
				2505	20800	22.61	23	0			
		1 RB	25	2535	21100	22.39	23	0			
				2565	21400	22.45	23	0			
				2505	20800	22.37	23	0			
			49	2535	21100	22.50	23	0			
				2565	21400	22.60	23	0			
				2505	20800	21.46	22	0-1			
	QPSK		0	2535	21100	21.40	22	0-1			
				2565	21400	21.60	22	0-1			
				2505	20800	21.36	22	0-1			
		25 RB	12	2535	21100	21.32	22	0-1			
				2565	21400	21.62	22	0-1			
				2505	20800	21.33	22	0-1			
			25	2535	21100	21.38	22	0-1			
				2565	21400	21.53	22	0-1			
				2505	20800	21.44	22	0-1			
		50	RB	2535	21100	21.31	22	0-1			
10			-	2565	21400	21.58	22	0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-1			
10				2505	20800	21.71	22	0-1			
			0	2535	21100	21.80	22				
				2565	21400	21.93	22	0-1			
				2505	20800	21.89	22	0-1			
		1 RB	25	2535	21100	21.66	22	0-1			
				2565	21400	21.69	22	0-1			
				2505	20800	21.39	22	0-1			
			49	2535	21100	21.60	22	0-1			
				2565	21400	21.70	22	0-1			
				2505	20800	20.52	21	0-2			
	16-QAM		0	2535	21100	20.26	21	0-2			
				2565	21400	20.39	21	0-2			
				2505	20800	20.60	21	0           0			
		25 RB	12	2535	21100	20.28	21				
				2565	21400	20.50	21				
				2505	20800	20.51	21				
			25	2535	21100	20.18	21				
				2565	21400	20.40	21	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0			
				2505	20800	20.30	21				
	50RB	RB	2535	21100	20.18	21					
				2565	21400	20.49	21	0-2			

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FDD Band 7 (Hotspot OFF)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
				2502.5	20775	22.50	23	0			
			0	2535	21100	22.38	23	0			
				2567.5	21425	22.59	23	0			
				2502.5	20775	22.74	23	0			
		1 RB	12	2535	21100	22.60	23	0			
				2567.5	21425	22.81	23	0			
				2502.5	20775	22.44	23	0			
			24	2535	21100	22.51	23	0			
				2567.5	21425	22.45	23	0			
				2502.5	20775	21.34	22	0-1			
	QPSK		0	2535	21100	21.36	22	0-1			
				2567.5	21425	21.59	22	0-1			
				2502.5	20775	21.46	22	0-1			
		12 RB	6	2535	21100	21.27	22	0-1			
				2567.5	21425	21.60	22	0-1			
				2502.5	20775	21.39	22	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
			13	2535	21100	21.34	22	-			
				2567.5	21425	21.51	22	0-1			
				2502.5	20775	21.37	22				
		25	RB	2535	21100	21.31	22				
5				2567.5	21425	21.53	22				
-				2502.5	20775	21.38	22				
			0	2535	21100	21.54	22				
				2567.5	21425	21.92	22				
				2502.5	20775	21.10	22				
		1 RB	12	2535	21100	21.39	22				
				2567.5	21425	21.55	22				
				2502.5	20775	21.73	22				
			24	2535	21100	21.48	22				
				2567.5	21425	21.83	22				
				2502.5	20775	20.40	21				
	16-QAM		0	2535	21100	20.32	21				
				2567.5	21425	20.87	21				
		40.55		2502.5	20775	20.32	21				
		12 RB	6	2535	21100	20.33	21				
				2567.5	21425	20.52	21	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0			
				2502.5	20775	20.32	21				
			13	2535	21100	20.20	21				
				2567.5	21425	20.30	21				
				2502.5	20775	20.33	21				
		25RB		2535	21100	20.28	21				
				2567.5	21425	20.46	21	0-2			

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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FDD Band 7 (Hotspot ON)										
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)		
				2510	20850	22.24	22.5	0		
			0	2535	21100	22.25	22.5	0		
				2560	21350	22.35	22.5	0		
				2510	20850	22.10	22.5	0		
		1 RB	50	2535	21100	22.19	22.5	0		
				2560	21350	22.32	22.5	0		
				2510	20850	22.20	22.5	0		
			99	2535	21100	22.21	22.5	0		
				2560	21350	22.02	22.5	0		
				2510	20850	21.66	22	0		
	QPSK		0	2535	21100	21.77	22	0		
				2560	21350	21.79	22	0		
				2510	20850	21.54	22	0		
		50 RB	25	2535	21100	21.71	22	0		
				2560	21350	21.78	22	0		
				2510	20850	21.57	22	0		
			50	2535	21100	21.65	22	0		
				2560	21350	21.64	22	0		
				2510	20850	21.70	22	0		
		100	)RB	2535	21100	21.82	22	0		
20				2560	21350	21.81	22	0		
				2510	20850	21.83	22			
			0	2535	21100	22.00	22			
				2560	21350	21.75	22			
				2510	20850	21.81	22			
		1 RB	50	2535	21100	21.79	22			
				2560	21350	22.00	22	-		
				2510	20850	21.31	22	-		
			99	2535	21100	21.72	22			
				2560	21350	21.75	22	-		
				2510	20850	20.61	21			
	16-QAM		0	2535	21100	20.77	21			
				2560	21350	20.74	21			
			05	2510	20850	20.59	21	3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0		
		50 RB	25	2535	21100	20.68	21			
				2560	21350	20.75	21			
			50	2510	20850	20.60	21	0           0-1           0-1           0-1           0-1           0-1           0-1           0-1           0-1           0-1           0-1           0-1           0-1		
			50	2535	21100	20.67	21			
				2560	21350	20.60	21			
		4.04	ססו	2510	20850	20.66	21			
		100	)RB	2535	21100	20.81	21			
				2560	21350	20.74	21	0-1		

## LTE FDD Band 7 - conducted power table (Hotspot ON):

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FDD Band 7 (Hotspot ON)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
				2507.5	20825	22.12	22.5	0			
			0	2535	21100	22.34	22.5	0			
				2562.5	21375	22.20	22.5	0			
				2507.5	20825	22.01	22.5	0			
		1 RB	36	2535	21100	22.08	22.5	0			
				2562.5	21375	21.92	22.5	0			
				2507.5	20825	22.12	22.5	0			
			74	2535	21100	22.22	22.5	0			
				2562.5	21375	22.20	22.5	0			
				2507.5	20825	21.53	22	0			
	QPSK		0	2535	21100	21.81	22	0			
				2562.5	21375	21.84	22	0			
				2507.5	20825	21.54	22	0			
		36 RB	18	2535	21100	21.66	22	0			
				2562.5	21375	21.74	22	0			
				2507.5	20825	21.52	22	Allowed per 3GPP(dB)         0			
			37	2535	21100	21.77	22				
				2562.5	21375	21.70	22	0			
				2507.5	20825	21.58	22	0			
		75	RB	2535	21100	21.84	22	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0			
15				2562.5	21375	21.75	22	0			
15			0	2507.5	20825	21.15	22	0			
				2535	21100	21.19	22	0			
				2562.5	21375	21.21	22	0			
				2507.5	20825	21.37	22	0			
		1 RB	36	2535	21100	21.68	22	0			
				2562.5	21375	21.58	22	0			
				2507.5	20825	21.75	22	0			
			74	2535	21100	21.05	22	0			
				2562.5	21375	21.37	22	0			
				2507.5	20825	20.64	21	0-1			
	16-QAM		0	2535	21100	20.72	21	0-1			
				2562.5	21375	20.79	21	0-1			
				2507.5	20825	20.74	21	0-1			
		36 RB	18	2535	21100	20.60	21	0           0-1           0-1           0-1           0-1           0-1           0-1           0-1           0-1           0-1           0-1           0-1           0-1			
				2562.5	21375	20.77	21				
				2507.5	20825	20.66	21	0-1			
			37	2535	21100	20.58	21	0-1			
				2562.5	21375	20.60	21	3GPP(dB)         0			
				2507.5	20825	20.76	21				
		75RB		2535	21100	20.75	21				
				2562.5	21375	20.72	21	0-1			

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FDD Band 7 (Hotspot ON)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
				2505	20800	22.08	22.5	0			
			0	2535	21100	22.26	22.5	0			
				2565	21400	22.17	22.5	0			
				2505	20800	22.19	22.5	0			
		1 RB	25	2535	21100	22.40	22.5	0			
				2565	21400	22.21	22.5	0			
				2505	20800	21.82	22.5	0			
			49	2535	21100	22.17	22.5	0			
				2565	21400	22.20	22.5	0			
				2505	20800	21.56	22	0			
	QPSK		0	2535	21100	21.77	22	0			
				2565	21400	21.68	22	0			
				2505	20800	21.59	22	0			
		25 RB	12	2535	21100	21.74	22	0			
				2565	21400	21.63	22	0			
				2505	20800	21.48	22	MPR Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
			25	2535	21100	21.70	22				
				2565	21400	21.68	22	0			
				2505	20800	21.62	22	0			
		50	RB	2535	21100	21.75	22	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
10				2565	21400	21.72	22	0			
10				2505	20800	21.82	22	0			
			0	2535	21100	21.81	22	0			
				2565	21400	21.28	22	0			
				2505	20800	21.60	22	0			
		1 RB	25	2535	21100	21.37	22	0			
				2565	21400	21.47	22	0			
				2505	20800	21.86	22	0			
			49	2535	21100	21.14	22	0			
				2565	21400	21.79	22	0			
				2505	20800	20.45	21	0-1			
	16-QAM		0	2535	21100	20.76	21				
				2565	21400	20.69	21	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
				2505	20800	20.64	21				
		25 RB	12	2535	21100	20.67	21	0-1			
				2565	21400	20.50	21				
				2505	20800	20.55	21				
			25	2535	21100	20.89	21	0-1			
				2565	21400	20.42	21				
				2505	20800	20.55	21				
	50RB		RB	2535	21100	20.56	21				
				2565	21400	20.63	21	0-1			

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FDD Band 7 (Hotspot ON)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
				2502.5	20775	21.95	22.5	0			
			0	2535	21100	22.30	22.5	0			
				2567.5	21425	22.23	22.5	0			
				2502.5	20775	22.25	22.5	0			
		1 RB	12	2535	21100	22.18	22.5	0			
				2567.5	21425	22.36	22.5	0			
				2502.5	20775	22.13	22.5	0			
			24	2535	21100	22.09	22.5	0			
				2567.5	21425	22.26	22.5	0			
				2502.5	20775	21.51	22	0			
	QPSK		0	2535	21100	21.79	22	0			
				2567.5	21425	21.76	22	0			
				2502.5	20775	21.47	22	0			
		12 RB	6	2535	21100	21.63	22	0			
				2567.5	21425	21.66	22	+         MPR Allowed per 3GPP(dB)           0         0           0			
				2502.5	20775	21.45	22				
			13	2535	21100	21.81	22				
				2567.5	21425	21.67	22	0			
				2502.5	20775	21.43	22	0			
		25	RB	2535	21100	21.68	22	0           0			
5				2567.5	21425	21.69	22	0			
Ũ			0	2502.5	20775	21.57	22	0			
			0	2535	21100	21.94	22	0			
				2567.5	21425	21.24	22	0			
				2502.5	20775	21.46	22	0			
		1 RB	12	2535	21100	21.44	22	0			
				2567.5	21425	21.68	22	0			
				2502.5	20775	21.78	22	0			
			24	2535	21100	21.62	22	0			
				2567.5	21425	21.66	22	0			
				2502.5	20775	20.51	21				
	16-QAM		0	2535	21100	20.64	21				
				2567.5	21425	20.67	21	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
				2502.5	20775	20.47	21				
		12 RB	6	2535	21100	20.66	21	0 0 0 0 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-1			
				2567.5	21425	20.52	21				
				2502.5	20775	20.38	21				
			13	2535	21100	20.66	21				
				2567.5	21425	20.49	21				
				2502.5	20775	20.47	21				
		25RB		2535 2567.5	21100	20.99	21				
					21425	20.55	21	0-1			

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FDD Band 12										
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)		
				704	23060	23.37	24	0		
			0	707.5	23095	23.25	24	0		
				711	23130	23.73	24	0		
				704	23060	23.58	24	0		
		1 RB	25	707.5	23095	23.39	24	0		
				711	23130	23.74	24	0		
				704	23060	23.51	24	0		
			49	707.5	23095	23.36	24	0		
				711	23130	23.99	24	0		
				704	23060	22.54	23	0-1		
	QPSK		0	707.5	23095	22.48	23	0-1		
				711	23130	22.73	23	0-1		
				704	23060	22.50	23	0-1		
		25 RB	12	707.5	23095	22.52	23	0-1		
				711	23130	22.77	23			
				704	23060	22.67	23			
			25	707.5	23095	22.51	23	0-1		
				711	23130	22.83	23			
				704	23060	22.53	23			
		50	RB	707.5	23095	22.52	23	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
10			1	711	23130	22.71	23			
-				704	23060	22.08	23			
			0	707.5	23095	22.85	23			
				711	23130	22.40	23			
		( 55	05	704	23060	22.42	23			
		1 RB	25	707.5	23095	22.78	23			
				711	23130	22.69	23			
			10	704	23060	22.25	23			
			49	707.5	23095	22.57	23	-		
				711	23130	22.97	23			
	16 0 4 14		0	704	23060	21.48	22			
	16-QAM		0	707.5	23095	21.55	22			
				711	23130	21.86	22			
		25 RB	12	704	23060	21.50	22			
		20 KD	12	707.5	23095	21.47	22			
				711 704	23130	21.98	22			
			25		23060 23095	21.43 21.57	22	0           0		
			20	707.5 711	23095	21.57	22 22			
				711						
		50	RB	704	23060 23095	21.50 21.57	22 22			
	50R			707.5	23095	21.57	22			
				111	23130	21.07	22	0-2		

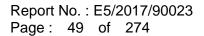
## LTE FDD Band 12 - conducted power table:

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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				FDD Band 12				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				701.5	23035	23.15	24	0
			0	707.5	23095	23.52	24	0
				713.5	23155	23.63	24	0
				701.5	23035	23.72	24	0
		1 RB	12	707.5	23095	23.71	24	0
				713.5	23155	23.45	24	0
				701.5	23035	23.67	24	0
			24	707.5	23095	23.66	24	0
				713.5	23155	23.75	24	0
				701.5	23035	22.35	23	0-1
	QPSK		0	707.5	23095	22.64	23	0-1
				713.5	23155	22.61	23	0-1
				701.5	23035	22.56	23	0-1
		12 RB	6	707.5	23095	22.51	23	0-1
				713.5	23155	22.69	23	0-1
				701.5	23035	22.64	23	0-1
			13	707.5	23095	22.52	23	0-1
				713.5	23155	22.79	23	0-1
				701.5	23035	22.52	23	0-1
		25	RB	707.5	23095	22.54	23	0-1
5				713.5	23155	22.76	23	0-1
5				701.5	23035	22.61	23	0-1
			0	707.5	23095	22.92	23	0-1
				713.5	23155	22.86	23	0-1
				701.5	23035	22.28	23	0-1
		1 RB	12	707.5	23095	22.78	23	0-1
				713.5	23155	22.70	23	0-1
				701.5	23035	22.93	23	0-1
			24	707.5	23095	22.71	23	0-1
				713.5	23155	22.93	23	0-1
				701.5	23035	21.15	22	0-2
	16-QAM		0	707.5	23095	21.67	22	0-2
				713.5	23155	21.92	22	0-2
				701.5	23035	21.17	22	0-2
		12 RB	6	707.5	23095	21.54	22	0-2
				713.5	23155	21.92	22	0-2
				701.5	23035	21.44	22	0-2
			13	707.5	23095	21.50	22	0-2
				713.5	23155	21.93	22	0-2
				701.5	23035	21.40	22	0-2
		25	RB	707.5	23095	21.52	22	0-2
				713.5	23155	21.76	22	0-2

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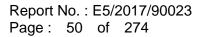
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				FDD Band 12				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				700.5	23025	23.44	24	0
			0	707.5	23095	23.65	24	0
				714.5	23165	23.92	24	0
				700.5	23025	23.38	24	0
		1 RB	7	707.5	23095	23.59	24	0
				714.5	23165	23.93	24	0
				700.5	23025	23.42	24	0
			14	707.5	23095	23.47	24	0
				714.5	23165	23.95	24	0
				700.5	23025	22.37	23	0-1
	QPSK		0	707.5	23095	22.60	23	0-1
				714.5	23165	22.71	23	0-1
				700.5	23025	22.40	23	0-1
		8 RB	4	707.5	23095	22.52	23	0-1
				714.5	23165	22.85	23	0-1
				700.5	23025	22.40	23	0-1
			7	707.5	23095	22.60	23	0-1
				714.5	23165	22.83	23	0-1
				700.5	23025	22.30	23	0-1
		15	RB	707.5	23095	22.59	23	0-1
3				714.5	23165	22.68	23	0-1
5				700.5	23025	22.40	23	0-1
			0	707.5	23095	22.74	23	0-1
				714.5	23165	22.92	23	0-1
				700.5	23025	22.18	23	0-1
		1 RB	7	707.5	23095	22.65	23	0-1
				714.5	23165	22.93	23	0-1
				700.5	23025	22.71	23	0-1
			14	707.5	23095	22.60	23	0-1
				714.5	23165	22.91	23	0-1
				700.5	23025	21.30	22	0-2
	16-QAM		0	707.5	23095	21.74	22	0-2
				714.5	23165	21.64	22	0-2
				700.5	23025	21.11	22	0-2
		8 RB	4	707.5	23095	21.56	22	0-2
				714.5	23165	21.67	22	0-2
			_	700.5	23025	21.28	22	0-2
			7	707.5	23095	21.44	22	0-2
				714.5	23165	21.81	22	0-2
				700.5	23025	21.60	22	0-2
		15	RB	707.5	23095	21.64	22	0-2
				714.5	23165	21.66	22	0-2

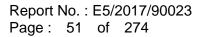
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				FDD Band 12				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				699.7	23017	23.50	24	0
			0	707.5	23095	23.49	24	0
				715.3	23173	23.88	24	0
				699.7	23017	23.56	24	0
		1 RB	2	707.5	23095	23.48	24	0
				715.3	23173	23.77	24	0
				699.7	23017	23.51	24	0
			5	707.5	23095	23.36	24	0
				715.3	23173	23.83	24	0
				699.7	23017	23.36	24	0
	QPSK		0	707.5	23095	23.41	24	0
				715.3	23173	23.73	24	0
				699.7	23017	23.47	24	0
		3 RB	2	707.5	23095	23.35	24	0
				715.3	23173	23.87	24	0
				699.7	23017	23.46	24	0
			3	707.5	23095	23.41	24	0
				715.3	23173	23.96	24	0
				699.7	23017	22.43	23	0-1
		68	RB	707.5	23095	22.54	23	0-1
1.4				715.3	23173	22.76	23	0-1
1.4				699.7	23017	22.08	23	0-1
			0	707.5	23095	22.78	23	0-1
				715.3	23173	22.91	23	0-1
				699.7	23017	22.65	23	0-1
		1 RB	2	707.5	23095	22.60	23	0-1
				715.3	23173	22.91	23	0-1
				699.7	23017	22.39	23	0-1
			5	707.5	23095	22.84	23	0-1
				715.3	23173	22.97	23	0-1
				699.7	23017	22.19	23	0-1
	16-QAM		0	707.5	23095	22.59	23	0-1
				715.3	23173	22.84	23	0-1
				699.7	23017	22.20	23	0-1
		3 RB	2	707.5	23095	22.45	23	0-1
				715.3	23173	22.98	23	0-1
				699.7	23017	22.23	23	0-1
			3	707.5	23095	22.54	23	0-1
				715.3	23173	22.91	23	0-1
				699.7	23017	21.07	22	0-2
		6F	RB	707.5	23095	21.40	22	0-2
				715.3	23173	21.49	22	0-2

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				FDD Band 17				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				709	23780	23.64	24	0
			0	710	23790	23.68	24	0
				711	23800	23.75	24	0
				709	23780	23.82	24	0
		1 RB	25	710	23790	23.74	24	0
				711	23800	23.93	24	0
				709	23780	23.98	24	0
			49	710	23790	23.94	24	0
				711	23800	23.95	24	0
				709	23780	22.83	23	0-1
	QPSK		0	710	23790	22.74	23	0-1
				711	23800	22.86	23	0-1
				709	23780	22.79	23	0-1
		25 RB	12	710	23790	22.70	23	0-1
				711	23800	22.80	23	0-1
				709	23780	22.84	23	0-1
			25	710	23790	22.96	23	0-1
				711	23800	22.98	23	0-1
				709	23780	22.73	23	0-1
		50	RB	710	23790	22.85	23	0-1
10				711	23800	22.86	23	0-1
				709	23780	22.83	23	0-1
			0	710	23790	22.42	23	0-1
				711	23800	22.94	23	0-1
				709	23780	22.95	23	0-1
		1 RB	25	710	23790	22.75	23	0-1
				711	23800	22.92	23	0-1
				709	23780	22.92	23	0-1
			49	710	23790	22.93	23	0-1
				711	23800	22.95	23	0-1
	40.000			709	23780	21.52	22	0-2
	16-QAM		0	710	23790	21.92	22	0-2
				711	23800	21.68	22	0-2
			10	709	23780	21.66	22	0-2
		25 RB	12	710	23790	21.93	22	0-2
				711	23800	21.74	22	0-2
			05	709	23780	21.87	22	0-2
			25	710	23790	21.97	22	0-2
				711	23800	21.88	22	0-2
		50	חח	709	23780	21.80	22	0-2
		50	RB	710	23790	21.70	22	0-2
				711	23800	21.74	22	0-2

## LTE FDD Band 17 - conducted power table:

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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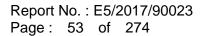
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				FDD Band 17				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				706.5	23755	23.67	24	0
			0	710	23790	23.65	24	0
				713.5	23825	23.96	24	0
				706.5	23755	23.60	24	0
		1 RB	12	710	23790	23.70	24	0
				713.5	23825	23.92	24	0
				706.5	23755	23.79	24	0
			24	710	23790	23.81	24	0
				713.5	23825	23.95	24	0
				706.5	23755	22.71	23	0-1
	QPSK		0	710	23790	22.80	23	0-1
				713.5	23825	22.86	23	0-1
				706.5	23755	22.74	23	0-1
		12 RB	6	710	23790	22.70	23	0-1
				713.5	23825	22.91	23	0-1
				706.5	23755	22.78	23	0-1
			13	710	23790	22.79	23	0-1
				713.5	23825	22.92	23	0-1
				706.5	23755	22.81	23	0-1
		25	RB	710	23790	22.80	23	0-1
5				713.5	23825	22.88	23	0-1
5				706.5	23755	22.41	23	0-1
			0	710	23790	22.94	23	0-1
				713.5	23825	22.91	23	0-1
				706.5	23755	22.90	23	0-1
		1 RB	12	710	23790	22.90	23	0-1
				713.5	23825	22.94	23	0-1
				706.5	23755	22.85	23	0-1
			24	710	23790	22.92	23	0-1
				713.5	23825	22.63	23	0-1
				706.5	23755	21.70	22	0-2
	16-QAM		0	710	23790	21.59	22	0-2
				713.5	23825	21.91	22	0-2
				706.5	23755	21.54	22	0-2
		12 RB	6	710	23790	21.64	22	0-2
				713.5	23825	21.85	22	0-2
				706.5	23755	21.47	22	0-2
			13	710	23790	21.72	22	0-2
				713.5	23825	21.87	22	0-2
				706.5	23755	21.65	22	0-2
		25	RB	710	23790	21.85	22	0-2
				713.5	23825	21.84	22	0-2

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				TDD Band 38				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				2580	37850	23.46	24	0
			0	2595	38000	23.85	24	0
				2610	38150	23.70	24	0
				2580	37850	23.53	24	0
		1 RB	50	2595	38000	23.50	24	0
				2610	38150	23.37	24	0
				2580	37850	23.47	24	0
			99	2595	38000	23.39	24	0
				2610	38150	23.26	24	0
				2580	37850	22.73	23	0-1
	QPSK		0	2595	38000	22.77	23	0-1
				2610	38150	22.80	23	0-1
				2580	37850	22.76	23	0-1
		50 RB	25	2595	38000	22.90	23	0-1
				2610	38150	22.71	23	0-1
				2580	37850	22.74	23	0-1
			50	2595	38000	22.75	23	0-1
				2610	38150	22.51	23	0-1
				2580	37850	22.83	23	0-1
		100	)RB	2595	38000	22.74	23	0-1
20				2610	38150	22.66	23	0-1
				2580	37850	22.85	23	0-1
			0	2595	38000	22.96	23	0-1
				2610	38150	22.92	23	0-1
				2580	37850	22.91	23	0-1
		1 RB	50	2595	38000	22.94	23	0-1
				2610	38150	22.96	23	0-1
				2580	37850	22.70	23	0-1
			99	2595	38000	22.76	23	0-1
				2610	38150	22.34	23	0-1
				2580	37850	21.76	22	0-2
	16-QAM		0	2595	38000	21.66	22	0-2
				2610	38150	21.76	22	0-2
			05	2580	37850	21.87	22	0-2
		50 RB	25	2595	38000	21.83	22	0-2
				2610	38150	21.68	22	0-2
			50	2580	37850	21.77	22	0-2
			50	2595	38000	21.75	22	0-2
				2610	38150	21.41	22	0-2
		4.00	ססו	2580	37850	21.73	22	0-2
		100	)RB	2595	38000	21.76	22	0-2
				2610	38150	21.61	22	0-2

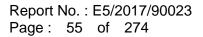
#### LTE TDD Band 38 - conducted power table:

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				TDD Band 38				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				2577.5	37825	23.46	24	0
			0	2595	38000	23.84	24	0
				2612.5	38175	23.71	24	0
				2577.5	37825	23.51	24	0
		1 RB	36	2595	38000	23.68	24	0
				2612.5	38175	23.55	24	0
				2577.5	37825	23.65	24	0
			74	2595	38000	23.84	24	0
				2612.5	38175	23.41	24	0
				2577.5	37825	22.65	23	0-1
	QPSK		0	2595	38000	22.97	23	0-1
				2612.5	38175	22.69	23	0-1
				2577.5	37825	22.66	23	0-1
		36 RB	18	2595	38000	22.86	23	0-1
				2612.5	38175	22.59	23	0-1
				2577.5	37825	22.65	23	0-1
			37	2595	38000	22.90	23	0-1
				2612.5	38175	22.49	23	0-1
				2577.5	37825	22.73	23	0-1
		75	RB	2595	38000	22.75	23	0-1
15				2612.5	38175	22.67	23	0-1
15				2577.5	37825	22.60	23	0-1
			0	2595	38000	22.93	23	0-1
				2612.5	38175	22.94	23	0-1
				2577.5	37825	22.71	23	0-1
		1 RB	36	2595	38000	22.74	23	0-1
				2612.5	38175	22.60	23	0-1
				2577.5	37825	22.82	23	0-1
			74	2595	38000	22.84	23	0-1
				2612.5	38175	22.34	23	0-1
				2577.5	37825	21.73	22	0-2
	16-QAM		0	2595	38000	21.81	22	0-2
				2612.5	38175	21.73	22	0-2
				2577.5	37825	21.72	22	0-2
		36 RB	18	2595	38000	21.81	22	0-2
				2612.5	38175	21.72	22	0-2
				2577.5	37825	21.71	22	0-2
			37	2595	38000	21.75	22	0-2
				2612.5	38175	21.54	22	0-2
				2577.5	37825	21.54	22	0-2
		75	RB	2595	38000	21.61	22	0-2
				2612.5	38175	21.53	22	0-2

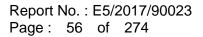
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				TDD Band 38				
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
				2575	37800	23.39	24	0
			0	2595	38000	23.71	24	0
				2615	38200	23.45	24	0
				2575	37800	23.36	24	0
		1 RB	25	2595	38000	23.51	24	0
				2615	38200	23.31	24	0
				2575	37800	23.43	24	0
			49	2595	38000	23.48	24	0
				2615	38200	23.37	24	0
				2575	37800	22.54	23	0-1
	QPSK		0	2595	38000	22.78	23	0-1
				2615	38200	22.68	23	0-1
				2575	37800	22.78	23	0-1
		25 RB	12	2595	38000	22.81	23	0-1
				2615	38200	22.49	23	0-1
				2575	37800	22.63	23	0-1
			25	2595	38000	22.79	23	0-1
				2615	38200	22.37	23	0-1
				2575	37800	22.51	23	0-1
		50	RB	2595	38000	22.89	23	0-1
10				2615	38200	22.46	23	0-1
10				2575	37800	22.81	23	0-1
			0	2595	38000	22.63	23	0-1
				2615	38200	22.60	23	0-1
				2575	37800	22.89	23	0-1
		1 RB	25	2595	38000	22.98	23	0-1
				2615	38200	22.65	23	0-1
				2575	37800	22.45	23	0-1
			49	2595	38000	22.81	23	0-1
				2615	38200	22.41	23	0-1
				2575	37800	21.53	22	0-2
	16-QAM		0	2595	38000	21.79	22	0-2
				2615	38200	21.86	22	0-2
				2575	37800	21.66	22	0-2
		25 RB	12	2595	38000	21.86	22	0-2
				2615	38200	21.68	22	0-2
				2575	37800	21.57	22	0-2
			25	2595	38000	21.61	22	0-2
				2615	38200	21.47	22	0-2
				2575	37800	21.64	22	0-2
		50	RB	2595	38000	21.79	22	0-2
				2615	38200	21.68	22	0-2

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	<u></u>	Mair	n Antenna			
Band	Mode	Channel	Frequency (MHz)	Data Rate	Max. Rated Avg. Power + Max.	Average power (dBm)
		1	2412		17.50	17.34
	802.11b	6	2437	1Mbps	17.50	17.26
		11	2462		17.50	17.22
		1	2412		13.00	12.92
2450 MHz	802.11g	6	2437	6Mbps	13.00	12.96
		11	2462		13.00	12.70
		1	2412		11.00	10.92
	802.11n-HT20	6	2437	MCS0	11.00	10.99
		11	2462		11.00	10.89

# WLAN802.11 b/g/n(20M) conducted power table:

## Bluetooth conducted power table:

Mode	Channel	Frequency	Average	Average Output Power (dBm)				
Mode	Channel	(MHz)	1Mbps	2Mbps	3Mbps	Power + Max. Tolerance		
	CH 00	2402	8.02	6.45	6.44			
BR/EDR	CH 39	2441	9.91	8.52	8.45	12		
	CH 78	2480	7.38	5.94	5.96			

		Frequency	Average Output Power (dBm)	Max. Rated Avg.
Mode	Channel	(MHz)	GFSK	Power + Max. Tolerance
	CH 00	2402	-1.48	
LE	CH 19	2440	0.14	2
	CH 39	2480	-2.17	

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# **1.4 Test Environment**

Ambient Temperature: 22±2° C Tissue Simulating Liquid: 22±2° C

# **1.5 Operation Description**

- The EUT is controlled by using a Radio Communication Tester (Anritsu 1. MT8820C), and the communication between the EUT and the tester is established by air link.
- 2. Measurements are performed respectively on the lowest, middle and highest channels of the operating band(s). The EUT is set to maximum power level during all tests, and at the beginning of each test the battery is fully charged.
- During the SAR testing, the DASY 5 system checks power drift by comparing 3. the e-field strength of one specific location measured at the beginning with that measured at the end of the SAR testing.
- SAR test reduction for GPRS and EDGE modes is determined by the 4. source-based time-averaged output power. The data mode with highest specified time-averaged output power should be tested for SAR compliance. The GMSK EDGE configurations are grouped with GPRS and considered with respect to time-averaged maximum output power to determine compliance. The 3G SAR test reduction procedure is applied to 8-PSK EDGE with GMSK GPRS/EDGE as the primary mode. Since the maximum output power in a secondary mode (8-PSK EDGE) is  $\leq \frac{1}{4}$  dB higher than the primary mode (GMSK GPRS/EDGE), SAR measurement is not required for the secondary mode (8-PSK EDGE).
- The 3G SAR test reduction procedure is applied to HSDPA with 12.2 kbps 5. RMC as the primary mode. Since the maximum output power in a secondary mode (HSDPA) is ≤ ¼ dB higher than the primary mode (WCDMA), SAR measurement is not required for the secondary mode (HSDPA).
- The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA 6. with RMC) with 12.2 kbps RMC as the primary mode. Since the maximum output power in a secondary mode (HSPA) is  $\leq \frac{1}{4}$  dB higher than the primary mode (WCDMA), SAR measurement is not required for the secondary mode (HSPA).

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# 7. SAR test exclusion for DC-HSDPA

The 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable. Since the maximum output power in a secondary mode (DC-HSDPA) is  $\leq \frac{1}{4}$  dB higher than the primary mode (DC-HSDPA).

Parameter	Unit	Value	]
Nominal Avg. Inf. Bit Rate	kbps	60	]
Inter-TTI Distance	TTI's	1	]
Number of HARQ Processes	Proces ses	6	
Information Bit Payload ( $N_{\it INF}$ )	Bits	120	
Number Code Blocks	Blocks	1	1
Binary Channel Bits Per TTI	Bits	960	1
Total Available SML's in UE	SML's	19200	
Number of SML's per HARQ Proc	. SML's	3200	]
Coding Rate		0.15	]
Number of Physical Channel Cod	es Codes	1	]
Modulation		QPSK	]
retransmission is not a constellation version 0		ncy and	
Inf. Bit Payload 120			
CRC Addition 120	24 CRC		
Code Block Segmentation 144			
Turbo-Encoding (R=1/3)	43	2	12 Tail
1st Rate Matching	4:	32	
RV Selection	960		
RV Selection Physical Channel Segmentation 960	960		

#### Table C.8.1.12: Fixed Reference Channel H-Set 12

Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

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Sub-set	βε	βø	β <sub>d</sub> (SF)	β./βα	β <sub>ns</sub> (note 1, note 2)	CM(dB) (note 3)	MPR(dB)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (note 4)	15/15 (note 4)	64	12/15 (note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5
Note2: CM Note3: Fo	A=1 for $\beta_0/\beta_0=1$ r subtest 2 the		1/15. 1/15 for the	TFC during th	5*βe e measurement per (TFC1,TF1) to βe=1		

# 8. SAR test exclusion for HSPA+

The 3G SAR test reduction procedure is applied to (uplink) HSPA+ with 12.2 kbps RMC as the primary mode. Power is measured for HSPA+ that supports uplink 16 QAM according to configurations in Table C.11.1.4 of 3GPP TS 34.121-1 to determine SAR test reduction. Since the maximum output power in a secondary mode (HSPA+) is  $\leq \frac{1}{4}$  dB higher than the primary mode (WCDMA), SAR measurement is not required for the secondary mode (HSPA+).

Table C.11.1.4:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub- test	β <sub>c</sub> (Note3)	βd	β <sub>нs</sub> (Note1)	$\beta_{ec}$	β <sub>ed</sub> (2xSF2) (Note 4)	β <sub>ed</sub> (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	$\beta_{ed}$ 1: 30/15 $\beta_{ed}$ 2: 30/15	β <sub>ed</sub> 3: 24/15 β <sub>ed</sub> 4: 24/15	3.5	2.5	14	105	105
Note 1	Note 1: $\Delta_{ACK}$ , $\Delta_{NACK}$ and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$ .										
Note 2	Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).										
Note 3	Note 3: DPDCH is not configured, therefore the $\beta_c$ is set to 1 and $\beta_d = 0$ by default.										
Note 4	Note 4: β <sub>ed</sub> can not be set directly; it is set by Absolute Grant Value.										
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-											
	DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH										
	configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.										

## 9. LTE modes test according to KDB 941225D05v02r05.

a. Per Section 5.2.1, the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation.

• Using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.

• When the reported SAR is  $\leq 0.8$  W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel.

• When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

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b. Per Section 5.2.2, the largest channel bandwidth and measure SAR for QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 5.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.

c. Per Section 5.2.3, the largest channel bandwidth and measure SAR for QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in 5.2.1 and 5.2.2 are ≤ 0.8 W/kg.

Otherwise, SAR is measured for the highest output power channel and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

d. Per Section 5.2.4, Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 5.2.1, 5.2.2 and 5.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > 1/2 dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

e. Per Section 5.3, other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section 5.2 to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > 1/2 dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg. The equivalent channel configuration for the RB allocation, RB offset and modulation etc. is determined for the smaller channel bandwidth according to the same number of RB allocated in the largest channel bandwidth.

WLAN802.11b DSSS SAR Test Requirements:

10. SAR is measured for 2.4 GHz 802.11b DSSS mode using the highest measured maximum output power channel, when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

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11. When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

802.11g/n OFDM SAR Test Exclusion Requirements:

12. SAR is not required for 802.11g/n since the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

Other

- 13. BT and WLAN 2.4GHz use the same antenna path and Bluetooth can't transmit simultaneously with WLAN 2.4GHz.
- 14. According to **KDB447498D01v06**, testing of other required channels is not required when the reported 1-g SAR for the highest output channel is ≤ 0.8 W/kg, when the transmission band is ≤ 100MHz.
- 15. According to KDB865664D01v01r04, SAR measurement variability must be assessed for each frequency band. When the original highest measured SAR is ≥ 0.8 W/kg, repeated that measurement once. 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)
- According to KDB447498D01v06 The 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances≤ 50 mm are determined by: [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, SAR evaluation is not required.

			front/back sides			
Mode	Mode Maximum power (dBm)		test separation distance (mm)	Exclusion threshold	Require SAR testing?	
BT	12	15.849	15	1.664	NO	

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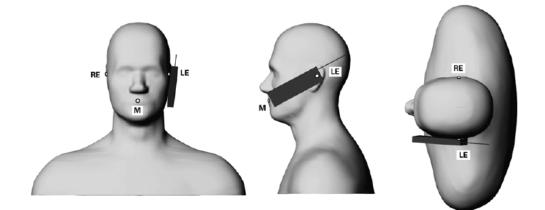
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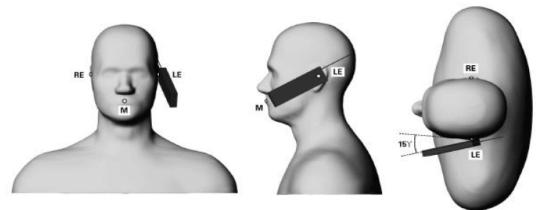
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## **1.6 Positioning Procedure**

## Head SAR measurement statement



Phone position 1, "cheek" or "touch" position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning.



one position 2, "tilted position." The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning.

## Cheek/Touch Position:

The handset was brought toward the mouth of the head phantom by pivoting against the ear reference point until any point of the mouthpiece or keypad touched the phantom.

Ear/Tilt Position:

With the phone aligned in the Cheek/Touch position, the handset was tilted away from the mouth with respect to the test device reference point by 15 degrees.

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## **Body SAR measurement statement**

1. Body-worn exposure: 15mm

Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. When the same wireless transmission configuration is used for testing body-worn accessory and hotspot mode SAR, respectively, in voice and data mode, SAR results for the most conservative test separation distance configuration may be used to support both SAR conditions. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for the body-worn accessory with a headset attached to the handset.

2. Hotspot exposure: 10mm

A test separation distance of 10 mm is required between the phantom and all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge when the form factor of a handset is larger than 9 cm  $\times$  5 cm, Test configurations of WWAN

- (1) Front side
- (2) Back side
- (3) Bottom side.
- (4) Right side
- (5) Left side.

Test configurations of WLAN

- (1) Front side
- (2) Back side
- (3) Top side.
- (4) Left side
- 3. Phablet SAR test consideration

Since the device is not a phablet (overall diagonal dimension > 16.0 cm), phablet SAR procedure is not required for this device.

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# **1.7 Power reduction information**

This device uses a single fixed level of power reduction through static table look-up for SAR compliance.

#### Hotspot ON

A fixed level power reduction is applied for WCDMA B4 / LTE B4 / LTE B7 when hotspot mode becomes active. When the hotspot is disabled, the power value will be recovered. The standalone SAR compliance still uses the standalone SAR results tested at the maximum output power level without any power reduction.

Table1 summarize the key power reduction information.

Table1: Power Reduction	frequency bands
-------------------------	-----------------

Operation Frequency Band	Mode	Reduction of maximum output power (dB)
WCDMA Band IV	All	1.5
LTE Band 4	All	1
LTE Band 7	All	0.5

## Note:

The power reduction level in the above table is only for reference. The final detailed full power and reduced tune-up specifications and conducted power measurement results will be confirmed and provided in the final SAR report.

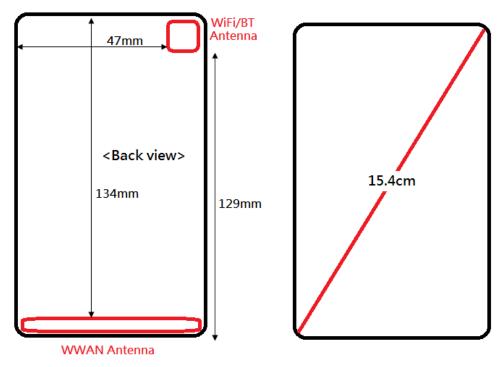
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# 1.7.1 Antennas placement details

Figue1: The location of the antennas (Back View)

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# **1.8 Evaluation Procedures**

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

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

The probe is calibrated at the center of the dipole sensors that is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within –2 dB of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5mm.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1g and 10g peak evaluations are only available for the predefined cube 7x7x7 scans.

The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 30x30x30mm contains about 30g of tissue. The first procedure is an extrapolation (incl. Boundary correction) to get the

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points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume. In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is the moved around until the highest averaged SAR is found.

If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

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# 1.9 Probe Calibration Procedures

For the calibration of E-field probes in lossy liquids, an electric field with an accurately known field strength must be produced within the measured liquid. For standardization purposes it would be desirable if all measurements which are necessary to assess the correct field strength would be traceable to standardized measurement procedures. In the following two different calibration techniques are summarized:

# **1.9.1 Transfer Calibration with Temperature Probes**

In lossy liquids the specific absorption rate (SAR) is related both to the electric field (*E*) and the temperature gradient ( $\delta T / \delta t$ ) in the liquid.

$$SAR = C \frac{\delta T}{\delta t}$$

Whereby  $\sigma$  is the conductivity,  $\rho$  the density and c the heat capacity of the liquid.

Hence, the electric field in lossy liquid can be measured indirectly by measuring the temperature gradient in the liquid. Non-disturbing temperature probes (optical probes or thermistor probes with resistive lines) with high spatial resolution (<1-2 mm) and fast reaction time (<1 s) are available and can be easily calibrated with high precision [1]. The setup and the exciting source have no influence on the calibration; only the relative positioning uncertainties of the standard temperature probe and the E-field probe to be calibrated must be considered. However, several problems limit the available accuracy of probe calibrations with temperature probes:

- 1. The temperature gradient is not directly measurable but must be evaluated from temperature measurements at different time steps. Special precaution is necessary to avoid measurement errors caused by temperature gradients due to energy equalizing effects or convection currents in the liquid. Such effects cannot be completely avoided, as the measured field itself destroys the thermal equilibrium in the liquid. With a careful setup these errors can be kept small.
- 2. The measured volume around the temperature probe is not well defined. It is difficult to calculate the energy transfer from a surrounding gradient temperature field into the probe. These effects must be considered, since temperature probes are calibrated in liquid with homogeneous temperatures. There is no traceable standard for temperature rise measurements.
- 3. The calibration depends on the assessment of the specific density, the heat capacity and the conductivity of the medium. While the specific density and

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heat capacity can be measured accurately with standardized procedures (~ 2% for c; much better for  $\rho$ ), there is no standard for the measurement of the conductivity. Depending on the method and liquid, the error can well exceed  $\pm 5\%$ .

4. Temperature rise measurements are not very sensitive and therefore are often performed at a higher power level than the E-field measurements. The nonlinearities in the system (e.g., power measurements, different components, etc.) must be considered.

Considering these problems, the possible accuracy of the calibration of E-field probes with temperature gradient measurements in a carefully designed setup is about ±10% (RSS) [2]. Recently, a setup which is a combination of the waveguide techniques and the thermal measurements was presented in [3]. The estimated uncertainty of the setup is  $\pm 5\%$  (RSS) when the same liquid is used for the calibration and for actual measurements and ±7-9% (RSS) when not, which is in good agreement with the estimates given in [2].

# 1.9.2 Calibration with Analytical Fields

In this method a technical setup is used in which the field can be calculated analytically from measurements of other physical magnitudes (e.g., input power). This corresponds to the standard field method for probe calibration in air; however, there is no standard defined for fields in lossy liquids.

When using calculated fields in lossy liquids for probe calibration, several points must be considered in the assessment of the uncertainty:

- 1. The setup must enable accurate determination of the incident power.
- 2. The accuracy of the calculated field strength will depend on the assessment of the dielectric parameters of the liquid.
- 3. Due to the small wavelength in liquids with high permittivity, even small setups might be above the resonant cutoff frequencies. The field distribution in the setup must be carefully checked for conformity with the theoretical field distribution.

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- (1) N. Kuster, Q. Balzano, and J.C. Lin, Eds., Mobile Communications Safety, Chapman & Hall, London, 1997.
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# 1.10 The SAR Measurement System

A block diagram of the SAR measurement system is given in Fig. a. This SAR measurement system uses a Computer-controlled 3-D stepper motor system (SPEAG DASY 5 professional system). Model EX3DV4 field probes are used to determine the internal electric fields. The SAR can be obtained from the equation SAR=  $\sigma$  (|Ei|2)/  $\rho$  where  $\sigma$  and  $\rho$  are the conductivity and mass density of the tissue-simulant.

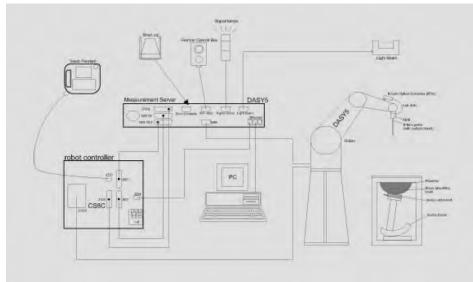


Fig. a A block diagram of the SAR measurement system

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The DASY 5 system for performing compliance tests consists of the following items:

- 1. A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
- 2. A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- 3. Data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- 4. The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- 5. The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- 6. A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- 7. A computer operating Windows7
- 8. DASY 5 software.
- 9. Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- 10. The SAM twin phantom enabling testing left-hand and right-hand usage.
- 11. The device holder for handheld mobile phones.
- 12. Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system. 13.

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## **1.11 System Components**

## **EX3DV4 E-Field Probe**

Construction	Symmetrical design with triangular core
	Built-in shielding against static charges
	PEEK enclosure material (resistant to
	organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air
	Conversion Factors (CF) for HSL
	750/835/1750/1900/2450/2600 MHz
	Additional CF for other liquids and
	frequencies upon request
Frequency	10 MHz to > 6 GHz, Linearity: $\pm$ 0.6 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis)
	± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic	10 μW/g to > 100 mW/g
Range	Linearity: $\pm$ 0.2 dB (noise: typically < 1 $\mu$ W/g)
Dimensions	Tip diameter: 2.5 mm
Application	High precision dosimetric measurements in any exposure scenario
	(e.g., very strong gradient fields). Only probe which enables
	compliance testing for frequencies up to 6 GHz with precision of
	better 30%.

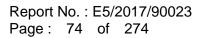
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#### Phantom

Model	Twin SAM	
Construction	Anthropomorphic Mannequin (S 1528 and IEC 62209. It enables the dosimetric evalua usage as well as body mounted u cover prevents evaporation of the the phantom allow the complete	e specifications of the Specific SAM) phantom defined in IEEE ation of left and right hand phone usage at the flat phantom region. A he liquid. Reference markings on e setup of all predefined phantom rids by manually teaching three
Shell Thickness	2 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Height: 850 mm; Length: 1000 mm; Width: 500 mm	

## **DEVICE HOLDER**

Construction	In combination with the Twin SAM	1- 1
	Phantom V4.0/V4.0C or Twin SAM, the	A DESCRIPTION OF
	Mounting Device (made from POM)	
	enables the rotation of the mounted	
	transmitter in spherical coordinates,	
	whereby the rotation point is the ear	
	opening. The devices can be easily and	
	accurately positioned according to IEC,	
	IEEE, CENELEC, FCC or other	
	specifications. The device holder can be	Device Holder
	locked at different phantom locations (left	
	head, right head, flat phantom).	

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#### **1.12 SAR System Verification**

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% (according to KDB865664D01v01r04) from the target SAR values. These tests were done at 750/835/1750/1900/2450/2600 MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1. During the tests, the liquid depth above the ear reference points was above 15 cm ( $\leq$ 3G) or 10 cm (>3G) in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

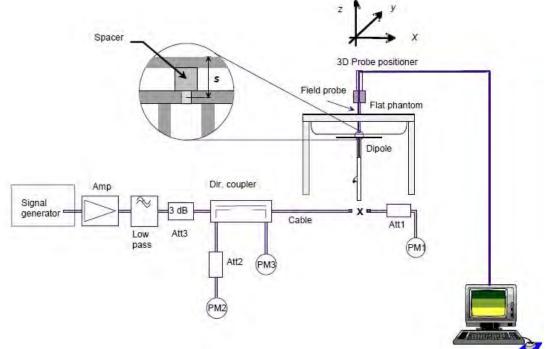
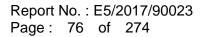


Fig. b The block diagram of system verification

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Validation Kit	S/N	Frequency (MHz)		1W Target SAR-1g (mW/g)	Measured SAR-1g (mW/g)	Measured SAR-1g normalized to 1W (mW/g)	Deviation (%)	Measured Date
D750V3	1015	750	Head	8.32	2.10	8.40	0.96%	Jun. 28, 2017
D750V5	1015	750	Body	8.77	2.26	9.04	3.08%	Jul. 02, 2017
D835V2	4d063	835	Head	9.4	2.41	9.64	2.55%	Jun. 29, 2017
D035V2	40003		Body	9.57	2.44	9.76	1.99%	Jul. 03, 2017
D835V2	4d120	835	Head	9.5	2.42	9.68	1.89%	Aug. 24, 2017
D035V2	40120	000	Body	9.68	2.45	9.80	1.24%	Aug. 25, 2017
D1750V2	1008	1750	Head	37.2	9.13	36.52	-1.83%	Jul. 07, 2017
D1750V2	1008	1750	Body	37.3	8.95	35.80	-4.02%	Jul. 13, 2017
D1900V2	5d173	1900	Head	40.7	9.92	39.68	-2.51%	Jul. 08, 2017
D1900v2	50175	1900	Body	40.2	9.88	39.52	-1.69%	Jul. 14, 2017
D2450V2	727	2450	Head	52.2	13.40	53.60	2.68%	Jul. 04, 2017
D2430V2	121	2400	Body	50.6	13.00	52.00	2.77%	Jul. 05, 2017
D2600V2	1005	2600	Head	55.5	13.90	55.60	0.18%	Jul. 12, 2017
D2000V2	1005	2000	Body	55.1	13.60	54.40	-1.27%	Jul. 05, 2017

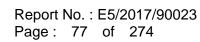
Validation Kit	S/N	Frequency (MHz)		1W Target SAR-1g (mW/g)	Measured SAR-1g (mW/g)	Measured SAR-1g normalized to 1W (mW/g)	Deviation (%)	Measured Date
D750V3	1015	750	Head	8.25	2.12	8.48	2.79%	Oct. 05, 2017
D750V3	1015	750	Body	8.76	2.26	9.04	3.20%	Oct. 06, 2017
D835V2	4d063	835	Head	9.34	2.40	9.60	2.78%	Oct. 12, 2017
D000v2	40005		Body	9.57	2.51	10.04	4.91%	Oct. 12, 2017
D1750V2	1008	1750	Head	36	8.90	35.60	-1.11%	Oct. 12, 2017
D1750V2	1008	1750	Body	36.7	9.49	37.96	3.43%	Oct. 12, 2017
D1900V2	5d173	1900	Head	40.7	9.74	38.96	-4.28%	Oct. 12, 2017
D1900V2	50175	1900	Body	40.2	10.20	40.80	1.49%	Oct. 12, 2017
D2450V2	727	2450	Head	52.2	12.90	51.60	-1.15%	Oct. 05, 2017
0243072	121	2450	Body	50.6	12.80	51.20	1.19%	Oct. 06, 2017
D2600V2	1005	2600	Head	55.5	14.30	57.20	3.06%	Oct. 05, 2017
D2600V2 100	1005	2000	Body	55.1	13.60	54.40	-1.27%	Oct. 06, 2017

Table 1. Results of system validation

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## **1.13 Tissue Simulant Fluid for the Frequency Band**

The dielectric properties for this Head-simulant fluid were measured by using the Agilent Model 85070E Dielectric Probe (rates frequency band 200 MHz to 20 GHz) in conjunction with Network Analyzer.

All dielectric parameters of tissue simulates were measured within 24 hours of SAR measurements. The depth of the tissue simulant in the flat section of the phantom was at least 15 cm ( $\leq$ 3G) or 10 cm (>3G) during all tests. (Appendix Fig. 2)

Tissue Type	Measurement Date	Measured Frequency (MHz)	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, ɛr	Measured Conductivity, σ (S/m)	% dev ɛr	% dev σ
		704	42.181	0.890	41.964	0.852	0.51%	4.25%
		707.5	42.162	0.890	41.941	0.854	0.52%	4.05%
	Jun. 28, 2017	709	42.155	0.890	41.933	0.854	0.53%	4.06%
	Jun. 20, 2017	710	42.149	0.890	41.927	0.855	0.53%	3.96%
		711	42.144	0.890	41.919	0.855	0.53%	3.97%
		750	41.942	0.893	41.695	0.861	0.59%	3.62%
		824.2	41.556	0.899	42.087	0.867	-1.28%	3.58%
		826.4	41.545	0.899	42.071	0.868	-1.27%	3.48%
		829	41.531	0.900	42.056	0.869	-1.26%	3.39%
		835	41.500	0.900	42.025	0.870	-1.27%	3.33%
	lun 00 0017	836.5	41.500	0.902	42.019	0.872	-1.25%	3.28%
	Jun. 29, 2017	836.6	41.500	0.902	42.019	0.872	-1.25%	3.30%
		842	41.500	0.908	42.013	0.879	-1.24%	3.14%
		844	41.500	0.910	42.011	0.882	-1.23%	3.04%
Head		846.6	41.500	0.912	42.009	0.884	-1.23%	3.12%
пеац		848.8	41.500	0.915	42.006	0.887	-1.22%	3.05%
		1712.4	40.138	1.349	39.933	1.309	0.51%	2.99%
		1720	40.126	1.354	39.917	1.314	0.52%	2.93%
		1732	40.107	1.361	39.898	1.322	0.52%	2.86%
	Jul. 07, 2017	1732.4	40.107	1.361	39.898	1.322	0.52%	2.86%
		1745	40.087	1.368	39.874	1.329	0.53%	2.86%
		1750	40.079	1.371	39.861	1.332	0.54%	2.85%
		1752.6	40.075	1.373	39.854	1.334	0.55%	2.81%
		1850.2	40.000	1.400	40.209	1.342	-0.52%	4.14%
		1852.4	40.000	1.400	40.206	1.344	-0.52%	4.00%
		1860	40.000	1.400	40.150	1.353	-0.37%	3.36%
	Jul. 08, 2017	1880	40.000	1.400	40.129	1.375	-0.32%	1.79%
		1900	40.000	1.400	40.107	1.396	-0.27%	0.29%
		1907.6	40.000	1.400	39.999	1.405	0.00%	-0.36%
		1909.8	40.000	1.400	39.997	1.407	0.01%	-0.50%

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Tissue Type	Measurement Date	Measured Frequency (MHz)	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, ɛr	Measured Conductivity, σ (S/m)	% dev ɛr	% dev σ
		2412	39.268	1.766	38.208	1.787	2.70%	-1.18%
	Jul 04 2017	2437	39.223	1.788	38.159	1.820	2.71%	-1.76%
	Jul. 04, 2017	2450	39.200	1.800	38.135	1.832	2.72%	-1.78%
		2462	39.185	1.813	38.114	1.847	2.73%	-1.87%
		2510	39.124	1.865	39.202	1.875	-0.20%	-0.51%
Head		2535	39.092	1.893	39.173	1.904	-0.21%	-0.60%
		2560	39.060	1.920	39.144	1.934	-0.22%	-0.73%
	Jul. 12, 2017	2580	39.035	1.942	39.121	1.957	-0.22%	-0.78%
		2595	39.015	1.958	39.104	1.974	-0.23%	-0.81%
		2600	39.009	1.964	39.098	1.981	-0.23%	-0.88%
		2610	38.996	1.975	39.086	1.992	-0.23%	-0.86%
		704	55.710	0.960	54.772	0.932	1.68%	2.90%
		707.5	55.697	0.960	54.753	0.933	1.69%	2.82%
		709	55.691	0.960	54.742	0.934	1.70%	2.73%
	Jul. 02, 2017	710	55.687	0.960	54.728	0.934	1.72%	2.73%
		711	55.683	0.960	54.717	0.934	1.74%	2.74%
		750	55.531	0.963	54.561	0.939	1.75%	2.53%
		824.2	55.242	0.969	53.362	1.000	3.40%	-3.18%
		826.4	55.234	0.969	53.349	1.001	3.41%	-3.27%
		829	55.223	0.970	53.333	1.003	3.42%	-3.45%
		835	55.200	0.970	53.305	1.005	3.43%	-3.61%
	Jul. 03, 2017	836.5	55.195	0.972	53.299	1.007	3.44%	-3.62%
		836.6	55.195	0.972	53.299	1.007	3.44%	-3.60%
		844	55.172	0.981	53.200	1.016	3.57%	-3.56%
		846.6	55.164	0.984	53.192	1.019	3.58%	-3.53%
Body		848.8	55.158	0.987	53.179	1.021	3.59%	-3.45%
		1712.4	53.531	1.465	53.900	1.406	-0.69%	4.01%
		1720	53.511	1.469	53.884	1.411	-0.70%	3.98%
		1732.4	53.478	1.477	53.851	1.419	-0.70%	3.95%
	Jul. 13, 2017	1732.5	53.478	1.477	53.851	1.419	-0.70%	3.95%
		1745	53.445	1.485	53.822	1.427	-0.71%	3.92%
		1750	53.432	1.488	53.814	1.431	-0.72%	3.86%
		1752.6	53.425	1.490	53.807	1.434	-0.72%	3.76%
		1850.2	53.300	1.520	52.927	1.474	0.70%	3.03%
		1852.4	53.300	1.520	52.919	1.476	0.71%	2.89%
	b. 44 0047	1880	53.300	1.520	52.762	1.504	1.01%	1.05%
	Jul. 14, 2017	1900	53.300	1.520	52.750	1.524	1.03%	-0.26%
		1907.6	53.300	1.520	52.739	1.531	1.05%	-0.72%
		1909.8	53.300	1.520	52.736	1.534	1.06%	-0.92%

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Tissue Type	Measurement Date	Measured Frequency (MHz)	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	% dev ɛr	% dev σ
		2412	52.751	1.914	52.415	1.907	0.64%	0.35%
	Jul. 05, 2017	2437	52.717	1.938	52.373	1.931	0.65%	0.34%
	Jul. 03, 2017	2450	52.700	1.950	52.351	1.944	0.66%	0.31%
		2462	52.685	1.967	52.331	1.962	0.67%	0.26%
		2510	52.624	2.035	51.594	2.082	1.96%	-2.31%
Body		2535	52.592	2.071	51.555	2.118	1.97%	-2.29%
		2560	52.560	2.106	51.521	2.153	1.98%	-2.23%
	Jul. 05, 2017	2580	52.535	2.134	51.486	2.181	2.00%	-2.19%
		2595	52.515	2.156	51.462	2.202	2.01%	-2.15%
		2600	52.509	2.163	51.450	2.209	2.02%	-2.14%
		2610	52.496	2.177	51.429	2.223	2.03%	-2.11%

Tissue Type	Measurement Date	Measured Frequency (MHz)	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	% dev ɛr	% dev σ
	829	41.531	0.900	41.757	0.911	-0.54%	-1.27%	
Head	Aug, 24. 2017	835	41.500	0.900	41.721	0.918	-0.53%	-2.00%
		844	41.500	0.910	41.712	0.930	-0.51%	-2.23%
		829	55.223	0.970	54.591	1.000	1.15%	-3.14%
Body	Body Aug, 25. 2017	835	55.200	0.970	54.562	1.006	1.16%	-3.71%
		844	55.172	0.981	54.529	1.011	1.17%	-3.05%

Tissue Type	Measurement Date	Measured Frequency (MHz)	Target Dielectric Constant, ɛr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	% dev ɛr	% dev σ
		709	42.155	0.890	41.984	0.867	0.40%	2.60%
	Oct. 05, 2017	711	42.144	0.890	41.970	0.868	0.41%	2.51%
		750	41.942	0.893	41.746	0.874	0.47%	2.17%
		829	41.531	0.900	42.107	0.880	-1.39%	2.17%
	Oct. 12, 2017	835	41.500	0.900	42.076	0.883	-1.39%	1.89%
	001. 12, 2017	836.6	41.500	0.902	42.070	0.885	-1.37%	1.85%
		846.6	41.500	0.912	42.060	0.897	-1.35%	1.70%
		1720	40.126	1.354	39.968	1.335	0.39%	1.38%
	Oct. 12, 2017	1732.4	40.107	1.361	39.949	1.343	0.39%	1.31%
Head		1750	40.079	1.371	40.536	1.430	-1.14%	-4.30%
		1852.4	40.000	1.400	40.257	1.365	-0.64%	2.50%
	Oct. 12, 2017	1860	40.000	1.400	40.201	1.374	-0.50%	1.86%
	001. 12, 2017	1900	40.000	1.400	40.158	1.417	-0.40%	-1.21%
		1909.8	40.000	1.400	40.048	1.428	-0.12%	-2.00%
	Oct 05 2017	2412	39.268	1.766	38.477	1.837	2.01%	-4.01%
	Oct. 05, 2017	2450	39.200	1.800	38.409	1.871	2.02%	-3.94%
		2560	39.060	1.920	40.644	1.968	-4.06%	-2.50%
	Oct. 05, 2017	2595	39.015	1.958	40.604	2.008	-4.07%	-2.54%
		2600	39.009	1.964	40.598	2.015	-4.07%	-2.62%

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Tissue Type	Measurement Date	Measured Frequency (MHz)	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, ɛr	Measured Conductivity, σ (S/m)	% dev ɛr	% dev σ
		709	55.691	0.960	54.947	0.942	1.34%	1.89%
	Oct. 06, 2017	711	55.683	0.960	54.922	0.942	1.37%	1.91%
		750	55.531	0.963	54.766	0.947	1.38%	1.70%
		829	55.223	0.970	53.537	0.975	3.05%	-0.56%
	Oct. 12, 2017	835	55.200	0.970	53.510	0.982	3.06%	-1.24%
	Oci. 12, 2017	836.6	55.195	0.972	53.504	0.984	3.06%	-1.24%
		846.6	55.164	0.984	53.397	0.996	3.20%	-1.19%
		1712.4	53.531	1.465	54.105	1.414	-1.07%	3.46%
		1720	53.511	1.469	54.089	1.419	-1.08%	3.43%
	Oct. 12, 2017	1732.4	53.478	1.477	54.056	1.427	-1.08%	3.41%
Body		1732.5	53.478	1.477	54.056	1.427	-1.08%	3.41%
		1750	53.432	1.488	54.019	1.439	-1.10%	3.32%
		1850.2	53.300	1.520	53.132	1.482	0.32%	2.50%
	Oct. 12, 2017	1880	53.300	1.520	52.967	1.512	0.62%	0.53%
	001. 12, 2017	1900	53.300	1.520	52.955	1.532	0.65%	-0.79%
		1909.8	53.300	1.520	52.941	1.542	0.67%	-1.45%
	Oct 06 2017	2412	52.751	1.914	52.620	1.915	0.25%	-0.07%
	Oct. 06, 2017	2450	52.700	1.950	52.556	1.952	0.27%	-0.10%
		2560	52.560	2.106	51.726	2.161	1.59%	-2.61%
	Oct. 06, 2017	2595	52.515	2.156	51.667	2.210	1.62%	-2.52%
		2600	52.509	2.163	51.655	2.217	1.63%	-2.51%

Table 2. Dielectric Parameters of Tissue Simulant Fluid

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Frequency				Ingre	dient			Total
Frequency (MHz)	Mode	DGMBE	Water	Salt	Preventol D-7	Cellulose	Sugar	
750	Head	_	532.98 g	18.3 g	2.4 g	3.2 g	766 g	1.3L(Kg)
750	Body	_	631.68 g	11.72 g	1.2 g	-	600 g	1.0L(Kg)
050	Head	_	532.98 g	18.3 g	2.4 g	3.2 g	766 g	1.3L(Kg)
850	Body	_	631.68 g	11.72 g	1.2 g		600 g	1.0L(Kg)
4750	Head	444.52 g	552.42 g	3.06 g	-	-	_	1.0L(Kg)
1750	Body	300.67 g	716.56 g	4.0 g			_	1.0L(Kg)
4000	Head	444.52 g	552.42 g	3.06 g			-	1.0L(Kg)
1900	Body	300.67 g	716.56 g	4.0 g			_	1.0L(Kg)
0450	Head	550ml	450ml	_	1		_	1.0L(Kg)
2450	Body	301.7ml	698.3ml	_	-	-	_	1.0L(Kg)
2000	Head	550ml	450ml	_	_	_	_	1.0L(Kg)
2600	Body	301.7ml	698.3ml	—	_	_	_	1.0L(Kg)

The composition of the tissue simulating liquid:

Table 3. Recipes for tissue simulating liquid

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## 1.14 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate ("SAR") in Section 4.2 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE C95.1, By the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017.

These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in "Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter.

Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

1. Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over a 10 grams of tissue (defined as a tissue volume in the shape of a cube).

Occupational/Controlled limits apply when persons are exposed as а consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

2. Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube).

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Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube).

General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure.

Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.(Table .6)

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

#### Table 4. RF exposure limits

Notes:

- 1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
- Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

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# 2. Summary of Results

#### **GSM 850**

Mode	Position	Distanc e (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power	Scaling	(W)	g ⁄kg)	Plot page
		. ,			. ,	(an)		Measured	•	
	Re Cheek	-	190	836.6	34.50	33.67	21.06%	0.245	0.297	-
Head	Re Tilt	-	190	836.6	34.50	33.67	21.06%	0.113	0.137	-
(GSM)	Le Cheek	-	190	836.6	34.50	33.67	21.06%	0.263	0.318	106
	Le Tilt	-	190	836.6	34.50	33.67	21.06%	0.094	0.114	-
Body-worn	Front side	15	190	836.6	34.50	33.67	21.06%	0.260	0.315	107
(GSM)	Back side	15	190	836.6	34.50	33.67	21.06%	0.259	0.314	-
	Front side	10	190	836.6	34.50	33.67	21.06%	0.449	0.544	108
Hotspot	Back side	10	190	836.6	34.50	33.67	21.06%	0.414	0.501	-
(GPRS)	Bottom side	10	190	836.6	34.50	33.67	21.06%	0.206	0.249	-
<1Dn1Up>	Right side	10	190	836.6	34.50	33.67	21.06%	0.224	0.271	-
	Left side	10	190	836.6	34.50	33.67	21.06%	0.269	0.326	-

#### 2<sup>nd</sup> spot check

Mode	Position	Distanc e (mm)	СН	Freq. (MHz)	(MHz) Tolerance (dBm) Power	Scaling	1	SAR over g /kg)	Plot page	
		()				(dBm)		Measured	Reported	
Head (GSM)	Le Cheek	-	190	836.6	34.50	33.95	13.50%	0.253	0.287	-
Body-worn (GSM)	Front side	15	190	836.6	34.50	33.95	13.50%	0.264	0.300	109
Hotspot (GPRS) <1Dn1Up>	Front side	10	190	836.6	34.50	33.84	16.41%	0.400	0.466	-

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#### **GSM 1900**

Mode	Position	Distanc e (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max	Measured Avg. Power	Scaling	1	′kg)	Plot page
		()				(dBm)		Measured	Reported	
	Re Cheek	-	810	1909.8	31.50	30.82	16.95%	0.141	0.165	110
Head	Re Tilt	-	810	1909.8	31.50	30.82	16.95%	0.039	0.046	-
(GSM)	Le Cheek	-	810	1909.8	31.50	30.82	16.95%	0.094	0.110	-
	Le Tilt	-	810	1909.8	31.50	30.82	16.95%	0.053	0.062	-
Body-worn	Front side	15	810	1909.8	31.50	30.82	16.95%	0.209	0.244	111
(GSM)	Back side	15	810	1909.8	31.50	30.82	16.95%	0.144	0.168	-
	Front side	10	512	1850.2	26.50	25.61	22.74%	0.396	0.486	-
	Back side	10	512	1850.2	26.50	25.61	22.74%	0.255	0.313	-
Hotspot	Bottom side	10	512	1850.2	26.50	25.61	22.74%	0.717	0.880	112
(GPRS)	Bottom side	10	661	1880	26.50	25.46	27.06%	0.643	0.817	-
<1Dn4Up>	Bottom side	10	810	1909.8	26.50	25.54	24.74%	0.656	0.818	-
	Right side	10	512	1850.2	26.50	25.61	22.74%	0.072	0.088	-
	Left side	10	512	1850.2	26.50	25.61	22.74%	0.058	0.071	-

## 2<sup>nd</sup> spot check

Mode	Position	Distanc e (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	1	Averaged SAR over 1g (W/kg) Measured Reported	
Head (GSM)	Re Cheek	-	810	1909.8	31.50	31.34	3.75%	0.130	0.135	-
Body-worn (GSM)	Front side	15	810	1909.8	31.50	31.34	3.75%	0.121	0.126	-
Hotspot (GPRS) <1Dn4Up>	Bottom side	10	512	1850.2	26.50	26.10	9.65%	0.799	0.876	113

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# WCDMA Band II – RMC 12.2Kbps

Mode	Position	Distanc e (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power	Scaling	1 (W/	SAR over g /kg)	Plot page
		( )			,	(dBm)		Measured	Reported	
	RE Cheek	-	9262	1852.4	23.5	23.43	1.62%	0.158	0.161	114
Head	RE Tilt	-	9262	1852.4	23.5	23.43	1.62%	0.038	0.039	-
Heau	LE Cheek	-	9262	1852.4	23.5	23.43	1.62%	0.109	0.111	-
	LE Tilt	-	9262	1852.4	23.5	23.43	1.62%	0.067	0.068	-
	Front side	10	9262	1852.4	23.5	23.43	1.62%	0.644	0.654	-
	Back side	10	9262	1852.4	23.5	23.43	1.62%	0.450	0.457	-
	Bottom side	10	9262	1852.4	23.5	23.43	1.62%	1.050	1.067	-
Hotspot	Bottom side	10	9400	1880	23.5	23.05	10.92%	1.110	1.231	115
riotspot	Bottom side*	10	9400	1880	23.5	23.05	10.92%	1.100	1.220	-
	Bottom side	10	9538	1907.6	23.5	22.91	14.55%	1.070	1.226	-
	Right side	10	9262	1852.4	23.5	23.43	1.62%	0.119	0.121	-
	Left side	10	9262	1852.4	23.5	23.43	1.62%	0.097	0.099	-

\* - repeated at the highest SAR measurement according to the KDB 865664 D01

#### 2<sup>nd</sup> spot check

Mode	Position	Distanc e (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	<u> </u>	/kg)	Plot page
Head	RE Cheek	-	9262	1852.4	23.5	23.49	0.23%	0.160	0.160	116
Hotspot	Bottom side	10	9400	1880	23.5	23.40	2.33%	0.974	0.997	-

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Mode	Position	Distanc e (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power	Scaling	1 (W/		Plot page
		( )			,	(dBm)		Measured	Reported	
	RE Cheek	-	1412	1732.4	24.5	24.32	4.23%	0.250	0.261	117
Head	RE Tilt	-	1412	1732.4	24.5	24.32	4.23%	0.083	0.087	-
Tieau	LE Cheek	-	1412	1732.4	24.5	24.32	4.23%	0.177	0.184	-
	LE Tilt	-	1412	1732.4	24.5	24.32	4.23%	0.069	0.072	-
Body-worn	Front side	15	1412	1732.4	24.5	24.32	4.23%	0.470	0.490	118
Body-woin	Back side	15	1412	1732.4	24.5	24.32	4.23%	0.327	0.341	-
	Front side	10	1513	1752.6	23	22.93	1.62%	0.610	0.620	-
	Back side	10	1513	1752.6	23	22.93	1.62%	0.439	0.446	-
	Bottom side	10	1312	1712.4	23	22.76	5.68%	1.210	1.279	119
Hotspot	Bottom side*	10	1312	1712.4	23	22.76	5.68%	1.200	1.268	-
Ποιδροι	Bottom side	10	1412	1732.4	23	22.80	4.71%	1.200	1.257	-
	Bottom side	10	1513	1752.6	23	22.93	1.62%	1.180	1.199	-
	Right side	10	1513	1752.6	23	22.93	1.62%	0.169	0.172	-
	Left side	10	1513	1752.6	23	22.93	1.62%	0.075	0.076	-

\* - repeated at the highest SAR measurement according to the KDB 865664 D01

## 2<sup>nd</sup> spot check

Mode	Position	Distanc e (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	NVG. Scaling		1	SAR over g ⁄kg)	Plot page
		(11111)				(dBm)		Measured	Reported	
Head	RE Cheek	-	1412	1732.4	24.5	24.00	12.20%	0.221	0.248	-
Body-worn	Front side	15	1412	1732.4	24.5	24.00	12.20%	0.415	0.466	-
Hotspot	Bottom side	10	1312	1712.4	23	22.99	0.23%	0.909	0.911	-

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#### WCDMA Band V – RMC 12.2Kbps

Mode	Position	Distanc e (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Avg. Power	Scaling	1	SAR over g ⁄kg)	Plot page
		()				(dBm)		Measured	Reported	
	RE Cheek	-	4233	846.6	25	24.63	8.89%	0.287	0.313	-
Head	RE Tilt	-	4233	846.6	25	24.63	8.89%	0.134	0.146	-
Tieau	LE Cheek	-	4233	846.6	25	24.63	8.89%	0.309	0.336	120
	LE Tilt	-	4233	846.6	25	24.63	8.89%	0.109	0.119	-
	Front side	10	4233	846.6	25	24.63	8.89%	0.531	0.578	121
	Back side	10	4233	846.6	25	24.63	8.89%	0.417	0.454	-
Hotspot	Bottom side	10	4233	846.6	25	24.63	8.89%	0.260	0.283	-
	Right side	10	4233	846.6	25	24.63	8.89%	0.250	0.272	-
	Left side	10	4233	846.6	25	24.63	8.89%	0.262	0.285	-

## 2<sup>nd</sup> spot check

Mode	Distanc Position e (mm)		CH Freq.		Max. Rated Avg. Power + Max. Tolerance (dBm)	Avg. Power	Avg. Power	1	SAR over g ⁄kg)	Plot page
		()			Tolerance (dbin)	(dBm)		Measured	Reported	
Head	LE Cheek	-	4233	846.6	25	24.35	16.14%	0.277	0.322	-
Hotspot	Front side	10	4233	846.6	25	24.27	18.30%	0.478	0.565	-

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## LTE FDD Band 2

Mode	Bandwidth (MHz)	Modulatior	RB Size	RB start	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Toleranc e (dBm)	Measure d Avg. Power (dBm)	Scaling		SAR over V/kg) Reported	Plot page
					RE Cheek	-	18700	1860	23.5	23.41	2.09%	0.156	0.159	122
					RE Tilt	-	18700	1860	23.5	23.41	2.09%	0.052	0.053	-
			1 RB	0	LE Cheek	-	18700	1860	23.5	23.41	2.09%	0.104	0.106	-
					LE Tilt	-	18700	1860	23.5	23.41	2.09%	0.048	0.049	-
					RE Cheek	-	18700	1860	22.5	22.30	4.71%	0.124	0.130	-
	001411	0.001/	50 00		RE Tilt	-	18700	1860	22.5	22.30	4.71%	0.042	0.044	-
Head	20MHz	QPSK	50 RB	0	LE Cheek	-	18700	1860	22.5	22.30	4.71%	0.080	0.084	-
					LE Tilt	-	18700	1860	22.5	22.30	4.71%	0.039	0.041	-
					RE Cheek	-	18700	1860	22.5	22.05	10.92%	0.118	0.131	-
			400		RE Tilt	-	18700	1860	22.5	22.05	10.92%	0.037	0.041	-
			100	КB	LE Cheek	-	18700	1860	22.5	22.05	10.92%	0.075	0.083	-
					LE Tilt	-	18700	1860	22.5	22.05	10.92%	0.035	0.039	-
				0	Bottom side	10	19100	1900	23.5	22.87	15.61%	1.090	1.260	-
					Front side	10	18700	1860	23.5	23.48	0.46%	0.619	0.622	-
					Back side	10	18700	1860	23.5	23.48	0.46%	0.433	0.435	-
			1 RB	50	Bottom side	10	18900	1880	23.5	23.03	11.43%	1.130	1.259	123
				50	Bottom side*	10	18900	1880	23.5	23.03	11.43%	1.100	1.226	-
					Right side	10	18700	1860	23.5	23.48	0.46%	0.109	0.110	-
					Left side	10	18700	1860	23.5	23.48	0.46%	0.102	0.102	-
					Front side	10	18700	1860	22.5	22.30	4.71%	0.466	0.488	-
					Back side	10	18700	1860	22.5	22.30	4.71%	0.321	0.336	-
				0	Bottom side	10	18700	1860	22.5	22.30	4.71%	0.815	0.853	-
Hotspot	20MHz	QPSK	50 RB	0	Bottom side	10	19100	1900	22.5	21.72	19.67%	0.827	0.990	-
					Right side	10	18700	1860	22.5	22.30	4.71%	0.080	0.084	-
					Left side	10	18700	1860	22.5	22.30	4.71%	0.075	0.079	-
				50	Bottom side	10	18900	1880	22.5	21.88	15.35%	0.852	0.983	-
					Front side	10	18700	1860	22.5	22.05	10.92%	0.451	0.500	-
					Back side	10	18700	1860	22.5	22.05	10.92%	0.312	0.346	-
					Bottom side	10	18700	1860	22.5	22.05	10.92%	0.805	0.893	-
			100	RB	Bottom side	10	18900	1880	22.5	21.78	18.03%	0.842	0.994	-
					Bottom side	10	19100	1900	22.5	21.74	19.12%	0.817	0.973	-
					Right side	10	18700	1860	22.5	22.05	10.92%	0.078	0.087	-
					Left side	10	18700	1860	22.5	22.05	10.92%	0.069	0.077	-

\* - repeated at the highest SAR measurement according to the KDB 865664 D01

2<sup>nd</sup> spot check

	Mode	Bandwidth	Modulatior	PR Sizo	PB start	Position	Distance	СН	Freq.	Max. Rated Avg. Power +	Measure d Avg.	Scaling	Averaged 1g (V	SAR over V/kg)	Plot
	Mode	(MHz)	viodulatioi	ND SIZE	ND SIAIT	FUSILION	(mm)	СП	(MHz)	Max. Toleranc e (dBm)	Power (dBm)	0	Measured	Reported	page
	Head	20MHz	QPSK	1 RB	0	RE Cheek	-	18700	1860	23.5	23.40	2.33%	0.139	0.142	-
н	lotspot	20MHz	QPSK	1 RB	50	Bottom side	10	18900	1880	23.5	23.38	2.80%	1.080	1.110	-

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Mode	Bandwidth (MHz)	Modulatior	RB Size	RB start	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Toleranc e (dBm)	Measure d Avg. Power (dBm)	Scaling	1g (V	SAR over V/kg) Reported	Plot page
					RE Cheek	-	20050	1720	24	23.35	16.14%	0.231	0.268	124
					RE Tilt	-	20050	1720	24	23.35	16.14%	0.041	0.048	-
			1 RB	50	LE Cheek	-	20050	1720	24	23.35	16.14%	0.136	0.158	-
					LE Tilt	-	20050	1720	24	23.35	16.14%	0.062	0.072	-
					RE Cheek	-	20050	1720	23	22.33	16.68%	0.179	0.209	-
		0.001/			RE Tilt	-	20050	1720	23	22.33	16.68%	0.032	0.037	-
Head	20MHz	QPSK	50 RB	0	LE Cheek	-	20050	1720	23	22.33	16.68%	0.110	0.128	-
					LE Tilt	-	20050	1720	23	22.33	16.68%	0.050	0.058	-
					RE Cheek	-	20050	1720	23	22.08	23.59%	0.171	0.211	-
			100 F		RE Tilt	-	20050	1720	23	22.08	23.59%	0.030	0.037	-
				RB	LE Cheek	-	20050	1720	23	22.08	23.59%	0.105	0.130	-
					LE Tilt	-	20050	1720	23	22.08	23.59%	0.047	0.058	-
				50	Front side	15	20050	1720	24	23.35	16.14%	0.392	0.455	125
		IKD	50	Back side	15	20050	1720	24	23.35	16.14%	0.278	0.323	-	
Rody worn	20MH-7	MHz QPSK 50 R	50 DD	0	Front side	15	20050	1720	23	22.33	16.68%	0.302	0.352	-
Bouy-worn	Body-worn 20MHz QPSK	QFSK	JUKD	0	Back side	15	20050	1720	23	22.33	16.68%	0.215	0.251	-
			100	RB	Front side	15	20050	1720	23	22.08	23.59%	0.294	0.363	-
			100	KD	Back side	15	20050	1720	23	22.08	23.59%	0.199	0.246	-
					Front side	10	20050	1720	23	22.98	0.46%	0.653	0.656	-
					Back side	10	20050	1720	23	22.98	0.46%	0.430	0.432	-
					Bottom side	10	20050	1720	23	22.98	0.46%	1.190	1.195	126
			1 RB	50	Bottom side*	10	20050	1720	23	22.98	0.46%	1.170	1.175	-
			TRD	50	Bottom side	10	20175	1732.5	23	22.63	8.89%	1.150	1.252	-
					Bottom side	10	20300	1745	23	22.73	6.41%	1.140	1.213	-
					Right side	10	20050	1720	23	22.98	0.46%	0.163	0.164	-
					Left side	10	20050	1720	23	22.98	0.46%	0.090	0.090	-
				0	Bottom side	10	20050	1720	23	22.03	25.03%	0.951	1.189	-
					Front side	10	20300	1745	23	22.05	24.45%	0.511	0.636	-
Hotspot	20MHz	QPSK			Back side	10	20300	1745	23	22.05	24.45%	0.335	0.417	-
riotspot	2011112	QFOR	50 RB	25	Bottom side	10	20175	1732,5	23	21.93	27.94%	0.931	1.191	-
				25	Bottom side	10	20300	1745	23	22.05	24.45%	0.939	1.169	-
					Right side	10	20300	1745	23	22.05	24.45%	0.127	0.158	-
					Left side	10	20300	1745	23	22.05	24.45%	0.070	0.087	-
					Front side	10	20300	1745	23	22.10	23.03%	0.510	0.627	-
					Back side	10	20300	1745	23	22.10	23.03%	0.332	0.408	-
					Bottom side	10	20050	1720	23	21.91	28.53%	0.924	1.188	-
		100	RB	Bottom side	10	20175	1732,5	23	21.84	30.62%	0.906	1.183	-	
					Bottom side	10	20300	1745	23	22.10	23.03%	0.938	1.154	-
					Right side	10	20300	1745	23	22.10	23.03%	0.127	0.156	-
					Left side	10	20300	1745	23	22.10	23.03%	0.071	0.087	-

#### \* - repeated at the highest SAR measurement according to the KDB 865664 D01

#### 2<sup>nd</sup> spot check

Mode	Bandwidth	Modulatior	RB Size	RB start	Position	Distance	СН	Freq.	Max. Rated Avg. Power +	Measure d Avg.	Scaling		SAR over V/kg)	Plot
Mode	(MHz)	viodulation	110 0120	ND Start	1 031011	(mm)	5	(MHz)	Max. Toleranc e (dBm)	Power	· ·	Measured	Reported	page
Head	20MHz	QPSK	1 RB	50	RE Cheek	-	20050	1720	24	23.50	12.20%	0.217	0.243	-
Body-worn	20MHz	QPSK	1 RB	50	Front side	15	20050	1720	24	23.50	12.20%	0.376	0.422	-
Hotspot	20MHz	QPSK	1 RB	50	Bottom side	10	20050	1720	23	22.53	11.43%	0.992	1.105	-

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### LTE FDD Band 5

Mode	Bandwidth	Modulatior	RB Size	RB start	Position	Distance	СН	Freq.	Max. Rated Avg. Power +	Measure d Avg.	Scaling		SAR over V/kg)	Plot
mode	(MHz)	noculation	ND 0120	The start	1 Coldon	(mm)		(MHz)	Max. Toleranc e (dBm)	Power (dBm)	County	Measured	Reported	page
					RE Cheek	-	20450	829	24	23.55	10.92%	0.227	0.252	-
			1 RB	25	RE Tilt	-	20450	829	24	23.55	10.92%	0.128	0.142	-
			TRD	25	LE Cheek	-	20450	829	24	23.55	10.92%	0.270	0.299	127
					LE Tilt	-	20450	829	24	23.55	10.92%	0.138	0.153	-
					RE Cheek	-	20600	844	23	22.42	14.29%	0.224	0.256	-
Head	10MHz	QPSK	25 RB	12	RE Tilt	-	20600	844	23	22.42	14.29%	0.110	0.126	-
riodu	1011112	di on	20110	12	LE Cheek	-	20600	844	23	22.42	14.29%	0.261	0.298	-
					LE Tilt	-	20600	844	23	22.42	14.29%	0.134	0.153	-
					RE Cheek	-	20450	829	23	22.38	15.35%	0.185	0.213	-
			50	RB	RE Tilt	-	20450	829	23	22.38	15.35%	0.107	0.123	-
					LE Cheek	-	20450	829	23	22.38	15.35%	0.226	0.261	-
					LE Tilt	-	20450	829	23	22.38	15.35%	0.114	0.131	-
					Front side	10	20450	829	24	23.55	10.92%	0.322	0.357	-
					Back side	10	20450	829	24	23.55	10.92%	0.320	0.355	-
			1 RB	25	Bottom side	10	20450	829	24	23.55	10.92%	0.190	0.211	-
					Right side	10	20450	829	24	23.55	10.92%	0.170	0.189	-
					Left side	10	20450	829	24	23.55	10.92%	0.364	0.404	128
					Front side	10	20600	844	23	22.42	14.29%	0.293	0.335	-
					Back side	10	20600	844	23	22.42	14.29%	0.316	0.361	-
Hotspot	10MHz	QPSK	25 RB	12	Bottom side	10	20600	844	23	22.42	14.29%	0.142	0.162	-
					Right side	10	20600	844	23	22.42	14.29%	0.126	0.144	-
					Left side	10	20600	844	23	22.42	14.29%	0.333	0.381	-
					Front side	10	20450	829	23	22.38	15.35%	0.282	0.325	-
					Back side	10	20450	829	23	22.38	15.35%	0.270	0.311	-
1			50	кв	Bottom side	10	20450	829	23	22.38	15.35%	0.140	0.161	-
1					Right side	10	20450	829	23	22.38	15.35%	0.122	0.141	-
					Left side	10	20450	829	23	22.38	15.35%	0.305	0.352	-

#### 2<sup>nd</sup> spot check

Mode	Bandwidth (MHz)	Modulation	PP Sizo	PP start	Position	Distance	СН	Freq.	Max. Rated Avg. Power +	Measure d	Scaling	Averaged 1g (V	SAR over V/kg)	Plot
Mode	(MHz)	viodulatioi	ND SIZE	ND SIAIT	Position	(mm)	Сп	(MHz)	Max. Toleranc e (dBm)	Avg. Power (dBm)	· ·	Measured	Reported	page
Head	10MHz	QPSK	1 RB	25	LE Cheek	-	20450	829	24	23.48	12.72%	0.141	0.159	-
Hotspot	10MHz	QPSK	1 RB	25	Left side	10	20450	829	24	23.48	12.72%	0.258	0.291	-

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## LTE FDD Band 7

Mode	Bandwidth (MHz)	Vodulatior	RB Size	RB start	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max.	Measure d Avg. Power	Scaling	1g (\	SAR over N/kg)	Plot page
									Toleranc e (dBm)	(dBm)		Measured	Reported	
					RE Cheek	-	21350	2560	23	22.93	1.62%	0.049	0.050	-
			1 RB	99	RE Tilt	-	21350	2560	23	22.93	1.62%	0.016	0.016	-
			IND	99	LE Cheek	-	21350	2560	23	22.93	1.62%	0.099	0.101	129
					LE Tilt	-	21350	2560	23	22.93	1.62%	0.040	0.041	-
					RE Cheek	-	21350	2560	22	21.87	3.04%	0.040	0.041	-
Head	20MHz	QPSK	50 RB	25	RE Tilt	-	21350	2560	22	21.87	3.04%	0.014	0.014	-
riodd	2011112	Q. 0.1	00112	20	LE Cheek	-	21350	2560	22	21.87	3.04%	0.080	0.082	-
					LE Tilt	-	21350	2560	22	21.87	3.04%	0.033	0.034	-
					RE Cheek	-	21350	2560	22	21.98	0.46%	0.041	0.041	-
			100	RB	RE Tilt	-	21350	2560	22	21.98	0.46%	0.015	0.015	-
					LE Cheek	-	21350	2560	22	21.98	0.46%	0.085	0.085	-
					LE Tilt	-	21350	2560	22	21.98	0.46%	0.036	0.036	-
			1 RB	99	Front side	15	21350	2560	23	22.93	1.62%	0.360	0.366	130
Body-worn 20MHz Q				Back side	15	21350	2560	23	22.93	1.62%	0.253	0.257	-	
	20MHz	QPSK	50 RB	25	Front side	15	21350	2560	22	21.87	3.04%	0.279	0.287	-
					Back side	15	21350	2560	22	21.87	3.04%	0.195	0.201	-
			100	RB	Front side	15	21350	2560	22 22	21.98	0.46%	0.283	0.284	-
				-	Back side	15 10	21350	2560	22.5	21.98	0.46%	0.201	0.202	-
					Front side Back side	10	21350 21350	2560 2560	22.5	22.35 22.35	3.51% 3.51%	0.731 0.518	0.757	-
					Bottom side	10	20850	2560	22.5	22.35	6.17%	1.070	1.136	-
					Bottom side	10	20650	2535	22.5	22.24	5.93%	1.100	1.165	-
			1 RB	0	Bottom side	10	21350	2555	22.5	22.25	3.51%	1.100	1.105	- 131
					Bottom side*	10	21350	2560	22.5	22.35	3.51%	1.060	1.097	-
					Right side	10	21350	2560	22.5	22.35	3.51%	0.254	0.263	-
					Left side	10	21350	2560	22.5	22.35	3.51%	0.113	0.203	-
					Front side	10	21350	2560	22	21.79	4.95%	0.638	0.670	-
					Back side	10	21350	2560	22	21.79	4.95%	0.449	0.471	-
					Bottom side	10	20850	2510	22	21.66	8.14%	0.941	1.018	-
Hotspot	20MHz	QPSK	50 RB	0	Bottom side	10	21100	2535	22	21.77	5.44%	0.989	1.043	-
					Bottom side	10	21350	2560	22	21.79	4.95%	1.010	1.060	-
					Right side	10	21350	2560	22	21.79	4.95%	0.220	0.231	-
					Left side	10	21350	2560	22	21.79	4.95%	0.097	0.102	-
				•	Front side	10	21100	2535	22	21.82	4.23%	0.602	0.627	-
					Back side	10	21100	2535	22	21.82	4.23%	0.428	0.446	-
					Bottom side	10	20850	2510	22	21.70	7.15%	0.945	1.013	-
			100	RB	Bottom side	10	21100	2535	22	21.82	4.23%	0.972	1.013	-
					Bottom side	10	21350	2560	22	21.81	4.47%	1.000	1.045	-
					Right side	10	21100	2535	22	21.82	4.23%	0.210	0.219	-
					Left side	10	21100	2535	22	21.82	4.23%	0.089	0.093	-

\* - repeated at the highest SAR measurement according to the KDB 865664 D01

## 2<sup>nd</sup> spot check

Mode	Bandwidth	Modulatior	RB Size	RB start	Position	Distance	СН	Freq.	Max. Rated Avg. Power +	Measure d Avg.	Scaling		SAR over V/kg)	Plot
mode	(MHz)	vioudiation	112 0120	ne stan	1 Contorr	(mm)	011	(MHz)	Max. Toleranc e (dBm)	Power (dBm)	, i i i i i i i i i i i i i i i i i i i	Measured	Reported	page
Head	20MHz	QPSK	1 RB	99	LE Cheek	-	21350	2560	23	23.37	-8.17%	0.094	0.086	-
Body-worn	20MHz	QPSK	1 RB	99	Front side	15	21350	2560	23	23.37	-8.17%	0.398	0.365	132
Hotspot	20MHz	QPSK	1 RB	0	Bottom side	10	21350	2560	22.5	22.49	0.23%	1.160	1.163	-

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### LTE FDD Band 12

Mode	Bandwidth (MHz)	Modulation	PB Sizo	PB start	Position	Distance	СН	Freq.	Max. Rated Avg. Power +	Measure d Avg.	Scaling		SAR over V/kg)	Plot
Mode	(MHz)	violulation	ND SIZE	ND Start	rosition	(mm)	CIT	(MHz)	Max. Toleranc e (dBm)	Power (dBm)	Scaling	Measured	Reported	page
					RE Cheek	-	23130	711	24	23.99	0.23%	0.208	0.208	133
			1 RB	49	RE Tilt	-	23130	711	24	23.99	0.23%	0.103	0.103	-
			TRD	43	LE Cheek	-	23130	711	24	23.99	0.23%	0.193	0.193	-
					LE Tilt	-	23130	711	24	23.99	0.23%	0.094	0.094	-
					RE Cheek	-	23130	711	23	22.83	3.99%	0.157	0.163	-
Head	10MHz	QPSK	25 RB	49	RE Tilt	-	23130	711	23	22.83	3.99%	0.081	0.084	-
Tieau	TOWITZ	Gron	23 110	43	LE Cheek	-	23130	711	23	22.83	3.99%	0.144	0.150	-
					LE Tilt	-	23130	711	23	22.83	3.99%	0.070	0.073	-
					RE Cheek	-	23130	711	23	22.71	6.91%	0.155	0.166	-
			50	PB	RE Tilt	-	23130	711	23	22.71	6.91%	0.078	0.083	-
			50	ΝD	LE Cheek	-	23130	711	23	22.71	6.91%	0.141	0.151	-
					LE Tilt	-	23130	711	23	22.71	6.91%	0.068	0.073	-
					Front side	10	23130	711	24	23.99	0.23%	0.443	0.444	134
					Back side	10	23130	711	24	23.99	0.23%	0.433	0.434	-
			1 RB	49	Bottom side	10	23130	711	24	23.99	0.23%	0.116	0.116	-
					Right side	10	23130	711	24	23.99	0.23%	0.247	0.248	-
					Left side	10	23130	711	24	23.99	0.23%	0.200	0.200	-
					Front side	10	23130	711	23	22.83	3.99%	0.331	0.344	-
					Back side	10	23130	711	23	22.83	3.99%	0.326	0.339	-
Hotspot	10MHz	QPSK	25 RB	49	Bottom side	10	23130	711	23	22.83	3.99%	0.086	0.089	-
					Right side	10	23130	711	23	22.83	3.99%	0.187	0.194	-
					Left side	10	23130	711	23	22.83	3.99%	0.151	0.157	-
					Front side	10	23130	711	23	22.71	6.91%	0.325	0.347	-
					Back side	10	23130	711	23	22.71	6.91%	0.317	0.339	-
			50	RB	Bottom side	10	23130	711	23	22.71	6.91%	0.084	0.090	-
1					Right side	10	23130	711	23	22.71	6.91%	0.182	0.195	-
					Left side	10	23130	711	23	22.71	6.91%	0.147	0.157	-

## 2<sup>nd</sup> spot check

Mode	Bandwidth (MHz)	Modulation	PB Sizo	PB start	Position	Distance	СН	Freq.	Max. Rated Avg. Power +	Measure d	Scaling		SAR over V/kg)	Plot
Mode	(MHz)	viodulatioi	KD SIZE	ND SIAIT	FOSILION	(mm)	СП	(MHz)	Max. Toleranc e (dBm)	Avg. Power (dBm)		Measured	Reported	page
Head	10MHz	QPSK	1 RB	49	RE Cheek	-	23130	711	24	23.91	2.09%	0.176	0.180	-
Hotspot	10MHz	QPSK	1 RB	49	Front side	10	23130	711	24	23.98	0.46%	0.389	0.391	-

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## LTE FDD Band 17

Mode	Bandwidth (MHz)	Modulation	PR Sizo	PB start	Position	Distance	СН	Freq.	Max. Rated Avg. Power +	Measure d Avg.	Scaling	Averaged 1g (V	SAR over V/kg)	Plot
Mode	(MHz)	violation	ND 0120	ND Start	rosition	(mm)	0	(MHz)	Max. Toleranc e (dBm)	Power (dBm)	ocanny	Measured	Reported	page
					RE Cheek	-	23780	709	24	23.98	0.46%	0.207	0.208	135
			1 RB	49	RE Tilt	-	23780	709	24	23.98	0.46%	0.099	0.099	-
			TIND	43	LE Cheek	-	23780	709	24	23.98	0.46%	0.195	0.196	-
					LE Tilt	-	23780	709	24	23.98	0.46%	0.100	0.100	-
					RE Cheek	-	23800	711	23	22.98	0.46%	0.169	0.170	-
Head	10MHz	QPSK	25 RB	25	RE Tilt	-	23800	711	23	22.98	0.46%	0.084	0.084	-
Tieau	TOIVITIZ	GFOR	23 110	25	LE Cheek	-	23800	711	23	22.98	0.46%	0.159	0.160	-
					LE Tilt	-	23800	711	23	22.98	0.46%	0.082	0.082	-
					RE Cheek	-	23800	711	23	22.86	3.28%	0.161	0.166	-
			50	DD	RE Tilt	-	23800	711	23	22.86	3.28%	0.080	0.083	-
			50	ΝD	LE Cheek	-	23800	711	23	22.86	3.28%	0.154	0.159	-
					LE Tilt	-	23800	711	23	22.86	3.28%	0.075	0.077	-
					Front side	10	23780	709	24	23.98	0.46%	0.444	0.446	136
					Back side	10	23780	709	24	23.98	0.46%	0.419	0.421	-
			1 RB	49	Bottom side	10	23780	709	24	23.98	0.46%	0.115	0.116	-
					Right side	10	23780	709	24	23.98	0.46%	0.245	0.246	-
					Left side	10	23780	709	24	23.98	0.46%	0.200	0.201	-
					Front side	10	23800	711	23	22.98	0.46%	0.335	0.337	-
					Back side	10	23800	711	23	22.98	0.46%	0.329	0.331	-
Hotspot	10MHz	QPSK	25 RB	25	Bottom side	10	23800	711	23	22.98	0.46%	0.082	0.082	-
					Right side	10	23800	711	23	22.98	0.46%	0.185	0.186	-
					Left side	10	23800	711	23	22.98	0.46%	0.151	0.152	-
					Front side	10	23800	711	23	22.86	3.28%	0.331	0.342	-
					Back side	10	23800	711	23	22.86	3.28%	0.326	0.337	-
			50	RB	Bottom side	10	23800	711	23	22.86	3.28%	0.080	0.083	-
					Right side	10	23800	711	23	22.86	3.28%	0.182	0.188	-
					Left side	10	23800	711	23	22.86	3.28%	0.149	0.154	-

## 2<sup>nd</sup> spot check

Mode	Bandwidth	Modulatior	PR Sizo	PB start	Position	Distance	СН	Freq.	Max. Rated Avg. Power +	Measure d Avg.	Scaling	Averaged 1g (V	SAR over V/kg)	Plot
Mode	(MHz)	viodulatioi	ND SIZE	ND SIAIT	FUSICION	(mm)	Ch	(MHz)	Max. Toleranc e (dBm)	Power (dBm)		Measured	Reported	page
Head	10MHz	QPSK	1 RB	49	RE Cheek	-	23780	709	24	23.99	0.23%	0.206	0.206	-
Hotspot	10MHz	QPSK	1 RB	49	Front side	10	23780	709	24	23.86	3.28%	0.404	0.417	-

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LTE TDD Band 38

Mode Bandwidth			or RB Size	RB start		Distance	СН	Freq.	Max. Rated Avg. Power +	Measure d Avg.	Scaling		SAR over V/kg)	Plot
()	(MHz)	vioudiation	10020		1 031011	(mm)		(MHz)	Max. Toleranc e (dBm)	Power (dBm)	ocanng	Measured	Reported	page
					RE Cheek	-	38000	2595	24	23.85	3.51%	0.031	0.032	-
			1 RB	0	RE Tilt	-	38000	2595	24	23.85	3.51%	0.012	0.012	-
			TRD	Ŭ	LE Cheek	-	38000	2595	24	23.85	3.51%	0.060	0.062	137
					LE Tilt	-	38000	2595	24	23.85	3.51%	0.022	0.023	-
					RE Cheek	-	38000	2595	23	22.90	2.33%	0.027	0.028	-
Head	20MHz	QPSK	50 RB	25	RE Tilt	-	38000	2595	23	22.90	2.33%	0.012	0.012	-
Ticau	2011112	GIOR	50 KD	25	LE Cheek	-	38000	2595	23	22.90	2.33%	0.051	0.052	-
					LE Tilt	-	38000	2595	23	22.90	2.33%	0.020	0.020	-
					RE Cheek	-	37850	2580	23	22.83	3.99%	0.026	0.027	-
			100	PB	RE Tilt	-	37850	2580	23	22.83	3.99%	0.012	0.012	-
					LE Cheek	-	37850	2580	23	22.83	3.99%	0.050	0.052	-
					LE Tilt	-	37850	2580	23	22.83	3.99%	0.020	0.021	-
				0	Front side	10	38000	2595	24	23.85	3.51%	0.374	0.387	-
					Back side	10	38000	2595	24	23.85	3.51%	0.247	0.256	-
			1 RB		Bottom side	10	38000	2595	24	23.85	3.51%	0.694	0.718	138
					Right side	10	38000	2595	24	23.85	3.51%	0.139	0.144	-
					Left side	10	38000	2595	24	23.85	3.51%	0.068	0.070	-
					Front side	10	38000	2595	23	22.90	2.33%	0.299	0.306	-
					Back side	10	38000	2595	23	22.90	2.33%	0.196	0.201	-
Hotspot	20MHz	QPSK	50 RB	25	Bottom side	10	38000	2595	23	22.90	2.33%	0.552	0.565	-
					Right side	10	38000	2595	23	22.90	2.33%	0.110	0.113	-
					Left side	10	38000	2595	23	22.90	2.33%	0.052	0.053	-
					Front side	10	37850	2580	23	22.83	3.99%	0.281	0.292	-
1					Back side	10	37850	2580	23	22.83	3.99%	0.191	0.199	-
1			100	RB	Bottom side	10	37850	2580	23	22.83	3.99%	0.539	0.561	-
					Right side	10	37850	2580	23	22.83	3.99%	0.102	0.106	-
					Left side	10	37850	2580	23	22.83	3.99%	0.045	0.047	-

## 2<sup>nd</sup> spot check

Mode	Bandwidth	andwidth (MHz)	DR Size DR stor	PB start	: Position	Distance (mm)	СН	CH Freq. (MHz)		ated Measure Vg. d wer + Avg. 4 Max. Power eranc (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot
Mode (N	(MHz)	viodulatioi	KD SIZE	ND Start							, i i i i i i i i i i i i i i i i i i i	Measured	Reported	page
Head	20MHz	QPSK	1 RB	0	LE Cheek	-	38000	2595	24	23.80	4.71%	0.052	0.054	-
Hotspot	20MHz	QPSK	1 RB	0	Bottom side	10	38000	2595	24	23.89	2.57%	0.684	0.702	-

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#### WiFi 2.4GHz - WLAN802.11b

Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max.	Measured Avg. Power	Scaling	Averaged S (W/	-	Plot page
					Tolerance (dBm)	(dBm)		Measured	Reported	
	RE Cheek	-	1	2412	17.5	17.34	3.75%	0.464	0.481	139
Head	RE Tilt	-	1	2412	17.5	17.34	3.75%	0.357	0.370	-
neau	LE Cheek	-	1	2412	17.5	17.34	3.75%	0.215	0.223	-
	LE Tilt	-	1	2412	17.5	17.34	3.75%	0.182	0.189	-
	Front side	10	1	2412	17.5	17.34	3.75%	0.053	0.055	-
Hotopot	Back side	10	1	2412	17.5	17.34	3.75%	0.210	0.218	140
Hotspot	Top side	10	1	2412	17.5	17.34	3.75%	0.044	0.046	-
	Left side	10	1	2412	17.5	17.34	3.75%	0.058	0.060	-

#### 2<sup>nd</sup> spot check

Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max.	Measured Avg. Power	Scaling	Averaged S (W/	-	Plot page
		. ,		, ,	Tolerance (dBm)	(dBm)		Measured	Reported	
Head	RE Cheek	-	1	2412	17.5	17.29	4.95%	0.293	0.308	-
Hotspot	Back side	10	1	2412	17.5	17.29	4.95%	0.188	0.197	-

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# 3. Simultaneous Transmission Analysis

Simulaneous mansimission S	cenarios.		
Simultaneous Transmit Configurations	Head	Body-Worn	Hotspo
GSM + 2.4GHz Wi-Fi	Yes	Yes	No
GPRS + 2.4GHz Wi-Fi	No	No	Yes
WCDMA + 2.4GHz Wi-Fi	Yes	Yes	Yes
LTE + 2.4GHz Wi-Fi	Yes	Yes	Yes
GSM + BT	No	Yes	No
GPRS + BT	No	No	No
WCDMA + BT	No	Yes	No
LTE + BT	No	Yes	No

## Simultaneous Transmission Scenarios:

1. WiFi 2.4G and BT can't transmit simultaneously.

2. The device does not support VoLTE.

3. The device does not support DTM function. Body-worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.

4.Based on KDB447498D01 note 36, when SAR test exclusion is allowed by other published RF exposure KDB procedures, such as the 2.5 cm hotspot mode SAR test exclusion for an edge or surface, then estimated SAR is not required to determine simultaneous SAR test exclusion.

5. Held to ear configurations are not applicable to Bluetooth and therefore were not considered for simultaneous transmission.

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## 3.1 Estimated SAR calculation

According to KDB447498 D01v06 – When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

Estimated SAR =	Max.tune up power(mW)	$\sqrt{f(GHz)}$
Estimated SAK -	Min. test separation distance(mm)	7.5

If the minimum test separation distance is < 5mm, a distance of 5mm is used for estimated SAR calculation. When the test separation distance is >50mm, the 0.4W/kg is used for SAR-1g.

mode	position	max. power (dB)	max. power (mW)	f(GHz)	distance (mm)	х	Estimated SAR
BT	body-worn	12	15.849	2.48	15	7.5	0.222 (1g)

## 3.2 SPLSR evaluation and analysis

Per KDB447498D01, when the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR sum to peak location separation ratio(SPLSR).

The simultaneous transmitting antennas in each operating mode and exposure condition combination must be considered one pair at a time to determine the SAR to peak location separation ratio to qualify for test exclusion.

The ratio is determined by  $(SAR1 + SAR2)^{1.5/Ri}$ , rounded to two decimal digits, and must be  $\leq 0.04$  for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion.

SAR1 and SAR2 are the highest reported or estimated SAR for each antenna in the pair, and Ri is the separation distance between the peak SAR locations for the antenna pair in mm.

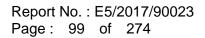
When standalone test exclusion applies, SAR is estimated; the peak location is assumed to be at the feed-point or geometric center of the antenna.

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Simultaneous Transmission Combination	
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reporte	d SAR W	WAN and WL	AN 2.4GHz,	ΣSAR evalu	uation
Frequency			reported S	SAR / W/kg	ΣSAR
band	P	osition	WWAN	WLAN	<1.6W/kg
		Right cheek	0.297	0.481	0.78
GSM 850	Head	Right tilt	0.137	0.370	0.51
GSIM 830	Tieau	Left cheek	0.318	0.223	0.54
		Left tilt	0.114	0.189	0.30
		Front	0.544	0.055	0.60
		Back	0.501	0.218	0.72
GPRS 850	Hotspot	Тор	-	0.046	0.05
(1Dn1UP)	Ποισροι	Bottom	0.249	-	0.25
		Right	0.271	-	0.27
		Left	0.326	0.060	0.39
		Right cheek	0.165	0.481	0.65
GSM 1900	Head	Right tilt	0.046	0.370	0.42
GSW 1900		Left cheek	0.110	0.223	0.33
		Left tilt	0.062	0.189	0.25
	Hotspot	Front side	0.486	0.055	0.54
		Back side	0.313	0.218	0.53
GPRS 1900		Top side	-	0.046	0.05
(1Dn4UP)		Bottom side	0.880	-	0.88
		Right side	0.088	-	0.09
		Left side	0.071	0.060	0.13
		Right cheek	0.161	0.481	0.64
	Head	Right tilt	0.039	0.370	0.41
	Head	Left cheek	0.111	0.223	0.33
		Left tilt	0.068	0.189	0.26
WCDMA		Front side	0.654	0.055	0.71
Band II		Back side	0.457	0.218	0.68
		Top side	-	0.046	0.05
	Hotspot	Bottom side	1.231	-	1.23
		Right side	0.121	-	0.12
		Left side	0.099	0.060	0.16

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reporte	d SAR W	WAN and WL	AN 2.4GHz,	ΣSAR evalu	uation
Frequency		iti	reported S	AR / W/kg	ΣSAR
band	P	osition	WWAN	WLAN	<1.6W/kg
		Right cheek	0.261	0.481	0.74
	Head	Right tilt	0.087	0.370	0.46
	пеац	Left cheek	0.184	0.223	0.41
		Left tilt	0.072	0.189	0.26
WCDMA		Front side	0.620	0.055	0.68
Band IV		Back side	0.446	0.218	0.66
	Hotspot	Top side	-	0.046	0.05
	Ποιδροι	Bottom side	1.279	-	1.28
		Right side	0.172	-	0.17
		Left side	0.076	0.060	0.14
		Right cheek	0.313	0.481	0.79
	Head	Right tilt	0.146	0.370	0.52
		Left cheek	0.336	0.223	0.56
		Left tilt	0.119	0.189	0.31
WCDMA	Hotspot	Front side	0.578	0.055	0.63
Band V		Back side	0.454	0.218	0.67
		Top side	-	0.046	0.05
		Bottom side	0.283	-	0.28
		Right side	0.272	-	0.27
		Left side	0.285	0.060	0.35
		Right cheek	0.159	0.481	0.64
	Head	Right tilt	0.053	0.370	0.42
	пеац	Left cheek	0.106	0.223	0.33
		Left tilt	0.049	0.189	0.24
LTE FDD		Front side	0.622	0.055	0.68
Band 2		Back side	0.435	0.218	0.65
		Top side	-	0.046	0.05
	Hotspot	Bottom side	1.260	-	1.26
		Right side	0.110	-	0.11
		Left side	0.102	0.060	0.16

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reporte	d SAR W	WAN and WL	AN 2.4GHz,	ΣSAR evalu	uation
Frequency	D	osition	reported S	SAR / W/kg	ΣSAR
band	P	USILION	WWAN	WLAN	<1.6W/kg
		Right cheek	0.268	0.481	0.75
	Head	Right tilt	0.048	0.370	0.42
	пеац	Left cheek	0.158	0.223	0.38
		Left tilt	0.072	0.189	0.26
LTE FDD		Front side	0.656	0.055	0.71
Band 4		Back side	0.432	0.218	0.65
	Hotspot	Top side	-	0.046	0.05
	Ποιοροι	Bottom side	1.252	-	1.25
		Right side	0.164	-	0.16
		Left side	0.090	0.060	0.15
		Right cheek	0.256	0.481	0.74
	Head	Right tilt	0.142	0.370	0.51
		Left cheek	0.299	0.223	0.52
		Left tilt	0.153	0.189	0.34
LTE FDD	Hotspot	Front side	0.357	0.055	0.41
Band 5		Back side	0.361	0.218	0.58
		Top side	-	0.046	0.05
		Bottom side	0.211	-	1.21
		Right side	0.189	-	0.26
		Left side	0.404	0.060	0.46
		Right cheek	0.050	0.481	0.53
	Head	Right tilt	0.016	0.370	0.39
	Tieau	Left cheek	0.101	0.223	0.32
		Left tilt	0.041	0.189	0.23
LTE FDD		Front side	0.757	0.055	0.81
Band 7		Back side	0.536	0.218	0.75
	l later et	Top side	-	0.046	0.05
	Hotspot	Bottom side	1.211	-	1.21
		Right side	0.263	-	0.26
		Left side	0.117	0.060	0.18

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reporte	d SAR W	WAN and WL	AN 2.4GHz,	ΣSAR evalu	uation
Frequency	D	osition	reported S	AR / W/kg	ΣSAR
band	P	OSITION	WWAN	WLAN	<1.6W/kg
		Right cheek	0.208	0.481	0.69
	Head	Right tilt	0.103	0.370	0.47
	Tieau	Left cheek	0.193	0.223	0.42
		Left tilt	0.094	0.189	0.28
LTE FDD		Front side	0.444	0.055	0.50
Band 12		Back side	0.434	0.218	0.65
	Hotopot	Top side	-	0.046	0.05
	Hotspot	Bottom side	0.116	-	0.12
		Right side	0.248	-	0.25
		Left side	0.200	0.060	0.26
	Head	Right cheek	0.208	0.481	0.69
		Right tilt	0.099	0.370	0.47
		Left cheek	0.196	0.223	0.42
		Left tilt	0.100	0.189	0.29
LTE FDD	Hotspot	Front side	0.446	0.055	0.50
Band 17		Back side	0.421	0.218	0.64
		Top side	-	0.046	0.05
		Bottom side	0.116	-	0.12
		Right side	0.246	-	0.25
		Left side	0.201	0.060	0.26
		Right cheek	0.032	0.481	0.51
	Head	Right tilt	0.012	0.370	0.38
	Tieau	Left cheek	0.062	0.223	0.29
		Left tilt	0.023	0.189	0.21
LTE TDD		Front side	0.387	0.055	0.44
Band 38		Back side	0.256	0.218	0.47
	Hotspot	Top side	-	0.046	0.05
	10.0pot	Bottom side	0.718	-	0.72
		Right side	0.144	-	0.14
		Left side	0.070	0.060	0.13

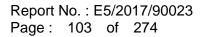
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reported SAR WWAN and Bluetooth, ΣSAR evaluation						
Frequency band	Position		reported SAR / W/kg		ΣSAR	
			WWAN	Bluetooth	<1.6W/kg	
GSM 850	Body-worn	Front	0.315	0.222	0.54	
		Back	0.314	0.222	0.54	
GSM 1900	Body-worn	Front	0.244	0.222	0.47	
		Back	0.168	0.222	0.39	
WCDMA	Pody worn	Front	0.654	0.222	0.88	
Band II	Body-worn	Back	0.457	0.222	0.68	
WCDMA	Body-worn	Front	0.490	0.222	0.71	
Band IV		Back	0.341	0.222	0.56	
WCDMA	Body-worn	Front	0.578	0.222	0.80	
Band V		Back	0.454	0.222	0.68	
LTE FDD Band 2	Body-worn	Front	0.622	0.222	0.84	
LIE FUD Band 2		Back	0.435	0.222	0.66	
LTE FDD Band 4	Body-worn	Front	0.455	0.222	0.68	
LIE FDD Band 4		Back	0.323	0.222	0.55	
LTE FDD Band 5	Body-worn	Front	0.357	0.222	0.58	
		Back	0.361	0.222	0.58	
LTE FDD Band 7	Body-worn	Front	0.366	0.222	0.59	
LIE FOD Band 7		Back	0.257	0.222	0.48	
LTE FDD Band 12	Body-worn	Front	0.444	0.222	0.67	
		Back	0.434	0.222	0.66	
LTE FDD Band 17	Body-worn	Front	0.446	0.222	0.67	
		Back	0.421	0.222	0.64	
LTE TDD Band 38	Body-worn	Front	0.387	0.222	0.61	
		Back	0.256	0.222	0.48	

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# 4. Instruments List

Manufacturer	Device	Туре	Serial number	Date of last calibration	Date of next calibration
SPEAG	Dosimetric E-Field Probe	EX3DV4	3923	Sep.02,2016	Sep.01,2017
			7466	Jul.04,2017	Jul.03,2018
			3831	Jan.23,2017	Jan.22,2018
	System Validation Dipole	D750V3	1015	Aug.30,2016	Aug.29,2017
		D835V2	4d063	Aug.25,2016	Aug.24,2017
				Aug.21,2017	Aug.20,2018
			4d120	Jul.03,2017	Jul.02,2018
SPEAG		D1750V2	1008	Aug.31,2016	Aug.30,2017
		D1900V2	5d173	May.31,2017	May.30,2018
		D2450V2	727	Apr.21,2017	Apr.20,2018
		D2600V2	1005	Jan.25,2017	Jan.24,2018
SPEAG	Data acquisition Electronics	DAE4	547	Mar.22,2017	Mar.21,2018
			1336	Nov.22,2016	Nov.21,2017
SPEAG	Software	DASY 52 V52.8.8	N/A	Calibration not required	Calibration not required
SPEAG	Phantom	SAM	N/A	Calibration not required	Calibration not required
Agilent	Network Analyzer	E5071C	MY46107530	Jan.20,2017	Jan.19,2018
Agilent	Dielectric Probe Kit	85070E	MY44300677	Calibration not required	Calibration not required
Agilent	Dual-directional coupler	772D	MY52180142	Apr.13,2017	Apr.12,2018
		778D	MY52180302	Apr.13,2017	Apr.12,2018
Agilent	RF Signal Generator	N5181A	MY50144143	Mar.01,2017	Feb.28,2018
Agilent	Power Meter	E4417A	MY52240003	Oct.17,2016	Oct.16,2017

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Manufacturer	Device	Туре	Serial number	Date of last calibration	Date of next calibration
Agilent	Power Sensor	E9301H	MY52200003	Oct.17,2016	Oct.16,2017
			MY52200004	Oct.17,2016	Oct.16,2017
Anritsu	Radio Communication Test	MT8820C	6201061049	Apr.08,2017	Apr.07,2018
TECPEL	Digital thermometer	DTM-303A	TP130077	Mar.17,2017	Mar.16,2018

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# 5. Measurements

Date: 2017/6/29

# GSM 850\_Head\_Le Cheek\_CH 190

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3 Medium parameters used: f = 837 MHz;  $\sigma$  = 0.872 S/m;  $\epsilon_r$  = 42.019;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Left Section Ambient temperature: 23.1°C; Liquid temperature: 22.0°C

DASY5 Configuration:

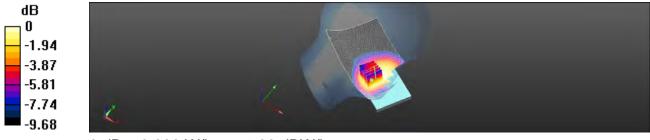
- Probe: EX3DV4 SN3923; ConvF(10.66, 10.66, 10.66); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.291 W/kg

# Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 3.337 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 0.314 W/kg SAR(1 g) = 0.263 W/kg; SAR(10 g) = 0.206 W/kg Maximum value of SAR (measured) = 0.289 W/kg



0 dB = 0.289 W/kg = -5.39 dBW/kg

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Date: 2017/7/3

# GSM 850\_Body-worn\_Front side\_CH 190\_15mm

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3 Medium parameters used: f = 837 MHz;  $\sigma$  = 1.007 S/m;  $\epsilon$ <sub>r</sub> = 53.299;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.4°C; Liquid temperature: 21.9°C

DASY5 Configuration:

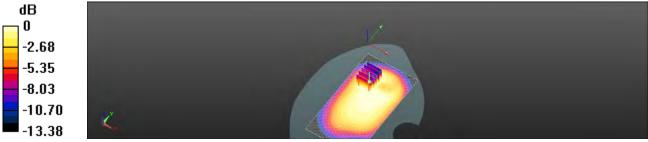
- Probe: EX3DV4 SN3923; ConvF(10.67, 10.67, 10.67); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (71x131x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.324 W/kg

# Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 16.74 V/m; Power Drift = -0.15 dB Peak SAR (extrapolated) = 0.371 W/kg SAR(1 g) = 0.260 W/kg; SAR(10 g) = 0.177 W/kg Maximum value of SAR (measured) = 0.316 W/kg



0 dB = 0.316 W/kg = -5.00 dBW/kg

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Date: 2017/7/3

# GPRS 850\_Hotspot\_Front side\_CH 190\_10mm

Communication System: GPRS (1Dn1Up); Frequency: 836.6 MHz; Duty Cycle: 1:8.3 Medium parameters used: f = 837 MHz;  $\sigma$  = 1.007 S/m;  $\epsilon$ <sub>r</sub> = 53.299;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.4°C; Liquid temperature: 21.9°C

DASY5 Configuration:

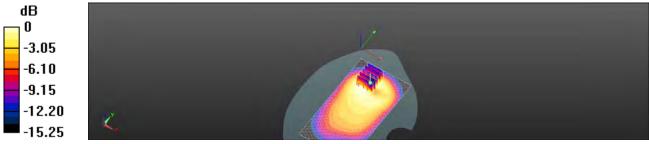
- Probe: EX3DV4 SN3923; ConvF(10.67, 10.67, 10.67); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (71x131x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.597 W/kg

# Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 17.16 V/m; Power Drift = -0.12 dB Peak SAR (extrapolated) = 0.720 W/kg SAR(1 g) = 0.449 W/kg; SAR(10 g) = 0.281 W/kg Maximum value of SAR (measured) = 0.579 W/kg



0 dB = 0.579 W/kg = -2.38 dBW/kg

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Date: 2017/10/12

# GSM 850\_Body-worn\_Front side\_CH 190\_15mm

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3 Medium parameters used: f = 837 MHz;  $\sigma$  = 0.984 S/m;  $\epsilon$ <sub>r</sub> = 53.504;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.1°C; Liquid temperature: 21.8°C

DASY5 Configuration:

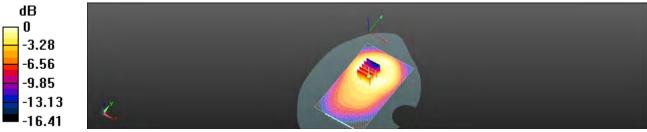
- Probe: EX3DV4 SN3831; ConvF(9.25, 9.25, 9.25); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.364 W/kg

# Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 12.44 V/m; Power Drift = -0.11 dB Peak SAR (extrapolated) = 0.383 W/kg SAR(1 g) = 0.264 W/kg; SAR(10 g) = 0.180 W/kg Maximum value of SAR (measured) = 0.324 W/kg



0 dB = 0.324 W/kg = -4.89 dBW/kg

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Date: 2017/7/8

# GSM 1900\_Head\_Re Cheek\_CH 810

Communication System: GSM; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3 Medium parameters used: f = 1910 MHz;  $\sigma$  = 1.407 S/m;  $\epsilon$ <sub>r</sub> = 39.997;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section Ambient temperature: 23.2°C; Liquid temperature: 22.4°C

DASY5 Configuration:

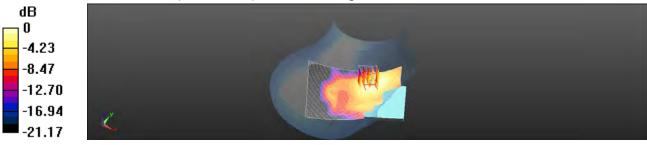
- Probe: EX3DV4 SN3923; ConvF(8.9, 8.9, 8.9); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.195 W/kg

# Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 5.181 V/m; Power Drift = -0.13 dB Peak SAR (extrapolated) = 0.206 W/kg SAR(1 g) = 0.141 W/kg; SAR(10 g) = 0.093 W/kg Maximum value of SAR (measured) = 0.174 W/kg



0 dB = 0.174 W/kg = -7.58 dBW/kg

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Date: 2017/7/14

#### GSM 1900\_Body-worn\_Front side\_CH 810\_15mm

Communication System: GSM; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3 Medium parameters used: f = 1910 MHz;  $\sigma$  = 1.534 S/m;  $\epsilon_r$  = 52.736;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 21.8°C

DASY5 Configuration:

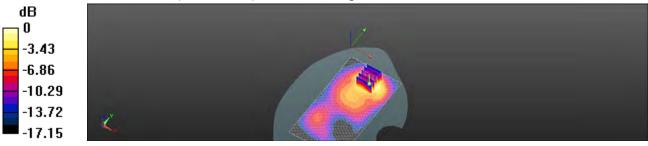
- Probe: EX3DV4 SN3923; ConvF(8.47, 8.47, 8.47); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (71x131x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.278 W/kg

#### Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 4.686 V/m; Power Drift = 0.11 dB Peak SAR (extrapolated) = 0.341 W/kg SAR(1 g) = 0.209 W/kg; SAR(10 g) = 0.120 W/kg Maximum value of SAR (measured) = 0.282 W/kg



0 dB = 0.282 W/kg = -5.50 dBW/kg

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Date: 2017/7/14

#### GPRS 1900\_Hotspot\_Bottom side\_CH 512\_10mm

Communication System: GPRS (1Dn4Up); Frequency: 1850.2 MHz; Duty Cycle: 1:2 Medium parameters used: f = 1850.2 MHz;  $\sigma$  = 1.474 S/m;  $\epsilon_r$  = 52.927;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 21.8°C

DASY5 Configuration:

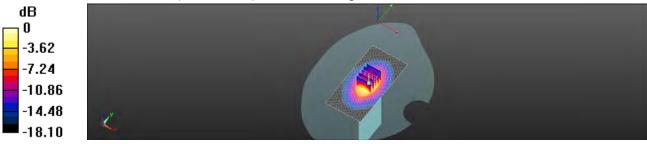
- Probe: EX3DV4 SN3923; ConvF(8.47, 8.47, 8.47); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (51x101x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.996 W/kg

#### Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 25.15 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 1.21 W/kg SAR(1 g) = 0.717 W/kg; SAR(10 g) = 0.386 W/kg Maximum value of SAR (measured) = 0.986 W/kg



0 dB = 0.986 W/kg = -0.06 dBW/kg

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#### GPRS 1900\_Hotspot\_Bottom side\_CH 512\_10mm

Communication System: GPRS (1Dn4Up); Frequency: 1850.2 MHz; Duty Cycle: 1:2 Medium parameters used: f = 1850.2 MHz;  $\sigma$  = 1.482 S/m;  $\epsilon_r$  = 53.132;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.1°C; Liquid temperature: 22.4°C

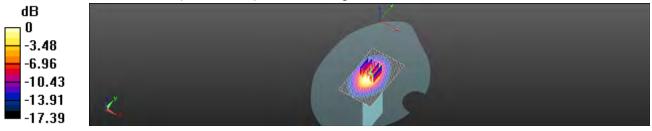
DASY5 Configuration:

- Probe: EX3DV4 SN3831; ConvF(7.53, 7.53, 7.53); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (51x81x1):** Interpolated grid: dx=15 mm, dy=15 mm Maximum value of SAR (interpolated) = 1.28 W/kg

#### Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 25.00 V/m; Power Drift = -0.14 dB Peak SAR (extrapolated) = 1.29 W/kg SAR(1 g) = 0.799 W/kg; SAR(10 g) = 0.446 W/kg Maximum value of SAR (measured) = 1.07 W/kg



0 dB = 1.07 W/kg = 0.30 dBW/kg

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Date: 2017/7/8

# WCDMA Band II\_Head\_Re Cheek\_CH 9262

Communication System: WCDMA; Frequency: 1852.4 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1852.4 MHz;  $\sigma$  = 1.344 S/m;  $\epsilon_r$  = 40.206;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section Ambient temperature: 23.2°C; Liquid temperature: 22.4°C

DASY5 Configuration:

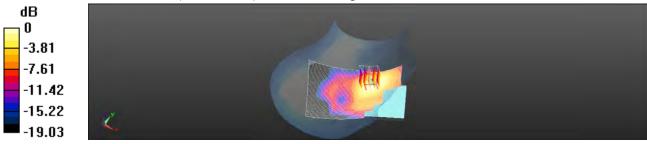
- Probe: EX3DV4 SN3923; ConvF(8.9, 8.9, 8.9); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.209 W/kg

# Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 4.761 V/m; Power Drift = -0.15 dB Peak SAR (extrapolated) = 0.234 W/kg SAR(1 g) = 0.158 W/kg; SAR(10 g) = 0.101 W/kg Maximum value of SAR (measured) = 0.198 W/kg



0 dB = 0.198 W/kg = -7.04 dBW/kg

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Date: 2017/7/14

# WCDMA Band II\_Hotspot\_Bottom side\_CH 9400\_10mm

Communication System: WCDMA; Frequency: 1880 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1880 MHz;  $\sigma$  = 1.504 S/m;  $\epsilon_r$  = 52.762;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 21.8°C

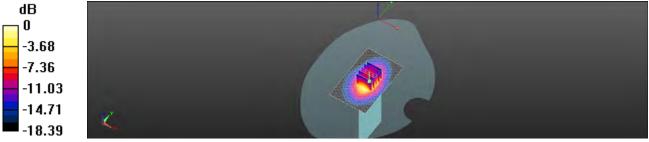
DASY5 Configuration:

- Probe: EX3DV4 SN3923; ConvF(8.47, 8.47, 8.47); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (51x81x1):** Interpolated grid: dx=15 mm, dy=15 mm Maximum value of SAR (interpolated) = 1.62 W/kg

#### Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 31.42 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 1.95 W/kg SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.637 W/kg Maximum value of SAR (measured) = 1.61 W/kg



0 dB = 1.61 W/kg = 2.06 dBW/kg

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# WCDMA Band II\_Head\_Re Cheek\_CH 9262

Communication System: WCDMA; Frequency: 1852.4 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1852.4 MHz;  $\sigma$  = 1.365 S/m;  $\epsilon_r$  = 40.257;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section Ambient temperature: 22.1°C; Liquid temperature: 22.3°C

DASY5 Configuration:

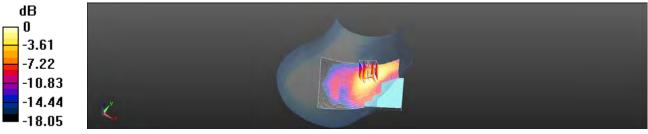
- Probe: EX3DV4 SN3831; ConvF(7.86, 7.86, 7.86); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (71x111x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.211 W/kg

# Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 4.752 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 0.240 W/kg SAR(1 g) = 0.160 W/kg; SAR(10 g) = 0.101 W/kg Maximum value of SAR (measured) = 0.204 W/kg



0 dB = 0.204 W/kg = -6.91 dBW/kg

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Date: 2017/7/7

# WCDMA Band IV\_Head\_Re Cheek\_CH 1412

Communication System: WCDMA; Frequency: 1732.4 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1732.4 MHz;  $\sigma$  = 1.322 S/m;  $\epsilon_r$  = 39.898;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section Ambient temperature: 22.7°C; Liquid temperature: 22.5°C

DASY5 Configuration:

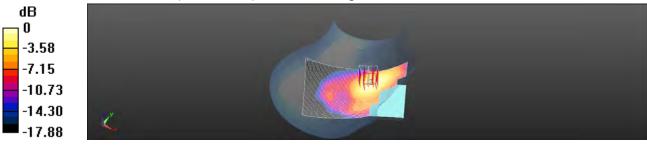
- Probe: EX3DV4 SN3923; ConvF(9.27, 9.27, 9.27); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.322 W/kg

# Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 6.592 V/m; Power Drift = 0.13 dB Peak SAR (extrapolated) = 0.383 W/kg SAR(1 g) = 0.250 W/kg; SAR(10 g) = 0.156 W/kg Maximum value of SAR (measured) = 0.319 W/kg



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

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#### WCDMA Band IV\_Body-worn\_Front side\_CH 1412\_15mm

Communication System: WCDMA; Frequency: 1732.4 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1732.4 MHz;  $\sigma$  = 1.419 S/m;  $\epsilon_r$  = 53.851;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.5°C; Liquid temperature: 22.2°C

DASY5 Configuration:

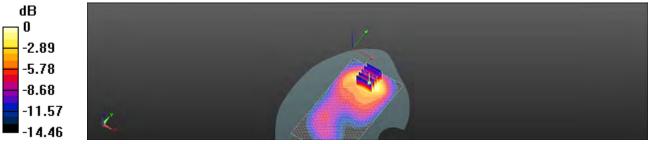
- Probe: EX3DV4 SN3923; ConvF(8.78, 8.78, 8.78); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (71x131x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.604 W/kg

#### Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 6.487 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 0.721 W/kg SAR(1 g) = 0.470 W/kg; SAR(10 g) = 0.286 W/kg Maximum value of SAR (measured) = 0.608 W/kg



0 dB = 0.608 W/kg = -2.16 dBW/kg

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# WCDMA Band IV\_Hotspot\_Bottom side\_CH 1312\_10mm

Communication System: WCDMA; Frequency: 1712.4 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1712.4 MHz;  $\sigma$  = 1.406 S/m;  $\epsilon$ <sub>r</sub> = 53.9;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.5°C; Liquid temperature: 22.2°C

DASY5 Configuration:

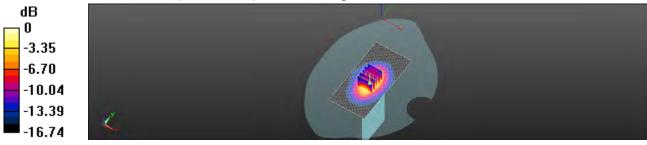
- Probe: EX3DV4 SN3923; ConvF(8.78, 8.78, 8.78); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (51x101x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 1.67 W/kg

# Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 33.36 V/m; Power Drift = 0.11 dB Peak SAR (extrapolated) = 1.96 W/kg SAR(1 g) = 1.21 W/kg; SAR(10 g) = 0.680 W/kg Maximum value of SAR (measured) = 1.61 W/kg



0 dB = 1.61 W/kg = 2.06 dBW/kg

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Date: 2017/6/29

# WCDMA Band V\_Head\_Le Cheek\_CH 4233

Communication System: WCDMA; Frequency: 846.6 MHz; Duty Cycle: 1:1 Medium parameters used: f = 847 MHz;  $\sigma$  = 0.884 S/m;  $\epsilon_r$  = 42.009;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Left Section Ambient temperature: 23.1°C; Liquid temperature: 22.0°C

DASY5 Configuration:

- Probe: EX3DV4 SN3923; ConvF(10.66, 10.66, 10.66); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

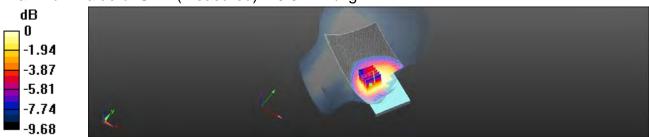
**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.352 W/kg

# Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm

Reference Value = 3.370 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 0.372 W/kg SAR(1 g) = 0.309 W/kg; SAR(10 g) = 0.242 W/kg Maximum value of SAR (measured) = 0.342 W/kg



0 dB = 0.342 W/kg = -4.66 dBW/kg

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Date: 2017/7/3

# WCDMA Band V\_Hotspot\_Front side\_CH 4233\_10mm

Communication System: WCDMA; Frequency: 846.6 MHz; Duty Cycle: 1:1 Medium parameters used: f = 847 MHz;  $\sigma$  = 1.019 S/m;  $\epsilon_r$  = 53.192;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.4°C; Liquid temperature: 21.9°C

DASY5 Configuration:

- Probe: EX3DV4 SN3923; ConvF(10.67, 10.67, 10.67); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (71x131x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.715 W/kg

#### Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm

Reference Value = 18.76 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 0.839 W/kg

SAR(1 g) = 0.531 W/kg; SAR(10 g) = 0.344 W/kg

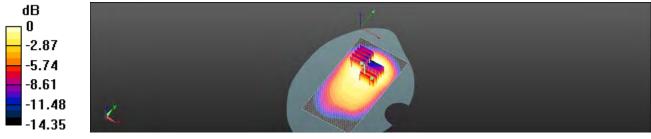
Configuration/Body/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm,

dy=8mm, dz=5mm

Reference Value = 18.76 V/m; Power Drift = -0.18 dB Peak SAR (extrapolated) = 0.651 W/kg

SAR(1 g) = 0.440 W/kg; SAR(10 g) = 0.311 W/kg

Maximum value of SAR (measured) = 0.543 W/kg



0 dB = 0.543 W/kg = -2.65 dBW/kg

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Report No. : E5/2017/90023 Page : 122 of 274

Date: 2017/7/8

# LTE Band 2 (20MHz)\_Head\_Re Cheek\_CH 18700\_QPSK\_1-0

Communication System: LTE; Frequency: 1860 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1860 MHz;  $\sigma$  = 1.353 S/m;  $\epsilon_r$  = 40.15;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section Ambient temperature: 23.2°C; Liquid temperature: 22.4°C

DASY5 Configuration:

- Probe: EX3DV4 SN3923; ConvF(8.9, 8.9, 8.9); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

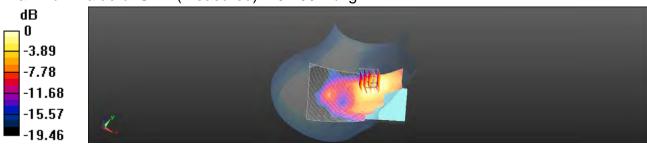
**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.224 W/kg

#### Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm

Reference Value = 4.896 V/m; Power Drift = 0.15 dB Peak SAR (extrapolated) = 0.234 W/kg SAR(1 g) = 0.156 W/kg; SAR(10 g) = 0.098 W/kg Maximum value of SAR (measured) = 0.200 W/kg



0 dB = 0.200 W/kg = -7.00 dBW/kg

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Report No. : E5/2017/90023 Page : 123 of 274

Date: 2017/7/14

#### LTE Band 2 (20MHz)\_Hotspot\_Bottom side\_CH 18900\_QPSK\_1-50\_10mm

Communication System: LTE; Frequency: 1880 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1880 MHz;  $\sigma$  = 1.504 S/m;  $\epsilon_r$  = 52.762;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 21.8°C

DASY5 Configuration:

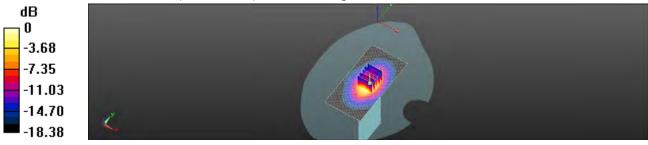
- Probe: EX3DV4 SN3923; ConvF(8.47, 8.47, 8.47); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (51x101x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 1.56 W/kg

#### Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 32.46 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 1.88 W/kg SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.574 W/kg Maximum value of SAR (measured) = 1.51 W/kg



0 dB = 1.51 W/kg = 1.79 dBW/kg

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Report No. : E5/2017/90023 Page : 124 of 274

Date: 2017/7/7

# LTE Band 4 (20MHz)\_Head\_Re Cheek\_CH 20050\_QPSK\_1-50\_1

Communication System: LTE; Frequency: 1720 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1720 MHz;  $\sigma$  = 1.314 S/m;  $\epsilon_r$  = 39.917;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section Ambient temperature: 22.7°C; Liquid temperature: 22.5°C

DASY5 Configuration:

- Probe: EX3DV4 SN3923; ConvF(9.27, 9.27, 9.27); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

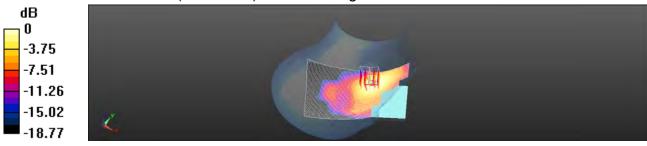
**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.301 W/kg

# Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm

Reference Value = 5.934 V/m; Power Drift = 0.06 dB Peak SAR (extrapolated) = 0.354 W/kg SAR(1 g) = 0.231 W/kg; SAR(10 g) = 0.146 W/kg Maximum value of SAR (measured) = 0.292 W/kg



0 dB = 0.292 W/kg = -5.34 dBW/kg

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Date: 2017/7/13

# LTE Band 4 (20MHz)\_Body-worn\_Front side\_CH 20050\_QPSK\_1-50\_15mm

Communication System: WCDMA; Frequency: 1720 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1720 MHz;  $\sigma$  = 1.411 S/m;  $\epsilon_r$  = 53.884;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

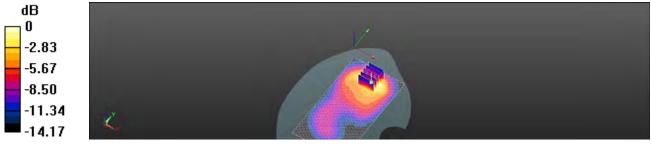
- Probe: EX3DV4 SN3923; ConvF(8.78, 8.78, 8.78); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

# **Configuration/Body/Area Scan (71x131x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.524 W/kg

#### Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 5.975 V/m; Power Drift = 0.12 dB Peak SAR (extrapolated) = 0.600 W/kg SAR(1 g) = 0.392 W/kg; SAR(10 g) = 0.240 W/kg Maximum value of SAR (measured) = 0.508 W/kg



0 dB = 0.508 W/kg = -2.94 dBW/kg

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Date: 2017/7/13

#### LTE Band 4 (20MHz)\_Hotspot\_Bottom side\_CH 20050\_QPSK\_1-50\_10mm

Communication System: LTE; Frequency: 1720 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1720 MHz;  $\sigma$  = 1.411 S/m;  $\epsilon_r$  = 53.884;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.5°C; Liquid temperature: 22.2°C

DASY5 Configuration:

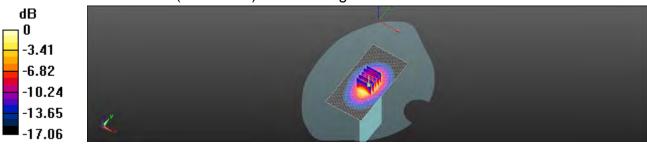
- Probe: EX3DV4 SN3923; ConvF(8.78, 8.78, 8.78); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (51x101x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 1.59 W/kg

#### Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 33.00 V/m; Power Drift = 0.09 dB Peak SAR (extrapolated) = 1.89 W/kg SAR(1 g) = 1.19 W/kg; SAR(10 g) = 0.639 W/kg Maximum value of SAR (measured) = 1.56 W/kg



0 dB = 1.56 W/kg = 1.92 dBW/kg

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Date: 2017/8/24

# LTE Band 5 (10MHz)\_Head\_Le Cheek\_CH 20450\_QPSK\_1-25

Communication System: LTE; Frequency: 829 MHz; Duty Cycle: 1:1 Medium parameters used: f = 829 MHz;  $\sigma$  = 0.911 S/m;  $\epsilon_r$  = 41.757;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Left Section Ambient temperature: 22.1°C; Liquid temperature: 21.8°C

DASY5 Configuration:

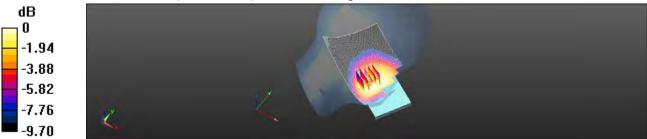
- Probe: EX3DV4 SN7466; ConvF(10.2, 10.2, 10.2); Calibrated: 2017/7/5;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2016/11/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.310 W/kg

# Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 6.767 V/m; Power Drift = 0.09 dB Peak SAR (extrapolated) = 0.323 W/kg SAR(1 g) = 0.270 W/kg; SAR(10 g) = 0.212 W/kg Maximum value of SAR (measured) = 0.300 W/kg



0 dB = 0.300 W/kg = -5.22 dBW/kg

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Report No. : E5/2017/90023 Page : 128 of 274

Date: 2017/8/25

#### LTE Band 5 (10MHz)\_Hotspot\_Left side\_CH 20450\_QPSK\_1-25\_10mm

Communication System: LTE; Frequency: 829 MHz; Duty Cycle: 1:1 Medium parameters used: f = 829 MHz;  $\sigma$  = 1 S/m;  $\epsilon_r$  = 54.591;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.1°C; Liquid temperature: 22.0°C

DASY5 Configuration:

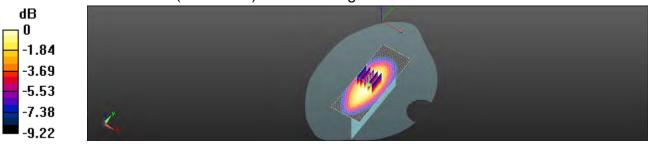
- Probe: EX3DV4 SN7466; ConvF(10.24, 10.24, 10.24); Calibrated: 2017/7/5;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2016/11/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (41x111x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.513 W/kg

# Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 24.31 V/m; Power Drift = -0.13 dB Peak SAR (extrapolated) = 0.584 W/kg SAR(1 g) = 0.364 W/kg; SAR(10 g) = 0.219 W/kg Maximum value of SAR (measured) = 0.509 W/kg



0 dB = 0.509 W/kg = -2.93 dBW/kg

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Date: 2017/7/12

# LTE Band 7 (20MHz)\_Head\_Le Cheek\_CH 21350\_QPSK\_1-99

Communication System: LTE; Frequency: 2560 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2560 MHz;  $\sigma$  = 1.934 S/m;  $\epsilon_r$  = 39.144;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Left Section Ambient temperature: 22.5°C; Liquid temperature: 22.0°C

DASY5 Configuration:

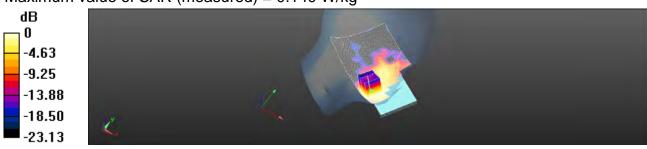
- Probe: EX3DV4 SN3923; ConvF(7.77, 7.77, 7.77); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (91x141x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.130 W/kg

# Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

dy=5mm, dz=5mm Reference Value = 1.400 V/m; Power Drift = -0.19 dB Peak SAR (extrapolated) = 0.190 W/kg SAR(1 g) = 0.099 W/kg; SAR(10 g) = 0.053 W/kg Maximum value of SAR (measured) = 0.140 W/kg



0 dB = 0.140 W/kg = -8.55 dBW/kg

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Date: 2017/7/5

#### LTE Band 7 (20MHz)\_Body-worn\_Front side\_CH 21350\_QPSK\_1-99\_15mm

Communication System: LTE; Frequency: 2560 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2560 MHz;  $\sigma$  = 2.153 S/m;  $\epsilon_r$  = 51.521;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.6°C; Liquid temperature: 22.0°C

DASY5 Configuration:

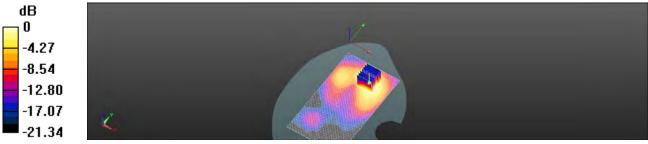
- Probe: EX3DV4 SN3923; ConvF(8.06, 8.06, 8.06); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (91x161x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.514 W/kg

#### Configuration/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

dy=5mm, dz=5mm Reference Value = 3.143 V/m; Power Drift = 0.14 dB Peak SAR (extrapolated) = 0.732 W/kg SAR(1 g) = 0.360 W/kg; SAR(10 g) = 0.183 W/kg Maximum value of SAR (measured) = 0.533 W/kg



0 dB = 0.533 W/kg = -2.74 dBW/kg

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Date: 2017/7/5

#### LTE Band 7 (20MHz)\_Hotspot\_Bottom side\_CH 21350\_QPSK\_1-0\_10mm

Communication System: LTE; Frequency: 2560 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2560 MHz;  $\sigma$  = 2.153 S/m;  $\epsilon_r$  = 51.521;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.6°C; Liquid temperature: 22.0°C

DASY5 Configuration:

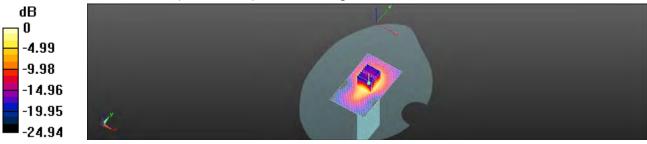
- Probe: EX3DV4 SN3923; ConvF(8.06, 8.06, 8.06); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (61x101x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 1.81 W/kg

#### Configuration/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

dy=5mm, dz=5mm Reference Value = 24.94 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 2.39 W/kg SAR(1 g) = 1.17 W/kg; SAR(10 g) = 0.558 W/kg Maximum value of SAR (measured) = 1.76 W/kg



0 dB = 1.76 W/kg = 2.45 dBW/kg

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Date: 2017/10/6

#### LTE Band 7 (20MHz)\_Body-worn\_Front side\_CH 21350\_QPSK\_1-99\_15mm

Communication System: LTE; Frequency: 2560 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2560 MHz;  $\sigma$  = 2.161 S/m;  $\epsilon_r$  = 51.726;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 22.0°C

DASY5 Configuration:

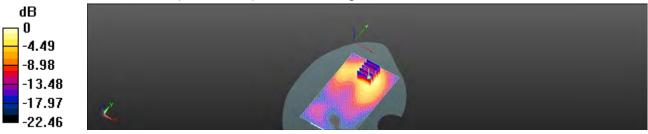
- Probe: EX3DV4 SN3831; ConvF(7.05, 7.05, 7.05); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.571 W/kg

#### Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 3.760 V/m; Power Drift = -0.05 dB Peak SAR (extrapolated) = 0.779 W/kg SAR(1 g) = 0.398 W/kg; SAR(10 g) = 0.206 W/kg Maximum value of SAR (measured) = 0.580 W/kg



0 dB = 0.580 W/kg = -2.37 dBW/kg

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Date: 2017/6/28

# LTE Band 12 (10MHz)\_Head\_Re Cheek\_CH 23130\_QPSK 1-49

Communication System: LTE; Frequency: 711 MHz; Duty Cycle: 1:1 Medium parameters used: f = 711 MHz;  $\sigma$  = 0.855 S/m;  $\epsilon_r$  = 41.919;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section Ambient temperature: 23.5°C; Liquid temperature: 21.8°C

DASY5 Configuration:

- Probe: EX3DV4 SN3923; ConvF(11.01, 11.01, 11.01); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

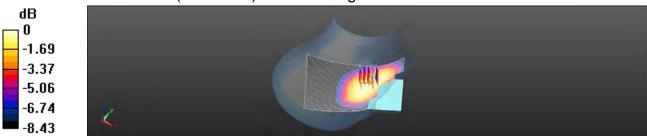
**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.243 W/kg

# Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm

Reference Value = 4.931 V/m; Power Drift = 0.15 dB Peak SAR (extrapolated) = 0.267 W/kg SAR(1 g) = 0.208 W/kg; SAR(10 g) = 0.161 W/kg Maximum value of SAR (measured) = 0.236 W/kg



0 dB = 0.236 W/kg = -6.27 dBW/kg

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Date: 2017/7/2

#### LTE Band 12 (10MHz)\_Hotspot\_Front side\_CH 23130\_QPSK\_1-49\_10mm

Communication System: LTE; Frequency: 711 MHz; Duty Cycle: 1:1 Medium parameters used: f = 711 MHz;  $\sigma$  = 0.934 S/m;  $\epsilon_r$  = 54.717;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.8°C; Liquid temperature: 22.3°C

DASY5 Configuration:

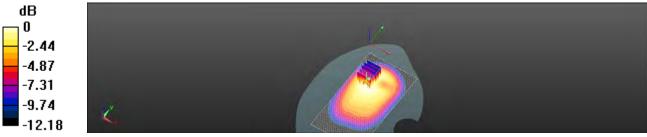
- Probe: EX3DV4 SN3923; ConvF(10.83, 10.83, 10.83); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (71x131x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.540 W/kg

#### Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 18.59 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 0.603 W/kg SAR(1 g) = 0.443 W/kg; SAR(10 g) = 0.301 W/kg Maximum value of SAR (measured) = 0.529 W/kg



0 dB = 0.529 W/kg = -2.77 dBW/kg

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Date: 2017/6/28

# LTE Band 17 (10MHz)\_Head\_Re Cheek\_CH 23780\_QPSK 1-49

Communication System: LTE; Frequency: 709 MHz; Duty Cycle: 1:1 Medium parameters used: f = 709 MHz;  $\sigma$  = 0.854 S/m;  $\epsilon_r$  = 41.933;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section Ambient temperature: 23.5°C; Liquid temperature: 21.8°C

DASY5 Configuration:

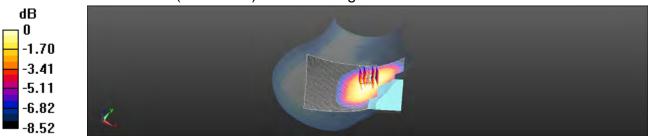
- Probe: EX3DV4 SN3923; ConvF(11.01, 11.01, 11.01); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.242 W/kg

# Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 4.746 V/m; Power Drift = 0.12 dB Peak SAR (extrapolated) = 0.260 W/kg SAR(1 g) = 0.207 W/kg; SAR(10 g) = 0.160 W/kg Maximum value of SAR (measured) = 0.237 W/kg



0 dB = 0.237 W/kg = -6.25 dBW/kg

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Date: 2017/7/2

#### LTE Band 17 (10MHz)\_Hotspot\_Front side\_CH 23780\_QPSK\_1-49\_10mm

Communication System: LTE; Frequency: 709 MHz; Duty Cycle: 1:1 Medium parameters used: f = 709 MHz;  $\sigma$  = 0.934 S/m;  $\epsilon_r$  = 54.742;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.8°C; Liquid temperature: 22.3°C

DASY5 Configuration:

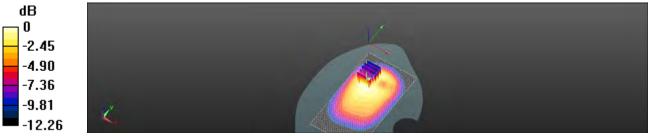
- Probe: EX3DV4 SN3923; ConvF(10.83, 10.83, 10.83); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (71x131x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.550 W/kg

#### Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm,

dy=8mm, dz=5mm Reference Value = 18.42 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 0.640 W/kg SAR(1 g) = 0.444 W/kg; SAR(10 g) = 0.298 W/kg Maximum value of SAR (measured) = 0.545 W/kg



0 dB = 0.545 W/kg = -2.64 dBW/kg

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Date: 2017/7/12

# LTE Band 38 (20MHz)\_Head\_Le Cheek\_CH 38000\_QPSK\_1-0

Communication System: LTE; Frequency: 2595 MHz; Duty Cycle: 1:0.633 Medium parameters used: f = 2595 MHz;  $\sigma$  = 1.974 S/m;  $\epsilon_r$  = 39.104;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Left Section Ambient temperature: 22.5°C; Liquid temperature: 22.0°C

DASY5 Configuration:

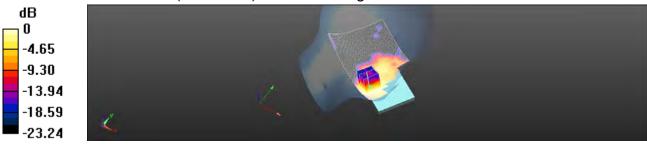
- Probe: EX3DV4 SN3923; ConvF(7.77, 7.77, 7.77); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (91x141x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.0855 W/kg

# Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

dy=5mm, dz=5mm Reference Value = 0.3130 V/m; Power Drift = 0.17 dB Peak SAR (extrapolated) = 0.117 W/kg SAR(1 g) = 0.060 W/kg; SAR(10 g) = 0.032 W/kg Maximum value of SAR (measured) = 0.0853 W/kg



0 dB = 0.0853 W/kg = -10.69 dBW/kg

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Report No. : E5/2017/90023 Page : 138 of 274

Date: 2017/7/5

#### LTE Band 38 (20MHz)\_Hotspot\_Bottom side\_CH 38000\_QPSK\_1-0\_10mm

Communication System: LTE; Frequency: 2595 MHz; Duty Cycle: 1:0.633 Medium parameters used: f = 2595 MHz;  $\sigma$  = 2.202 S/m;  $\epsilon_r$  = 51.462;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.6°C; Liquid temperature: 22.0°C

DASY5 Configuration:

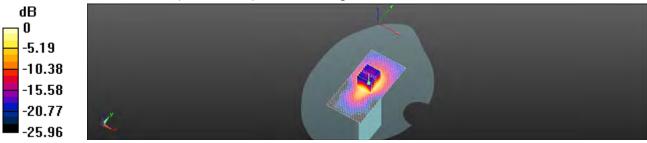
- Probe: EX3DV4 SN3923; ConvF(7.84, 7.84, 7.84); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Body/Area Scan (61x121x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 1.07 W/kg

#### Configuration/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

dy=5mm, dz=5mm Reference Value = 18.22 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 1.46 W/kg SAR(1 g) = 0.694 W/kg; SAR(10 g) = 0.321 W/kg Maximum value of SAR (measured) = 1.06 W/kg



0 dB = 1.06 W/kg = 0.25 dBW/kg

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Report No. : E5/2017/90023 Page : 139 of 274

Date: 2017/7/4

# WLAN 802.11b\_Head\_Re Cheek\_CH 1

Communication System: WLAN(2.4G); Frequency: 2412 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2412 MHz;  $\sigma$  = 1.787 S/m;  $\epsilon_r$  = 38.208;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section Ambient temperature: 22.3°C; Liquid temperature: 22.1°C

DASY5 Configuration:

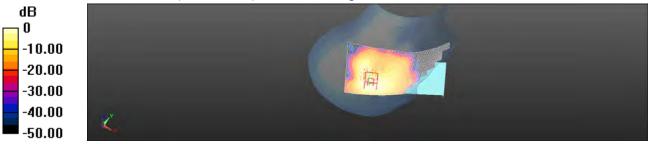
- Probe: EX3DV4 SN3923; ConvF(7.95, 7.95, 7.95); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Head/Area Scan (81x151x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.696 W/kg

# Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

dy=5mm, dz=5mm Reference Value = 6.781 V/m; Power Drift = 0.12 dB Peak SAR (extrapolated) = 0.934 W/kg SAR(1 g) = 0.464 W/kg; SAR(10 g) = 0.216 W/kg Maximum value of SAR (measured) = 0.673 W/kg



0 dB = 0.673 W/kg = -1.72 dBW/kg

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Date: 2017/7/5

# WLAN 802.11b\_Hotspot\_Back side\_CH 1\_10mm

Communication System: WLAN 2.4G; Frequency: 2412 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2412 MHz;  $\sigma$  = 1.907 S/m;  $\epsilon_r$  = 52.415;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.6°C; Liquid temperature: 21.9°C

DASY5 Configuration:

- Probe: EX3DV4 SN3923; ConvF(8.06, 8.06, 8.06); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

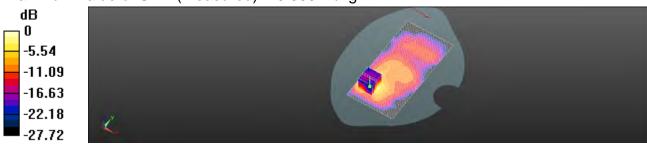
**Configuration/Body/Area Scan (81x161x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.353 W/kg

# Configuration/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm,

dy=5mm, dz=5mm

Reference Value = 4.896 V/m; Power Drift = 0.06 dB Peak SAR (extrapolated) = 0.498 W/kg SAR(1 g) = 0.210 W/kg; SAR(10 g) = 0.085 W/kg Maximum value of SAR (measured) = 0.353 W/kg



0 dB = 0.353 W/kg = -4.52 dBW/kg

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# 6. SAR System Performance Verification

Date: 2017/6/28

# Dipole 750 MHz\_SN:1015\_Head

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 750 MHz;  $\sigma$  = 0.861 S/m;  $\epsilon_r$  = 41.695;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 23.5°C; Liquid temperature: 21.8°C

DASY5 Configuration:

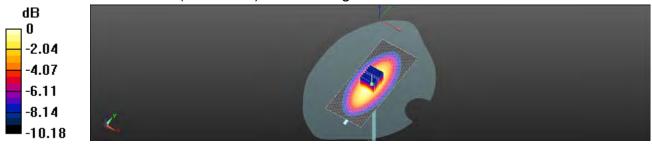
- Probe: EX3DV4 SN3923; ConvF(11.01, 11.01, 11.01); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Pin=250mW/Area Scan (51x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 2.56 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 55.89 V/m; Power Drift = -0.07 dB Peak SAR (extrapolated) = 3.07 W/kg SAR(1 g) = 2.1 W/kg; SAR(10 g) = 1.39 W/kg Maximum value of SAR (measured) = 2.64 W/kg



0 dB = 2.64 W/kg = 4.22 dBW/kg

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Date: 2017/7/2

# Dipole 750 MHz\_SN:1015\_Body

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 750 MHz;  $\sigma$  = 0.939 S/m;  $\epsilon_r$  = 54.561;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.8°C; Liquid temperature: 22.3°C

DASY5 Configuration:

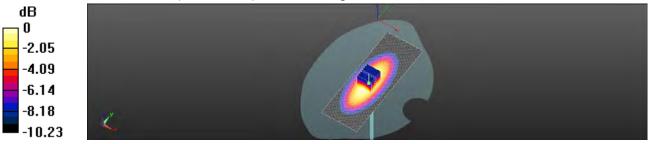
- Probe: EX3DV4 SN3923; ConvF(10.83, 10.83, 10.83); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

# **Configuration/Pin=250mW/Area Scan (51x141x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 2.82 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 55.60 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 3.35 W/kg SAR(1 g) = 2.26 W/kg; SAR(10 g) = 1.49 W/kg Maximum value of SAR (measured) = 2.85 W/kg



0 dB = 2.85 W/kg = 4.56 dBW/kg

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Date: 2017/6/29

# Dipole 835 MHz\_SN:4d063\_Head

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: f = 835 MHz;  $\sigma$  = 0.87 S/m;  $\epsilon_r$  = 42.025;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 23.1°C; Liquid temperature: 22.0°C

DASY5 Configuration:

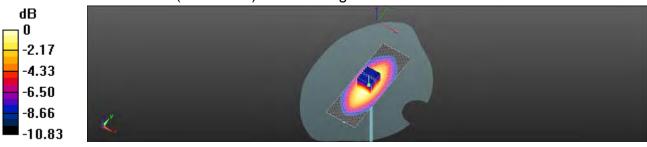
- Probe: EX3DV4 SN3923; ConvF(10.66, 10.66, 10.66); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

# **Configuration/Pin=250mW/Area Scan (41x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 3.04 W/kg

# Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 60.65 V/m; Power Drift = -0.06 dB Peak SAR (extrapolated) = 3.58 W/kg SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.57 W/kg Maximum value of SAR (measured) = 3.06 W/kg



0 dB = 3.06 W/kg = 4.85 dBW/kg

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Date: 2017/7/3

#### Dipole 835 MHz\_SN:4d063\_Body

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: f = 835 MHz;  $\sigma$  = 1.005 S/m;  $\epsilon_r$  = 53.305;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.4°C; Liquid temperature: 21.9°C

DASY5 Configuration:

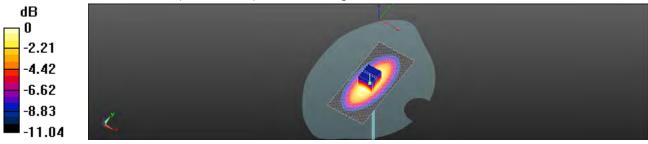
- Probe: EX3DV4 SN3923; ConvF(10.67, 10.67, 10.67); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Pin=250mW/Area Scan (51x111x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 3.05 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 56.89 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 3.67 W/kg SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.58 W/kg Maximum value of SAR (measured) = 3.11 W/kg



0 dB = 3.11 W/kg = 4.93 dBW/kg

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Date: 2017/8/24

## Dipole 835 MHz\_SN:4d120\_Head

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: f = 835 MHz;  $\sigma$  = 0.918 S/m;  $\epsilon_r$  = 41.721;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.1°C; Liquid temperature: 21.8°C

DASY5 Configuration:

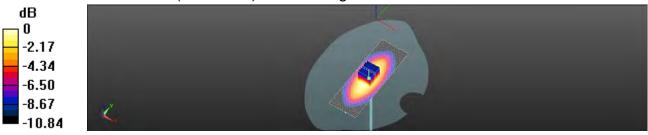
- Probe: EX3DV4 SN7466; ConvF(10.2, 10.2, 10.2); Calibrated: 2017/7/5;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2016/11/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Pin=250mW/Area Scan (41x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 3.06 W/kg

## Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 61.29 V/m; Power Drift = -0.12 dB Peak SAR (extrapolated) = 3.59 W/kg SAR(1 g) = 2.42 W/kg; SAR(10 g) = 1.58 W/kg Maximum value of SAR (measured) = 3.07 W/kg



0 dB = 3.07 W/kg = 4.87 dBW/kg

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Date: 2017/8/25

## Dipole 835 MHz\_SN:4d120\_Body

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: f = 835 MHz;  $\sigma$  = 1.006 S/m;  $\epsilon_r$  = 54.562;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.1°C; Liquid temperature: 22.0°C

DASY5 Configuration:

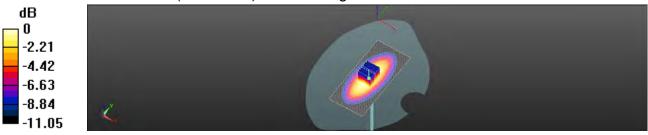
- Probe: EX3DV4 SN7466; ConvF(10.24, 10.24, 10.24); Calibrated: 2017/7/5;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2016/11/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

# **Configuration/Pin=250mW/Area Scan (51x111x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 3.07 W/kg

## Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 57.13 V/m; Power Drift = -0.02 dB Peak SAR (extrapolated) = 3.69 W/kg SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.59 W/kg Maximum value of SAR (measured) = 3.13 W/kg



0 dB = 3.13 W/kg = 4.95 dBW/kg

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Date: 2017/7/7

### Dipole 1750 MHz\_SN:1008\_Head

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.332 S/m;  $\epsilon_r$  = 39.861;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.7°C; Liquid temperature: 22.5°C

DASY5 Configuration:

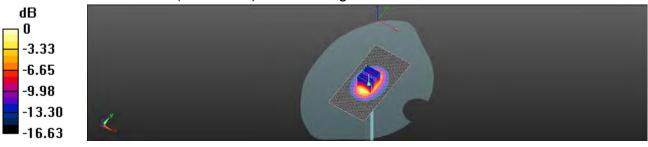
- Probe: EX3DV4 SN3923; ConvF(9.27, 9.27, 9.27); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (51x101x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 13.1 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 96.56 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 16.5 W/kg SAR(1 g) = 9.13 W/kg; SAR(10 g) = 4.88 W/kg Maximum value of SAR (measured) = 13.0 W/kg



0 dB = 13.0 W/kg = 11.12 dBW/kg

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Date: 2017/7/13

### Dipole 1750 MHz\_SN:1023\_Body

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.431 S/m;  $\epsilon_r$  = 53.814;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.5°C; Liquid temperature: 22.2°C

DASY5 Configuration:

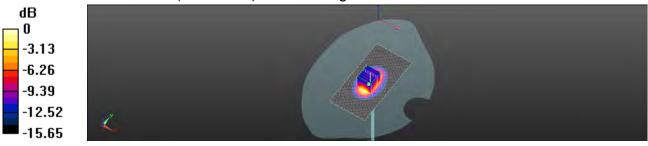
- Probe: EX3DV4 SN3923; ConvF(8.78, 8.78, 8.78); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (51x101x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 14.1 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 96.24 V/m; Power Drift = -0.09 dB Peak SAR (extrapolated) = 15.2 W/kg SAR(1 g) = 8.95 W/kg; SAR(10 g) = 4.78 W/kg Maximum value of SAR (measured) = 12.2 W/kg



0 dB = 12.2 W/kg = 10.87 dBW/kg

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Date: 2017/7/8

### Dipole 1900 MHz\_SN:5d173\_Head

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1900 MHz;  $\sigma$  = 1.396 S/m;  $\epsilon_r$  = 40.107;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 23.2°C; Liquid temperature: 22.4°C

DASY5 Configuration:

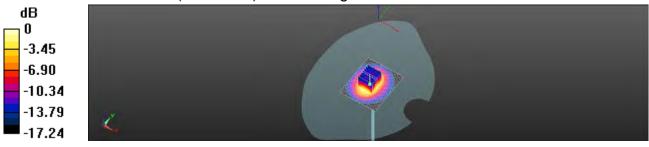
- Probe: EX3DV4 SN3923; ConvF(8.9, 8.9, 8.9); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (51x61x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 13.6 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 100.3 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 16.8 W/kg SAR(1 g) = 9.92 W/kg; SAR(10 g) = 5.22 W/kg Maximum value of SAR (measured) = 13.2 W/kg



0 dB = 13.2 W/kg = 11.22 dBW/kg

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Date: 2017/7/14

## Dipole 1900 MHz\_SN:5d173\_Body

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1900 MHz;  $\sigma$  = 1.524 S/m;  $\epsilon_r$  = 52.75;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 21.8°C

DASY5 Configuration:

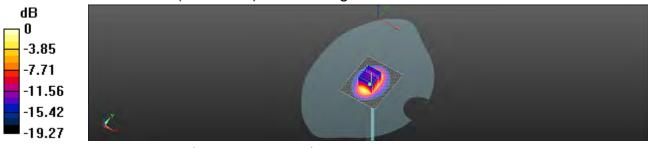
- Probe: EX3DV4 SN3923; ConvF(8.47, 8.47, 8.47); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

# **Configuration/Pin=250mW/Area Scan (51x61x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 14.9 W/kg

## Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 97.25 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 18.2 W/kg SAR(1 g) = 9.88 W/kg; SAR(10 g) = 5.27 W/kg Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.50 dBW/kg

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Date: 2017/7/4

### Dipole 2450 MHz\_SN:727\_Head

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2450 MHz;  $\sigma$  = 1.832 S/m;  $\epsilon_r$  = 38.135;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.3°C; Liquid temperature: 22.1°C

DASY5 Configuration:

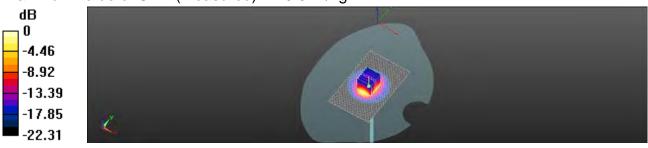
- Probe: EX3DV4 SN3923; ConvF(7.95, 7.95, 7.95); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (71x111x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 21.5 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 106.4 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 27.8 W/kg SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.2 W/kg Maximum value of SAR (measured) = 20.6 W/kg



0 dB = 20.6 W/kg = 13.15 dBW/kg

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## Dipole 2450 MHz\_SN:727\_Body

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2450 MHz;  $\sigma$  = 1.944 S/m;  $\epsilon_r$  = 52.351;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.6°C; Liquid temperature: 21.9°C

DASY5 Configuration:

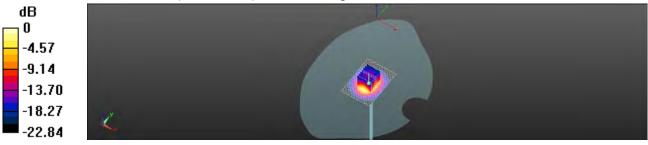
- Probe: EX3DV4 SN3923; ConvF(8.06, 8.06, 8.06); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (51x71x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 19.4 W/kg

### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 95.44 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 25.4 W/kg SAR(1 g) = 13 W/kg; SAR(10 g) = 5.98 W/kg Maximum value of SAR (measured) = 18.6 W/kg



0 dB = 18.6 W/kg = 12.69 dBW/kg

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### Dipole 2600 MHz\_SN:1005\_Head

Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2600 MHz;  $\sigma$  = 1.981 S/m;  $\epsilon_r$  = 39.098;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.5°C; Liquid temperature: 22.0°C

DASY5 Configuration:

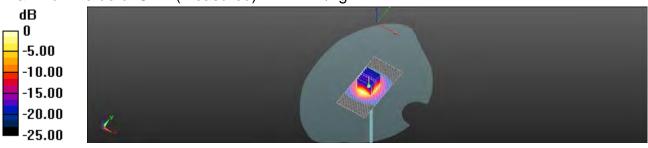
- Probe: EX3DV4 SN3923; ConvF(7.77, 7.77, 7.77); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

# **Configuration/Pin=250mW/Area Scan (51x101x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 22.2 W/kg

## Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 109.7 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 32.3 W/kg SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.22 W/kg Maximum value of SAR (measured) = 22.1 W/kg



0 dB = 22.1 W/kg = 13.39 dBW/kg

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### Dipole 2600 MHz\_SN:1005\_Body

Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2600 MHz;  $\sigma$  = 2.209 S/m;  $\epsilon_r$  = 51.45;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.6°C; Liquid temperature: 22.0°C

DASY5 Configuration:

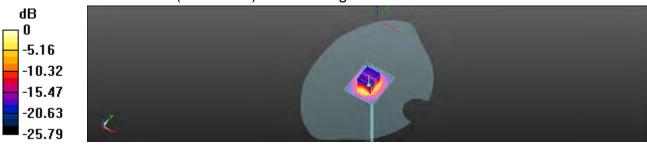
- Probe: EX3DV4 SN3923; ConvF(7.84, 7.84, 7.84); Calibrated: 2016/9/2;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (51x61x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 22.8 W/kg

### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 96.94 V/m; Power Drift = -0.00 dB Peak SAR (extrapolated) = 30.2 W/kg SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6 W/kg Maximum value of SAR (measured) = 21.5 W/kg



0 dB = 21.5 W/kg = 13.32 dBW/kg

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## Dipole 750 MHz\_SN:1015\_Head

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 750 MHz;  $\sigma$  = 0.874 S/m;  $\epsilon$ <sub>r</sub> = 41.746;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 21.8°C

DASY5 Configuration:

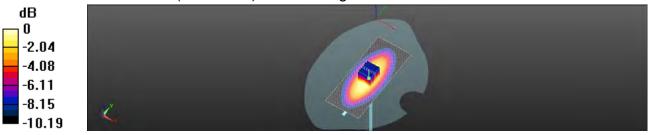
- Probe: EX3DV4 SN3831; ConvF(9.63, 9.63, 9.63); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

**Configuration/Pin=250mW/Area Scan (51x121x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 2.71 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 57.75 V/m; Power Drift = -0.09 dB Peak SAR (extrapolated) = 3.28 W/kg SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.37 W/kg Maximum value of SAR (measured) = 2.80 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

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## Dipole 750 MHz\_SN:1015\_Body

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 750 MHz;  $\sigma$  = 0.947 S/m;  $\epsilon_r$  = 54.766;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 22.0°C

DASY5 Configuration:

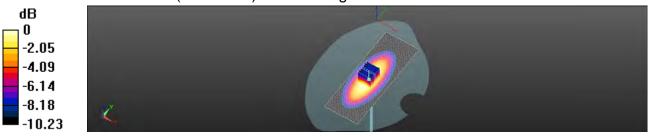
- Probe: EX3DV4 SN3831; ConvF(9.59, 9.59, 9.59); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

# **Configuration/Pin=250mW/Area Scan (51x141x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 2.81 W/kg

### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 55.42 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 3.35 W/kg SAR(1 g) = 2.26 W/kg; SAR(10 g) = 1.49 W/kg Maximum value of SAR (measured) = 2.85 W/kg



0 dB = 2.85 W/kg = 4.54 dBW/kg

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### Dipole 835 MHz\_SN:4d063\_Head

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: f = 835 MHz;  $\sigma$  = 0.883 S/m;  $\epsilon$ r = 42.076;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.1°C; Liquid temperature: 21.9°C

#### DASY5 Configuration:

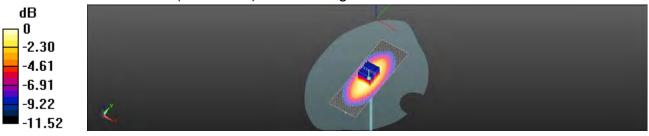
- Probe: EX3DV4 SN3831; ConvF(9.15, 9.15, 9.15); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

### Configuration/Pin=250mW, d=15mm/Area Scan (41x121x1): Interpolated grid:

dx=15 mm, dy=15 mm Maximum value of SAR (interpolated) = 2.97 W/kg

### Configuration/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 58.77 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 3.60 W/kg SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.57 W/kg Maximum value of SAR (measured) = 2.98 W/kg



0 dB = 2.98 W/kg = 4.75 dBW/kg

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## Dipole 835 MHz\_SN:4d063\_Body

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1 Medium parameters used: f = 835 MHz;  $\sigma$  = 0.982 S/m;  $\epsilon_r$  = 53.51;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.1°C; Liquid temperature: 21.8°C

DASY5 Configuration:

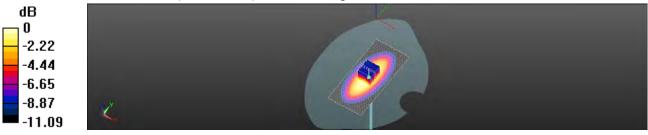
- Probe: EX3DV4 SN3831; ConvF(9.25, 9.25, 9.25); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (51x111x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 3.18 W/kg

### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 57.93 V/m; Power Drift = -0.00 dB Peak SAR (extrapolated) = 3.80 W/kg SAR(1 g) = 2.51 W/kg; SAR(10 g) = 1.63 W/kg Maximum value of SAR (measured) = 3.23 W/kg



0 dB = 3.23 W/kg = 5.09 dBW/kg

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### Dipole 1750 MHz\_SN:1008\_Head

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.43 S/m;  $\epsilon_r$  = 40.536;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.1°C; Liquid temperature: 22.2°C

DASY5 Configuration:

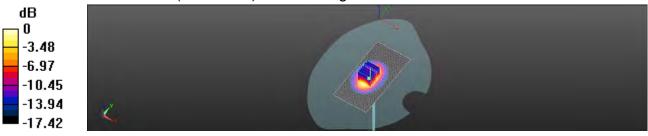
- Probe: EX3DV4 SN3831; ConvF(8.17, 8.17, 8.17); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (51x101x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 12.9 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 90.79 V/m; Power Drift = 0.16 dB Peak SAR (extrapolated) = 16.2 W/kg SAR(1 g) = 8.9 W/kg; SAR(10 g) = 4.72 W/kg Maximum value of SAR (measured) = 12.6 W/kg



0 dB = 12.6 W/kg = 11.02 dBW/kg

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Date: 2017/10/12

## Dipole 1750 MHz\_SN:1008\_Body

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.439 S/m;  $\epsilon_r$  = 54.019;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.1°C; Liquid temperature: 22.5°C

DASY5 Configuration:

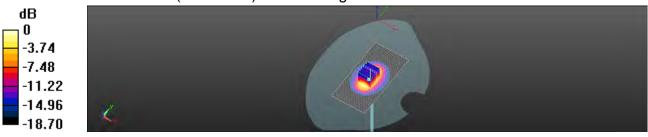
- Probe: EX3DV4 SN3831; ConvF(7.78, 7.78, 7.78); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

# **Configuration/Pin=250mW/Area Scan (51x101x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 14.6 W/kg

## Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 98.92 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 18.8 W/kg SAR(1 g) = 9.49 W/kg; SAR(10 g) = 5.07 W/kg Maximum value of SAR (measured) = 14.4 W/kg



0 dB = 14.4 W/kg = 11.58 dBW/kg

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Date: 2017/10/12

### Dipole 1900 MHz\_SN:5d173\_Head

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1900 MHz;  $\sigma$  = 1.417 S/m;  $\epsilon$ r = 40.158;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.1°C; Liquid temperature: 22.3°C

DASY5 Configuration:

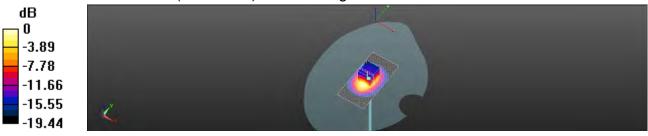
- Probe: EX3DV4 SN3831; ConvF(7.86, 7.86, 7.86); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (41x81x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 14.2 W/kg

### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 100.0 V/m; Power Drift = -0.02 dB Peak SAR (extrapolated) = 18.3 W/kg SAR(1 g) = 9.74 W/kg; SAR(10 g) = 5.04 W/kg Maximum value of SAR (measured) = 13.9 W/kg



0 dB = 13.9 W/kg = 11.44 dBW/kg

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Date: 2017/10/12

### Dipole 1900 MHz\_SN:5d173\_Body

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1 Medium parameters used: f = 1900 MHz;  $\sigma$  = 1.532 S/m;  $\epsilon$ r = 52.955;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.1°C; Liquid temperature: 22.4°C

DASY5 Configuration:

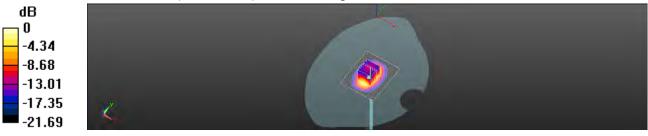
- Probe: EX3DV4 SN3831; ConvF(7.53, 7.53, 7.53); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (51x61x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 15.6 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 98.45 V/m; Power Drift = -0.00 dB Peak SAR (extrapolated) = 18.9 W/kg SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.24 W/kg Maximum value of SAR (measured) = 14.7 W/kg



0 dB = 14.7 W/kg = 11.67 dBW/kg

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Date: 2017/10/5

### Dipole 2450 MHz\_SN:727\_Head

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2450 MHz;  $\sigma$  = 1.871 S/m;  $\epsilon_r$  = 38.409;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 22.1°C

DASY5 Configuration:

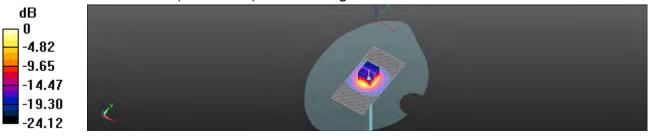
- Probe: EX3DV4 SN3831; ConvF(7.21, 7.21, 7.21); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (61x121x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 20.4 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 105.5 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 27.7 W/kg SAR(1 g) = 12.9 W/kg; SAR(10 g) = 5.95 W/kg Maximum value of SAR (measured) = 19.9 W/kg



0 dB = 19.9 W/kg = 13.00 dBW/kg

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Date: 2017/10/6

## Dipole 2450 MHz\_SN:727\_Body

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2450 MHz;  $\sigma$  = 1.952 S/m;  $\epsilon_r$  = 52.556;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 21.9°C

DASY5 Configuration:

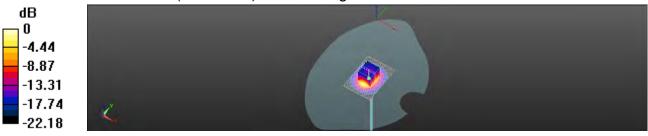
- Probe: EX3DV4 SN3831; ConvF(7.3, 7.3, 7.3); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

# **Configuration/Pin=250mW/Area Scan (51x71x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 21.5 W/kg

## Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 100.2 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 26.7 W/kg SAR(1 g) = 12.8 W/kg; SAR(10 g) = 5.85 W/kg Maximum value of SAR (measured) = 19.7 W/kg



0 dB = 19.7 W/kg = 12.95 dBW/kg

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Date: 2017/10/5

### Dipole 2600 MHz\_SN:1005\_Head

Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2600 MHz;  $\sigma$  = 2.015 S/m;  $\epsilon_r$  = 40.598;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 21.8°C

DASY5 Configuration:

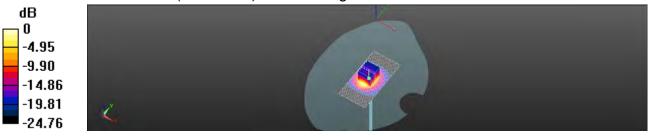
- Probe: EX3DV4 SN3831; ConvF(6.99, 6.99, 6.99); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

## **Configuration/Pin=250mW/Area Scan (51x101x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 22.8 W/kg

#### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 105.6 V/m; Power Drift = 0.00 dB Peak SAR (extrapolated) = 31.7 W/kg SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.31 W/kg Maximum value of SAR (measured) = 22.5 W/kg



0 dB = 22.5 W/kg = 13.52 dBW/kg

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Date: 2017/10/6

## Dipole 2600 MHz\_SN:1005\_Body

Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1 Medium parameters used: f = 2600 MHz;  $\sigma$  = 2.217 S/m;  $\epsilon_r$  = 51.655;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Ambient temperature: 22.0°C; Liquid temperature: 22.0°C

DASY5 Configuration:

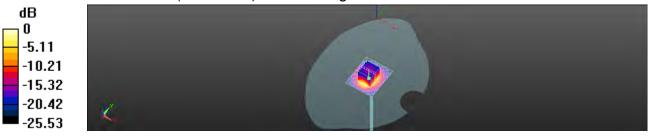
- Probe: EX3DV4 SN3831; ConvF(7.05, 7.05, 7.05); Calibrated: 2017/1/23;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2017/3/22
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

# **Configuration/Pin=250mW/Area Scan (51x61x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 22.9 W/kg

## Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 96.96 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 30.0 W/kg SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.06 W/kg Maximum value of SAR (measured) = 21.5 W/kg



0 dB = 21.5 W/kg = 13.33 dBW/kg

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## 7. DAE & Probe Calibration Certificate

credited by the Swiss Accredit te Swiss Accreditation Servic			.: SCS 0108
ultilateral Agreement for the			
lient SGS - TW (Au	den)	Certificate No:	DAE4-547_Mar17
CALIBRATION	CERTIFICATE		
Object	DAE4 - SD 000 D	04 BM - SN: 547	
Calibration procedure(s)	QA CAL-06,v29 Calibration proced	lure for the data acquisition electr	onics (DAE)
Calibration date:	March 22, 2017		
The measurements and the unc All calibrations have been condi	ertainties with confidence pro ucted in the closed laboratory	nal standards, which realize the physical units obability are given on the following pages and facility: environment temperature $(22 \pm 3)^{\circ}$ C :	are part of the certificate.
The measurements and the unc All calibrations have been cond Calibration Equipment used (Ma	ertainties with confidence pro- ucted in the closed laboratory &TE critical for calibration)	obability are given on the following pages and $facility: environment temperature (22 \pm 3)^{\circ}C + 1$	are part of the certificate. and humidity < 70%.
The measurements and the unc All calibrations have been cond Calibration Equipment used (Mi Primary Standards	ertainties with confidence pro ucted in the closed laboratory	obability are given on the following pages and	are part of the certificate.
The measurements and the unc All calibrations have been cond Calibration Equipment used (Mi Primary Standards Keithley Multimeter Type 2001	sertainties with confidence pro- ucted in the closed laboratory &TE critical for calibration) ID # SN: 0810278	bability are given on the following pages and facility: environment temperature (22 ± 3)°C i <u>Cal Date (Certificate No.)</u> 09-Sep-16 (No:19065)	are part of the certificate. and humidity < 70%. Scheduled Calibration Sep-17
The measurements and the unc All calibrations have been cond Calibration Equipment used (Mi Primary Standards Keithley Multimeter Type 2001 Secondary Standards	entainties with confidence pro- ucted in the closed laboratory STE critical for calibration) ID # SN: 0610278 ID #	obability are given on the following pages and $facility: environment temperature (22 \pm 3) °C + 3$ Cal Date (Certificate No.)	are part of the certificate. and humidity < 70%. Scheduled Calibration
The measurements and the unc All calibrations have been cond Calibration Equipment used (Mi Primary Standards Keithley Multimeter Type 2001 Secondary Standards Auto DAE Calibration Unit	entainties with confidence pro- ucted in the closed laboratory STE critical for calibration) ID # SN: 0810278 ID # SE UWS 053 AA 1001	bability are given on the following pages and facility: environment temperature (22 ± 3)°C i Cal Date (Certificate No.) 09-Sep-16 (No:19065) Check Date (in house)	are part of the certificate. and humidity < 70%. Scheduled Calibration Sep-17 Scheduled Check
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#### Report No. : E5/2017/90023 Page : 168 of 274

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



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Accreditation No.: SCS 0108

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#### Glossary

DAE Connector angle

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

#### Methods Applied and Interpretation of Parameters

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

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#### DC Voltage Measurement

High Range:	1LSB =	6. hiv .	full range =	-100, +300 mV
Low Range:	1LSB =	6tnV .	full range =	-1+3mV
DASY measurement	parameters: Au	o Zero Time: 3	sec; Measuring	time: 3 sec

<b>Calibration Factors</b>	X	Y	Z
High Range	403.189 ± 0.02% (k=2)	403.093 ± 0.02% (k=2)	402.739 ± 0.02% (k=2)
Low Range	3.95348 ± 1.50% (k=2)	3.90456 ± 1.50% (k=2)	3.96243 ± 1.50% (k=2)

#### **Connector Angle**

Connector Angle to be used in DASY system	91.0 "±1"
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#### Appendix (Additional assessments outside the scope of SCS0108)

#### 1. DC Voltage Linearity

High Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Inpu	nt 200031.23	0.59	0.00
Channel X + Inpu	it 20005.44	2,04	0.01
Channel X - Inpu	-20000.97	4.91	-0.02
Channel Y + Inpu	rt 200029.80	-1.03	-0.00
Channel Y + Inpu	rt 20000.30	-3.03	-0.02
Channel Y - Inpu	t -20007.73	-1.72	0.01
Channel Z + Inpu	rt 200030.21	-0.96	-0.00
Channel Z + Inpu	nt 20003.13	-0.21	-0,00
Channel Z - Inpu	t -20005.14	0.81	-0.00

Low Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	2000.02	-0.08	-0.00
Channel X + Input	200.18	0.36	0.18
Channel X - Input	-200,16	0.00	-0.00
Channel Y + Input	2000.10	0.06	0.00
Channel Y + Input	199.43	-0.40	-0.20
Channel Y - Input	-200,77	-0,70	0.35
Channel Z + Input	2000.19	0.28	0.01
Channel Z + Input	198.82	-1.00	-0.50
Channel Z - Input	-201.46	-1.37	0.68

#### 2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (µV)	Low Range Average Reading (µV)
Channel X	200	-2.09	-5.00
	- 200	6.80	4.50
Channel Y	200	-0.67	-1.21
	- 200	0.37	-0,41
Channel Z	200	5.07	4.93
	- 200	-7.67	-8.12

#### 3. Channel separation

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

	Input Voltage (mV)	Channel X (µV)	Channel Y (µV)	Channel Z (µV)
Channel X	200		2.65	-2.08
Channel Y	200	10.56	÷	3.60
Channel Z	200	4,55	7.85	

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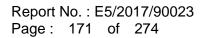
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#### 4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	16364	15364
Channel Y	16476	16801
Channel Z	16077	16468

#### 5. Input Offset Measurement

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

	Average (µV)	min. Offset (µV)	max. Offset (μV)	Std. Deviation (µV)
Channel X	-0.53	-1.14	0.26	0.31
Channel Y	-1.03	-2.43	-0.21	0.32
Channel Z	-1.56	-2.31	-0.62	0.35

#### 6. Input Offset Current

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

#### 7. Input Resistance (Typical values for information)

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

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

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7,â

#### 9. Power Consumption (Typical values for information)

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

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Client SGS - TW (Aud			DAE4-1336_Nov16
CALIBRATION O	CERTIFICATE		
Object.	DAE4 - SD 000 D	04 BM - SN: 1336	
Calibration procedure(k)	QA CAL-06.v29 Calibration proced	lure for the data acquisition elect	ronics (DAE)
Calibration date:	November 22, 201	18	
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  - Channel separation: Influence of a voltage on the neighbor channels not subject to an input voltage.
  - AD Converter Values with inputs shorted: Values on the Internal AD converter corresponding to zero input voltage
  - Input Offset Measurement. Output voltage and statistical results over a large number of zero voltage measurements.
  - Input Offset Current: Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - Input resistance: Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - Low Battery Alarm Voltage: Typical value for Information. Below this voltage, a battery alarm signal is generated.
  - Power consumption: Typical value for information. Supply currents in various operating modes.

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#### DC Voltage Measurement

~		nage	1 Miles	aau	CHIIC	ante -	
	A/D	- Com	enter	Respi	afirm	comina	d.

High Range:	1LSB-	6.1µV	= agrun Ilut	-100 +300 mV
Low Range	ILSE =	61nV	full minge =	-1+3mV
DASY measurement p	sammenere Aut	o Zero Time: :		

<b>Calibration Factors</b>	X	Υ	Z
High Range	403.332 ± 0.02% (k=2)	403.635 ± 0.02% (k=2)	403,121±0.02% (k=2)
Low Range	3.95216 ± 1.50% (k=2)	3.98718±1.50% (k=2)	3.99680 ± 1.50% (k=2)

**Connector Angle** 

Connector Angle to be used in DASY system 12	2.0 * ± 1 *
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#### Appendix (Additional assessments outside the scope of SCS0108)

#### 1. DC Voltage Linearity

High Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	199996.24	0.16	0.00
Channel X + Input	20001.25	-0.04	-0.00
Channel X - Input	-19999.81	1.36	-0.01
Channel Y + Input	199994.04	-1.8B	-6.00
Channel Y + Input	20000.69	-0.82	+0.00
Channel Y - Input	-20002.64	-1.77	0.01
Channel Z + Input	199997.44	1.49	D.00
Channel Z + Input	19999.78	-1.82	-0,01
Channel Z - Input	-20003.24	-2.19	0.01

Low Range		Reading (µV)	Difference (µV)	Error (%)
Channel X	+ Input	2001.87	0.66	0.02
Channel X	+ Input	201.39	-0.11	-0.06
Channel X	- Input	-198.27	0.04	-0.02
Channel Y	+ Input	2001.34	-0,04	-0.00
Channel Y	+ Input	201.35	-0.36	+0.18
Channel Y	- Imput	-198.77	-0.62	0.31
Channel Z	+ Input	2001.30	0,10	10,0
Channel Z	+ Input	200,72	-0,71	+0.35
Channel Z	- Input:	-199.12	-0.78	0.39
				- 0

#### 2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Renge Average Reading (µV)	Low Range Average Reading (µV)
Channel X	200	5.23	3.90
-	- 200	-3.72	-5.31
Channel Y	200	-4.23	-3,73
	- 500	2.71	2.31
Channel Z	200	80.93	21,36
-	- 1200	-23.91	-24.44

#### 3. Channel separation

	Input Voltage (mV)	Channel X (µV)	Channel Y (µV)	Channel Z (µV)
Channel X	200	9-11	6.47	+1.27
Channel Y	200	7.97	-	6.72
Channel Z	200	7.94	5,96	1. A.

Certificate No: DAE4-1336\_Nov1E

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#### 4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	15660	15881
Channel Y	15906	15597
Channel Z	(5853	15173

#### 5. Input Offset Measurement

DASY measurement parameters: Aulti Zero Time: 3 sec; Measuring time: 3 sec Input 10MG

- C	Average (µV)	min. Offset (µV)	max. Offset (µV)	Std. Deviation (µV)
Channel X	-0.26	+1.07	0.37	0.98
Channel Y	-0.22	-0.92	0.62	0.34
Channel Z	-0.97	-1.73	0.29	0.36

#### 6. Input Offset Current

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

#### 7. Input Resistance (Typical values for Information)

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

#### B. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)			
Supply (+ Vcc)	+7,9			
Supply (- Vcc)	-7.6			

#### 9. Power Consumption (Typical values for information)

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

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	ation Service (SAS) ce is one of the signatories t recognition of calibration ce	o the EA	editation No.: SCS 0108
ient SGS-TW (Aud	len)	Certificate No:	EX3-3923_Sep16
ALIBRATION	CERTIFICATE		
	EX3DV4 - SN:3923		
bject	EA3DV4 - 514.392	5	
alibration procedure(s)		CAL-14.v4, QA CAL-23.v5, QA ure for dosimetric E-field probes	CAL-25.v6
alibration date:	September 2, 2016	5	
alibration Equipment used (M	&TE ontical for calibration)		
	10	Cal Date (Certificate No.)	Scheduled Calibration
Primary Standards Power meter NRP	ID SN: 104778	05-Apr-16 (No. 217-02288/02289)	Apr-17
Primary Standards Power meter NRP Power sensor NRP-291	ID SN: 104778 SN: 103244	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288)	Apr-17 Apr-17
Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291	ID SN: 104778 SN: 103244 SN: 103245	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02289)	Apr-17 Apr-17 Apr-17
Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator	ID SN: 104778 SN: 103244 SN: 103245 SN: 55277 (20x)	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02288) 05-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02293)	Apr-17 Apr-17 Apr-17 Apr-17 Apr-17
Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference 2 Probe ES3DV2	ID SN: 104778 SN: 103244 SN: 103245 SN: 56277 (20x) SN: 3013	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02289) 31-Dec-15 (No. ES3-3013_Dec15)	Apr-17 Apr-17 Apr-17 Apr-17 Dec-18
Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference 2 Probe ES3DV2	ID SN: 104778 SN: 103244 SN: 103245 SN: 55277 (20x)	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02288) 05-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02293)	Apr-17 Apr-17 Apr-17 Apr-17 Apr-17
Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4	ID SN: 104778 SN: 103244 SN: 103245 SN: 50277 (20x) SN: 5013 SN: 5680	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 05-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02293) 31-Dec-15 (No. E33-3013_Dec15) 23-Dec-15 (No. DAE4-660_Dec15)	Apr-17 Apr-17 Apr-17 Apr-17 Dec-18
Primary Standards <sup>3</sup> ower meter NRP <sup>3</sup> ower sensor NRP-291 <sup>3</sup> ower sensor NRP-291 Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Becondary Standards	ID SN: 104778 SN: 103244 SN: 103245 SN: 56277 (20x) SN: 3013	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02289) 31-Dec-15 (No. ES3-3013_Dec15)	Apr-17 Apr-17 Apr-17 Apr-17 Dec-16 Dec-16
Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards Power meter E4419B	ID SN: 104778 SN: 103244 SN: 103245 SN: 55277 (20x) SN: 3013 SN: 660 ID	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 05-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02293) 31-Dec-15 (No. 217-02293) 23-Dec-15 (No. DAE4-660_Dec15) 23-Dec-15 (No. DAE4-660_Dec15) Check Date (in house)	Apr-17           Apr-17           Apr-17           Apr-17           Dec-18           Dec-16           Scheduled Check
ealBration Equipment used (M- Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards Power sensor E4412A Power sensor E4412A	ID SN: 104778 SN: 103244 SN: 103245 SN: 58277 (20x) SN: 3013 SN: 560 ID SN: GB41283874	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02283) 31-Dec-15 (No. ES3-3013_Dec15) 23-Dec-15 (No. DAE4-660_Dec15) Check Date (in house) 08-Apr-16 (in house check Jun-16)	Apr-17 Apr-17 Apr-17 Apr-17 Dec-16 Dec-16 Scheduled Check In house check: Jun-18 In house check: Jun-18 In house check: Jun-18
Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-281 Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards Power meter E44198 Power sensor E4412A Power sensor E4412A	ID SN: 104778 SN: 103244 SN: 103245 SN: 55277 (20x) SN: 5013 SN: 660 ID SN: GB41293874 SN: MY41498087	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 05-Apr-16 (No. 217-02283) 05-Apr-16 (No. 217-02293) 31-Dec-15 (No. E33-3013, Dec15) 23-Dec-15 (No. DAE4-660, Dec15) Check Date (in house) 06-Apr-16 (in house check Jun-16) 06-Apr-16 (in house check Jun-16) 06-Apr-16 (in house check Jun-16) 04-Aug-99 (in house check Jun-16)	Apr-17 Apr-17 Apr-17 Apr-17 Dec-16 Dec-16 Scheduled Check In house check: Jun-18 In house check: Jun-18 In house check: Jun-18 In house check: Jun-18
Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards Power meter E44198 Power sensor E4412A	ID SN: 104778 SN: 103244 SN: 103245 SN: 55277 (20x) SN: 55277 (20x) SN: 560 ID SN: GB41293874 SN: GB41293874 SN: MY41498087 SN: 000110210	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 05-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02293) 31-Dec-15 (No. DAE4-660, Dec15) 23-Dec-15 (No. DAE4-660, Dec15) 	Apr-17 Apr-17 Apr-17 Apr-17 Dec-16 Dec-16 Scheduled Check In house check: Jun-18 In house check: Jun-18 In house check: Jun-18
Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards Power sensor E44198 Power sensor E4412A RF generator HP 8648C	ID SN: 104778 SN: 103244 SN: 103245 SN: 3013 SN: 3013 SN: 680 ID SN: GB41293874 SN: WY41498087 SN: WY41498087 SN: 000110210 SN: US3842U01700	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 05-Apr-16 (No. 217-02283) 05-Apr-16 (No. 217-02293) 31-Dec-15 (No. E33-3013, Dec15) 23-Dec-15 (No. DAE4-660, Dec15) Check Date (in house) 06-Apr-16 (in house check Jun-16) 06-Apr-16 (in house check Jun-16) 06-Apr-16 (in house check Jun-16) 04-Aug-99 (in house check Jun-16)	Apr-17 Apr-17 Apr-17 Apr-17 Dec-16 Dec-16 Scheduled Check In house check: Jun-18 In house check: Jun-18 In house check: Jun-18 In house check: Jun-18
Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards Power sensor E44198 Power sensor E4412A RF generator HP 8648C	ID SN: 104778 SN: 103244 SN: 103245 SN: 55277 (20x) SN: 55277 (20x) SN: 660 ID SN: GB41293874 SN: MY41498087 SN: 000110210 SN: US3642001700 SN: US3642001700 SN: US37390585	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 05-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02293) 31-Dec-15 (No. DAE4-660 Dec15) 23-Dec-15 (No. DAE4-660 Dec15) Check Date (in house) 06-Apr-16 (in house check Jun-16) 06-Apr-16 (in house check Jun-16) 06-Apr-16 (in house check Jun-16) 04-Aug-99 (in house check Jun-16) 18-Oct-01 (in house check Oct-15)	Apr-17 Apr-17 Apr-17 Dec-18 Dec-18 Dec-16 Scheduled Check In house check: Jun-18 In house check: Jun-18
Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference Probe ES3DV2 DAE4 Secondary Standards Power meter E44198 Power meter E44198 Power sensor E4412A RF generator HP 8648C Network Analyzer HP 8753E	ID SN: 104778 SN: 103244 SN: 103245 SN: 55277 (20x) SN: 3013 SN: 680 ID SN: GB41293874 SN: WY41498087 SN: WY41498087 SN: 000110210 SN: US3842U01700 SN: US37390585 Name	06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 05-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02293) 31-Dec-15 (No. DAE4-660, Dec15) 23-Dec-15 (No. DAE4-660, Dec15) 	Apr-17 Apr-17 Apr-17 Dec-18 Dec-18 Dec-16 Scheduled Check In house check: Jun-18 In house check: Jun-18

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Accreditation No.: SCS 0108

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#### Glossary:

TSL NORMX, Y.Z. ConvF DCP CF A.B.C.D Polarization g Polarization 9

tissue simulating liquid sensitivity in free space sensitivity in TSL / NORMx,y,z diade compression point crest factor (1/duty\_cycle) of the RF signal modulation dependent linearization parameters o rotation around probe axis 8 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 information used in DASY system to align probe sensor X to the robot coordinate system

Connector Angle

#### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement
- Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement. Techniques: June 2013 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 IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010 KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz" C)

#### Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization  $\vartheta = 0$  (f  $\leq 900$  MHz in TEM-cell; f  $\geq 1800$  MHz; R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E<sup>2</sup>-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 .
- character stics Ax,y,z, Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z; A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode. ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer
- Standard for I ≤ 800 MHz) and inside waveguide using analytical field distributions based on powal Standard for 1's doublet, and inside waveguide using analytical read of automatic database on paveral 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
- Sphorical 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 affset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

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EX3DV4 - SN:3923

September 2, 2016

# Probe EX3DV4

## SN:3923

Manufactured: Repaired: Calibrated:

March 8, 2013 August 30, 2016 September 2, 2016

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

Certificate No: EX3-3923\_Sep16

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EX3DV4- SN:3923

September 2, 2016

#### DASY/EASY - Parameters of Probe: EX3DV4 - SN:3923

#### **Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) <sup>2</sup> ) <sup>A</sup>	0,55	0.46	0.45	± 10.1 %
DCP (mV) <sup>6</sup>	101.5	102.8	106.7	

#### **Modulation Calibration Parameters**

UID	Communication System Name		A dB	B dBõV	c	D dB	VR mV	Unc (k=2)
0	CW	X	0.0	0.0	1.0	0.00	150.8	±3.0 %
		Y	0.0	0.0	1.0		149.7	
		Z	0.0	0,0	1.0	C	151.5	

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%.

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6). <sup>a</sup> Numerical linearization parameter: uncertainty not required. <sup>b</sup> Uncertainty is determined using the max, deviation from linear response applying rectangular distribution and is expressed for the square of the field value

Certificate No: EX3-3923 Sep16

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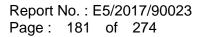
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EX3DV4-SN:3923

September 2, 2016

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3923

f (MHz) <sup>C</sup>	Relative Permittivity	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>B</sup> (mm)	Unc (k=2)
750	41.9	0.89	11.01	11.01	11.01	0,53	0.80	± 12.0 %
835	41.5	0.90	10.66	10.66	10.66	0.47	0.80	± 12.0 %
900	41.5	0,97	10.40	10.40	10.40	0.36	0.93	± 12.0 %
1750	40.1	1.37	9.27	9.27	9.27	0.29	0.80	±12.0 %
1900	40.0	1.40	8.90	8.90	8.90	0,30	0.80	±12.0 %
2000	40.0	1.40	8.92	8.92	8,92	0,34	0.80	± 12.0 %
2450	39.2	1.80	7.95	7.95	7.95	0.33	0.85	± 12.0 %
2600	39.0	1.96	7.77	7.77	7.77	0.33	0.80	± 12.0 %
5250	35.9	4.71	5.36	5.36	5.36	0.30	1.80	±13.1%
5600	35.5	5.07	4.94	4.94	4.94	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.96	4.96	4.96	0.40	1.80	± 13,1 %

Calibration Parameter Determined in Head Tissue Simulating Media

<sup>6</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of this ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity validity can be extended to ± 10 MHz. The for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity validity can be extended to ± 10 MHz. The validity of tissue parameters (c and c) can be relaxed to ± 10% if liquid compression formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters. <sup>1</sup> Altificient and elementation formula is applied to the ConvF uncertainty for indicated target tissue parameters. <sup>2</sup> AlphaDpeth are determined oung calibration SPEAG variants that the remaining deviation due to the boundary effect after compression is elevated for the boundary.

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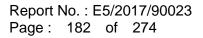
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EX3DV4-SN:3923

September 2, 2016

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3923

f (MHz) <sup>c</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha <sup>5</sup>	Depth (nim)	Unc (k=2)
750	55.5	0.96	10.83	10.83	10.83	0.32	0,98	± 12.0 %
835	55.2	0.97	10.67	10.67	10.67	0.37	0.96	± 12.0 %
900	55,0	1.05	10.52	10.52	10.52	0.44	0.80	± 12.0 %
1750	53.4	1.49	8.78	8.78	8.78	0.39	0.81	±12.0 %
1900	53.3	1.52	8.47	8.47	8.47	0.37	0.80	± 12.0 %
2000	53.3	1.52	8.68	8.68	8.68	0.38	0.80	± 12.0 %
2450	52.7	1.95	8.06	8.06	8.06	0.30	0.80	± 12.0 %
2600	52.5	2,16	7.84	7.84	7.84	0.27	0.80	± 12.0 %
5250	48.9	5,36	4.58	4.58	4.58	0.50	1,90	± 13.1 9
5600	48.5	5.77	4.00	4.00	4.00	0.55	1,90	± 13,1 9
5750	48.3	5.94	4.19	4.19	4.19	0.55	1,90	± 13.1 %

Calibration Parameter Determined in Body Tissue Simulating Media

<sup>16</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at ballbration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 123, 150 and 220 MHz respectively. Above 5 GHz frequency validity are being above 3 GHz. The validity of tissue parameters (a and a) can be relaxed to ± 10% if iquid compensation formula is applied to measured SAR values. After equencies below 3 GHz the validity of tissue parameters (a and a) can be relaxed to ± 10% if iquid compensation formula is applied to formessured SAR values. After equencies below 3 GHz the validity of tissue parameters.
 <sup>6</sup> AlphaDaph are determined during calculations of the validity of the validity of the validity of the requencies below 3 GHz. The validity of the validity for a second to ± 10% if iquid compensation formula is applied to formessured SAR values. After equencies below 3 GHz the validity of Validi

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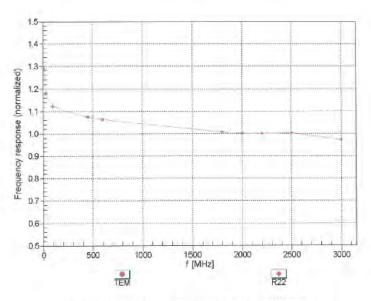
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September 2, 2016

EX3DV4- SN:3923 Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



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

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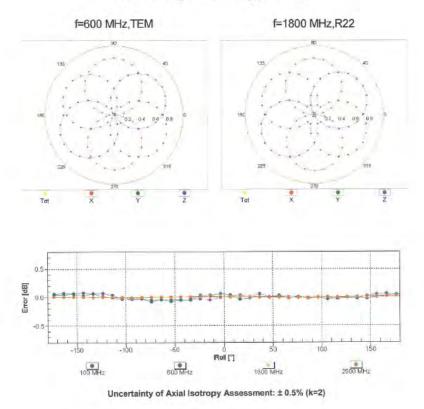
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Receiving Pattern ( $\phi$ ),  $\vartheta = 0^{\circ}$ 

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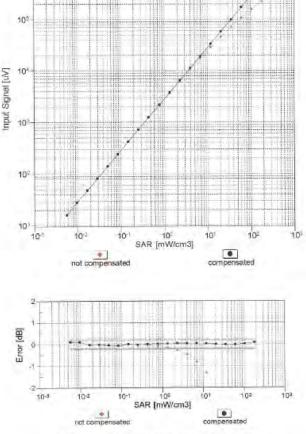


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September 2, 2016

# Dynamic Range f(SAR<sub>head</sub>) (TEM cell , f<sub>eval</sub>= 1900 MHz)



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

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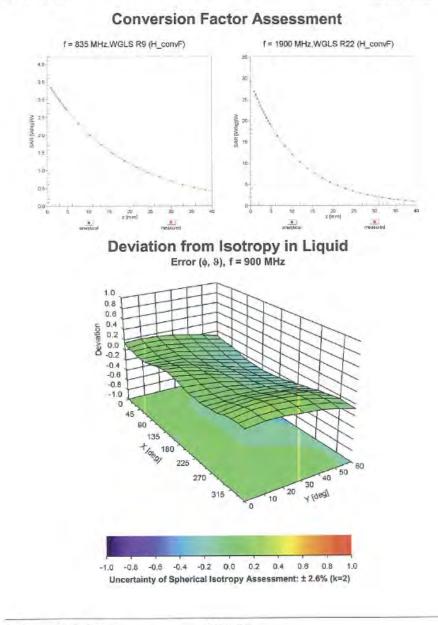
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EX3DV4-SN:3923

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EX3DV4- SN:3923

September 2, 2016

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3923

### Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	26.4
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 നന
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

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CALIBRATION	CERTIFICATE		
layed	EX30//4 - SN:746	8	
Californium (interdumi)a)	QA GAL-01.v9, QA Calibration proced	CAL-25.V6	
Saapoation care	.July 4, 2017		-
All calibrations here been cond	octed in the closed laboratory	facility anvironment tempterature (22 = 3)*C p	and humidally < 70%.
		(acity: unvicorment temperature (22 ± 3)°C g	and humidity < 70%
Calibration Equipment used (M			and humidaty = 70%
allbraich Equipment used (M Primary Stendarde	STE critical for calibration)	(acity: anti-serment transportation (22 ± 3)*C g Cal Date (Centrolie No.) 04-Apr-17 (No. 217-02521/00522)	
Calibration Equipment used (M Primery Stendarde Power meter NRP	STE onlical for calibration)	Cal Data (Centrolie No.)	Scheduled Calibration
Salbradov Equipment used (M Primory Stendards Power meter NRP Power sensor NRP-291	TE onlical for calibration)	Cal Data (Centifician No.) 04-Apr-17 (No. 217-02521/02522)	Scheduled Caribration Apr-18
Calibration Equipment used (M Primary Standarda Power meter NRP Power Sensor NRP-291 Power sensor NRP-291	STE omical for calibration)	Del Date (Centificale No.) 04-Apr-17 (No. 217-02521/00522) 04-Apr-17 (No. 217-02521)	Scheduled Carilipation Apr-18 Apr-18
Calibration Equipment used (M Primory Standards Power meter NRP- Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator	ID SN: 104778 SN: 104778 SN: 103244 SN: 103245	Gel Date (Centrolin No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02525)	Scheduled Caribration Apr-18 Apr-18 Apr-18
Calibration Equipment used (M Primary Stansards Power meter NRP Power sensor NRP-291 Power sensor NRP-291	ID SN: 104778 SN: 104778 SN: 103244 SN: 103245 SN: 58277 (20k)	Cal Date (Centrolie No.) 04-Apr-17 (No. 217-0252100522) 04-Apr-17 (No. 217-025251) 04-Apr-17 (No. 217-02525) 07-Apr-17 (No. 217-02526)	Scheduled Caribration Apr-18 Apr-18 Apr-18
Calibration Equipment used (M Primery Standarda Power moter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Atternator Reference Probe EB3DV2 DAE4	ID         SN: 104778           SN: 104778         SN: 103244           SN: 103245         SN: 103245           SN: 103245         SN: 103245           SN: 1032577 (20k)         SN: 88277 (20k)           SN: 680277         SN: 6802	Cal Data (Certificale No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02525) 07-Apr-17 (No. 217-02525) 07-Apr-17 (No. 217-02528) 21-Dec-16 (No. ES3-3013, Dec16) 7-Dec-16 (No. DAE4-050, Dec16)	Scheduled Carityetion Apr-18 Apr-18 Apr-18 Apr-18 Dec-17 Dec-17
Calibration Equipment used (M Primary Standards Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference 20 dB Attenuator Reference Phobe EB3DV2 DAE4 Secondary Standards	ID         SN: 104778           SN: 104778         SN: 103244           SN: 103245         SN: 50277 (20x)           SN: 50277 (20x)         SN: 50277 (20x)           SN: 50277 (20x)         SN: 50277 (20x)	Dal Date (Certificate No.) 04-Apr-17 (No. 217-02521/00522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02525) 07-Apr-17 (No. 217-00528) 21-Dec-16 (No. 253-3013, Dec16) 7-Dac-16 (No. DAE4-050, Dec16) Chies, Data (in house)	Scheduled Caritystion Apr-18 Apr-18 Apr-18 Dec-17 Dec-17 Scheduled Dheck
Calibration Equipment used (M Primary Standards Power meter NRP-291 Power sensor NRP-291 Reference Probe EB3DV2 (DAE4 Secondary Standards Power meter E44196	ID         SN: 104778           SN: 104778         SN: 103786           SN: 103245         SN: 103245           SN: 58277 (20k)         SN: 5813           SN: 6804         SN: 58277 (20k)           SN: 58277 (20k)         SN: 58277 (20k)	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/00522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02525) 07-Apr-17 (No. 217-02525) 07-Apr-17 (No. 217-02526) 11-Dec.16 (No. DAE-4-050, Dec.16) 7-Dac-16 (No. DAE-4-050, Dec.16) Check: Date (in house) 05-Apr-16 (in house)	Scheduled Carityetion Apr-18 Apr-18 Apr-18 Apr-18 Dec-17 Dec-17
Calibration Equipment used (M Primary Stercards Power moter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference Probe E83DV2 DAE4 Secondary Standards Power sensor E44196 Power sensor E4412A	ID         SN: 104778           SN: 104778         SN: 105244           SN: 105244         SN: 105245           SN: 105245         SN: 55277 (20k)           SN: 55277 (20k)         SN: 660           SN: 5841250674         SN: 5841250674           SN: 5841250674         SN: 4440667	Dal Date (Certificate No.) 04-Apr-17 (No. 217-02521/00522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02525) 07-Apr-17 (No. 217-00528) 21-Dec-16 (No. 253-3013, Dec16) 7-Dac-16 (No. DAE4-050, Dec16) Chies, Data (in house)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Dec-17 Dec-17 Scheduled Dheck In Bouse check Jun-18
Calibration Equipment used (M Primary Standards Power moter NRP Power sensor NRP-291 Power sensor NRP-291 Reference Probe EB3DV2 DAE4 Secondary Glanderds Power sensor E44196 Power sensor E4412A	ID         SN: 104778           SN: 104778         SN: 103244           SN: 103244         SN: 103245           SN: 103245         SN: 50277 (20x)           SN: 60245         SN: 660           ID         SN: 660	Cal Data (Certificate No.) 04-Apr-17 (No. 217-02521/00522) 14-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02525) 17-Apr-17 (No. 217-02525) 17-Dep-16 (No. 253-3013, Dec16) 7-Dep-16 (No. 253-3013, Dec16) 7-Dep-16 (No. 2454-052, Dec16) Closeb, Data ()n house (Dec16) 05-Apr-16 (n house (Dec14), Jun 16)	Scheduled Caritivation Apr-18 Apr-18 Apr-18 Apr-18 Dec-17 Dec-17 Dec-17 Scheduled Dhock In Rouse check, Jun-18 In Rouse check, Jun-18
Calibration Equipment used (M Primary Standards Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference 20 dB Attenuator Reference Phote EB3DV2 DAE4 Secondary Standards Power sensor E4412A Power sensor E4412A RF generator H# 58462	ID         SN: 104778           SN: 104778         SN: 105244           SN: 105244         SN: 105245           SN: 105245         SN: 55277 (20k)           SN: 55277 (20k)         SN: 660           SN: 5841250674         SN: 5841250674           SN: 5841250674         SN: 4440667	Cal Date (Certificate No.) 04-Apr-17 (No. 217-32521/02522) 04-Apr-17 (No. 217-32521/02522) 04-Apr-17 (No. 217-32525) 07-Apr-17 (No. 217-32525) 07-Apr-17 (No. 217-32525) 07-Apr-16 (No. DAE-4-650, Dec16) 7-Dec-16 (No. DAE-4-650, Dec16) 7-Dec-16 (No. DAE-4-650, Dec16) Check, Data (in No.see check, Jun-16) 06-Apr-18 (in No.see check, Jun-16) 06-Apr-19 (in No.see check, Jun-16)	Scheduled Caritystion Apr-18 Apr-18 Apr-18 Apr-18 Dars-17 Dec-17 Dec-17 Scheduled Dheck In Rouse check Jun-18 In Rouse check Jun-18
Calibration Equipment used (M Primary Standards Power meter NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference Phobe EB3DV2 (DAE4 Secondary Standards Power meter E44196	ID         SN: 104778           SN: 104778         SN: 103245           SN: 103245         SN: 50277 (20k)           SN: 2013         SN: 80277 (20k)           SN: 80277 (20k)         SN: 80277 (20k)           SN: 680         SN: 50277 (20k)           SN: 680         SN: 680           ID         SN: 680           SN: 680         SN: 680           ID         SN: 680           SN: 000110210         SN: 003120674           SN: 003120210         SN: 0037260585	Cal Data (Certificale No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02523) 04-Apr-17 (No. 217-02525) 07-Apr-17 (No. 217-02525) 07-Apr-17 (No. 217-02528) 21-Dec-16 (No. 245-3013, Dec16) 7-Dec-16 (No. 245-4050, Dec16) 7-Dec-16 (No. 245-4050, Dec16) Chach, Data (in Nouse chack Jun-16) 06-Apr-18 (in Nouse chack Jun-16) 06-Apr-19 (in Nouse chack Jun-16) 04-Apr-99 (in Incuse chack Jun-16) 04-Apr-99 (in Incuse chack Jun-16) 04-Apr-99 (in Incuse chack Jun-16) 18-Cet-01 (in Incuse chack Oct-16)	Scheduled Caritivation Apr-18 Apr-18 Apr-18 Apr-18 Dec-17 Dec-17 Dec-17 Scheduled Dheck In Rouse check Jun-18 In Rouse check Jun-18
Calibration Equipment used (M Primary Standards Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference Probe EB3DV2 DAE4 Secondary Standards Power sensor E44196 Power sensor E44196 Power sensor E44197 Reference HP 83480 Network Analyzar HP 8753E	ID         SN: 104778           SN: 104778         SN: 103244           SN: 103245         SN: 203245           SN: 203245         SN: 203245           SN: 3013         SN: 68277 (209)           SN: 3013         SN: 6841250874           SN: 6841250874         SN: 66841250874           SN: 66841250874         SN: 00010210           SN: 00010210         SN: 0001020           SN: UB3642U01700         SN: 00010255           Name         Name	Cal Date (Certificate No.)           04-Apr-17 (No. 217-02521/002522)           04-Apr-17 (No. 217-02525)           07-Apr-17 (No. 217-02525)           07-Apr-16 (No. CAS-3:013_Dec16)           7-Den-16 (No. DAE4-050; Dec16)           Check Date (In house)           Ob-Apr-16 (In house check Jun-16)           DB-Apr-16 (In house check Jun-16)           DB-Apr-17 (In house check Jun-16)           DB-Apr-16 (In house check Jun-16)           DB-Apr-17 (In house check Jun-16)	Scheduled Caritisetton Apr-18 Apr-18 Apr-18 Dec-17 Dec-17 Scheduled Dhock In Bouse check Jun-18 In Protect Check, Jun-18 In Protect Check, Jun-18 In Protect Check, Jun-18
Calibration Equipment used (M Primary Standards Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Reference Probe EB3DV2 DAE4 Secondary Standards Power sensor E44196 Power sensor E44196 Power sensor E44197 Reference HP 83480 Network Analyzar HP 8753E	ID         SN: 104778           SN: 104778         SN: 103245           SN: 103245         SN: 50277 (20k)           SN: 2013         SN: 80277 (20k)           SN: 80277 (20k)         SN: 80277 (20k)           SN: 680         SN: 50277 (20k)           SN: 680         SN: 680           ID         SN: 680           SN: 680         SN: 680           ID         SN: 680           SN: 000110210         SN: 003120674           SN: 003120210         SN: 0037260585	Cal Data (Certificale No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02523) 04-Apr-17 (No. 217-02525) 07-Apr-17 (No. 217-02525) 07-Apr-17 (No. 217-02528) 21-Dec-16 (No. 245-3013, Dec16) 7-Dec-16 (No. 245-4050, Dec16) 7-Dec-16 (No. 245-4050, Dec16) Chach, Data (in Nouse chack Jun-16) 06-Apr-18 (in Nouse chack Jun-16) 06-Apr-19 (in Nouse chack Jun-16) 04-Apr-99 (in Incuse chack Jun-16) 04-Apr-99 (in Incuse chack Jun-16) 04-Apr-99 (in Incuse chack Jun-16) 18-Cet-01 (in Incuse chack Oct-16)	Scheduled Caritivation Apr-18 Apr-18 Apr-18 Apr-18 Dec-17 Dec-17 Dec-17 Scheduled Dheck In Rouse check Jun-18 In Rouse check Jun-18
Calibration Equipment used (M Primary Standards Power servor NRP-291 Power servor NRP-291 Reference 20 dB Attenuator Reference Phobe EB3DV2 DAE4 Secondary Standards Power servor E44198 Power servor E44192 Ref. generator H# 88480	ID         SN: 104778           SN: 104778         SN: 103244           SN: 103245         SN: 203245           SN: 203245         SN: 203245           SN: 3013         SN: 68277 (209)           SN: 3013         SN: 6841250874           SN: 6841250874         SN: 66841250874           SN: 66841250874         SN: 00010210           SN: 00010210         SN: 0001020           SN: UB3642U01700         SN: 00010255           Name         Name	Cal Date (Certificate No.)           04-Apr-17 (No. 217-02521/002522)           04-Apr-17 (No. 217-02525)           07-Apr-17 (No. 217-02525)           07-Apr-16 (No. CAS-3:013_Dec16)           7-Den-16 (No. DAE4-050; Dec16)           Check Date (In house)           Ob-Apr-16 (In house check Jun-16)           DB-Apr-16 (In house check Jun-16)           DB-Apr-17 (In house check Jun-16)           DB-Apr-16 (In house check Jun-16)           DB-Apr-17 (In house check Jun-16)	Scheduled Caritivation Apr-18 Apr-18 Apr-18 Apr-18 Dec-17 Dec-17 Dec-17 Scheduled Dheck In Rouse check Jun-18 In Rouse check Jun-18

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Calibration Laboratory of Schmid & Partner Engineering AG aughouseness 43, 8064 Zunch, Switzerter



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Accreditation No.1 SCS 0108

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

#### Classen

Giussary.	
TSL	lissue simulating liquid
NORMs, y.z	servitivity in free space
ConvF	sensitivity in TSL / NORMX, y.z.
DCP	diade compression point
CF	crest lactor (1/duty cycle) of the RF signal
W. B. C. D	modulation dependent lineertzetion parameters
Polarization o	g rotation around probe axis
Polarization 3	I rotation around an oxis that is in the plane normal to probe axis (at measurement center).

information used in DASY system to align probe sensor X to the robot coordinate system Connector Angle

# Callbration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013. "IEEE Recommended Practice for Determining the Peak Spalial-Averaged Specific Techniques", June 2013, Tech Recommended Pracade for Distributing the Heak Spatial Averaged spectrum. Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement. Techniques", June 2013 IEC 62209-1, " Measurement procedure for the assessment of Spacific Absorption Rate (SAR) from hand-held and body-mountiad devices used next to the sar (frequency range of 300 MHz to 8 GHz)", July 2016 IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)". March 2010 VTB aB6664, "SAR Measurement for 100 MHz to 6 GHz)". March 2010
- 55
- 4
- d) KDB 865664, SAR Measurement Requirements for 100 MHz to 6 GHz

### Methods Applied and Interpretation of Parameters:

- NORMAX, y.z. Assessed for E-field polarization  $\theta = 0$  ( $1 \le 900$  MHz in TEM-cell; 1 > 1800 MHz; R22 waveguide). NORMAX, y.z. are only intermediate values, i.e., the uncertainties of NORMAX, y.z. does not affect the E<sup>1</sup>-field uncertainty inside TSL (see below ConvF). NORMAY, y.z. = NORMAX, y.z. \* inequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software variance 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 assassed 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 datermined based on the signal characteristics.
- Ax,y,z; Ex,y,z; Cx,y,z; Dx,y,z; VRx,y,z; A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- Media. We is the matching realition range expression in which we using E-field (or Tempetature Transfer Standard for  $f \le 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f \le 800$  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 DASYM software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMs*, y,  $z^*$  *Conv*<sup>C</sup> whereby the uncertainty corresponds to that given for z = 4500 MHz. The sensitivity in TSL corresponds to *NORMs*, y,  $z^*$  *Conv*<sup>C</sup> whereby the uncertainty corresponds to that given for z = 4500 MHz. The Com/F is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical (solropy (3D deviation from isotropy)) in a field of low gradients realized using a fial phantom
- exposed by a patch antenna. Sensor Offset, The sensor offset corresponds to the offset of virtual measurement center from the probe 5p
- (on probe axis). No tolerance required. Connector Angle: The angle is assessed using the information gained by determining the NORMs (no unicertainly required).

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EX3DV4 - SN:7466

July 4, 2017

# Probe EX3DV4

# SN:7466

Manufactured: Calibrated: October 25, 2016 July 4, 2017

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

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EX3DV4- SN:7466

July 4, 2017

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:7466

#### **Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m) <sup>2</sup> ) <sup>4</sup>	0.46	0.40	0.63	± 10.1 %
DCP (mV) <sup>a</sup>	96.7	100.3	93.7	

# Modulation Calibration Parameters

UID	Communication System Name		A	в	С	D	VR	Unc	1
			dB	dBõV		dB	mV	(k=2)	
0	CW	х	0.0	0.0	1.0	0.00	145.9	±3.0 %	
		Y	0.0	0.0	1.0		148.6		
		Z	0.0	0.0	1.0		130.0		

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%.

<sup>5</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>3</sup>-field uncertainty inside TSL (see Pages 5 and 6).
<sup>9</sup> Numerical linearization parameter: uncertainty not required.
<sup>9</sup> Uncertainty is determined using the max, deviation from linear response applying rectangular distribution and is expressed for the square of the find value. field value.

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EX3DV4-- SN:7466

July 4, 2017

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>13</sup> (mm)	Unc (k=2)
835	41.5	0.90	10.20	10.20	10.20	0.60	0.84	± 12.0
900	41.5	0.97	9.95	9.95	9.95	0.42	0.94	± 12.0 9
1750	40.1	1.37	8.84	.8.84	8.84	0.34	0.80	± 12.0
1900	40.0	1.40	8.52	8.52	8.52	0.35	0.80	± 12.0
2000	40.0	1.40	8.47	8.47	8.47	0.35	0.80	± 12.0
2450	39.2	1.80	7.81	7.81	7.81	0.35	0.99	± 12.0
2600	39.0	1.96	7.58	7.58	7.58	0.37	0.95	± 12.0
5200	36.0	4.66	5.81	5.81	5.81	0.35	1.80	± 13.1
5300	35.9	4.76	5.56	5.56	5.56	0.35	1.80	± 13.1
5600	35.5	6.07	4.98	4.98	4.98	0.40	1.80	± 13.1
5800	35.3	5.27	5.17	5.17	5.17	0.40	1.80	± 13.1

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:7466

<sup>6</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v1.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the HSS of the Conv<sup>2</sup> uncertainty is calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for Conv<sup>2</sup> assessment at 30, 64, 128, 158 and 220 MHz respectively. Above 50 GHz frequency validity use extended to ± 10 MHz. \* A frequencies below 3 GHz, the validity of tissue parameters (s and e) can be relaxed to ± 10% if "guid componation formula is applied to measured SAR values. Af frequencies to the walkity of tissue parameters (s and e) is restricted to ± 5%. The uncertainty is the RSS of the Conv<sup>2</sup> uncertainty for indicated target tissue parameters. \* A they and the uncertainty for indicated target tissue parameters. \* A they and the test of the test of the convert set of the test of test of test of test of the test of the test of te

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EX3DV4- SN:7466

July 4, 2017

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Una (k=2
835	55.2	0.97	10.24	10.24	10.24	0.39	0.96	± 12.0
900	55.0	1.05	10.06	10.06	10.06	0.34	1.01	± 12.0
1750	53.4	1.49	8.52	8.52	8.52	0.39	0.87	± 12.0
1900	53.3	1.52	8.14	8.14	8.14	0.34	0.91	± 12.0
2000	53.3	1.52	8.30	8.30	8.30	0.33	0.94	± 12.0
2450	52.7	1.95	7.94	7.94	7.94	0.28	1.10	± 12.0
2600	52.5	2.16	7.66	7.66	7.66	0.27	1.15	± 12.0
5200	49.0	5.30	5.20	5.20	5.20	0.40	1.90	± 13.1
5300	48.9	5.42	5.10	5.10	5.10	0.40	1.90	± 13.1
5600	48.5	5.77	4.27	4.27	4.27	0.50	1.90	± 13.1
5800	48.2	6.00	4.48	4.48	4.48	0.50	1.90	± 13.1

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:7466

<sup>C</sup> Frequency validity above 360 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is realriched to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at estimation frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF essentents at 30, 64, 128, 156 and 220 MHz respectively. Above 5 GHz frequency validity volidity can be extended to ± 10, 25, 40, 50 and 70 MHz for ConvF essentents at 30, 64, 128, 156 and 220 MHz respectively. Above 5 GHz frequency validity on the extended to ± 10 MHz. In the frequencies below 3 GHz, the validity of tissue parameters (s and o) can be relaxed to ± 10% if liquid componration formule is applied to measured SAR values. Af frequencies to validity of tissue parameters (s and o) can be relaxed to ± 10% if liquid componration formule is applied to the ConvF uncertainty for indicated torget tissue parameters.

Certificate No: EX3-7466\_Jul17

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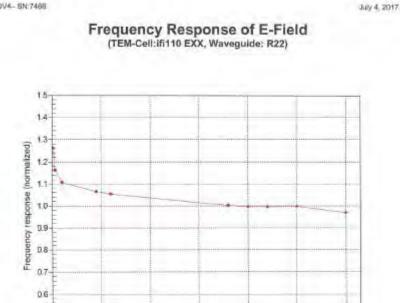
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EX3DV4- SN:7468



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

1500

[[MHz]

2500

+ R22

2000

3000

Cartificate No: EX3-7466\_Jul17

0.5

Ó.

500

1000

TEN

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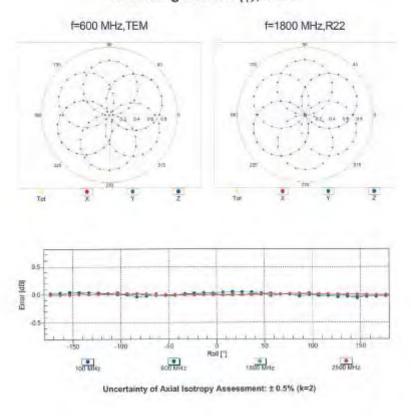
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EX3DV4-SN:7466

July 4, 2017



Receiving Pattern (\$), 9 = 0°

Contineate No: EX3-7466 Jul17

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EX3DV4- SN:7466

AJV-4, 2017.

# Dynamic Range f(SAR<sub>head</sub>) (TEM cell , feval= 1900 MHz) 10 10 [WI] Isngit tuqu 10 107 SAR [mW/cm3] (n) 10 101 10 (đ 10 not comper . Error [08] -2 103 10-2 10-107 10 SAR [mW/cm3] compensate not compensated Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: EX3-7466\_Jun7

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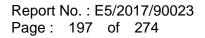
Page 9 of 11

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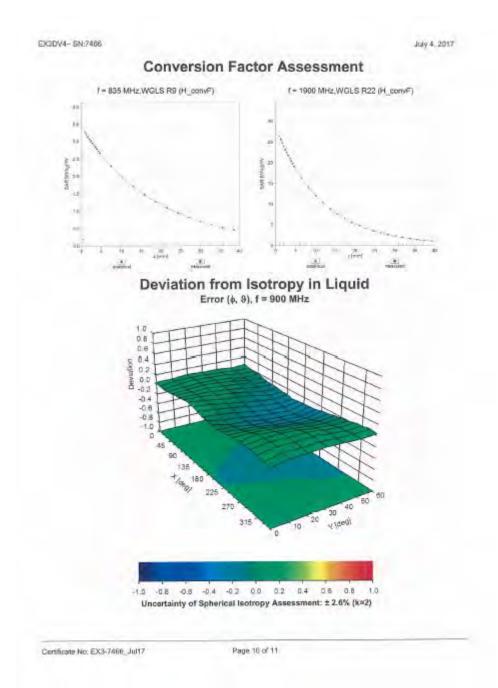
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台灣檢驗科技股份有限公司

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EX3DV4-- SN:7466

July 4, 2017

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:7466

### Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-3.3
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Certificate No: EX3-7466\_Jul17

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unt SGS-TW (Aud	en)	Certificate No: 1	EX3-3831 Jan17
ALIBRATION	CERTIFICATE		
tier:	EX3DV4 - SN/3831		
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Certificate No: EX3-3831\_Jan17

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# Report No. : E5/2017/90023 Page: 200 of 274



Calibration Laboratory of Schmid & Partner Engineering AG argheisstrasse 43, 4004 Zunch, Switzerland



s Service suisse d'étaismade C Serviziti svizzem di immira S Ewine Galibration Service

Accentitation No. SCS 0108

Accessional by the Swan Accession Service (BAS) The Swiss Accreditation Service to one of the algorithmic to the LA Multiliational Agreement for the Acceptition of calibration certification

#### Glossary:

Heave simulating liquid sanstivity in free space sensitivity in TSI,7 NORMs, y, z NORMX, Y.Z CONVE diode compression point creat factor (1/duty\_cycle) of the RF signal DCP CF modulation dependent linearization parameters A S.C.D a relation around probe axis Polatization in s rotation around an axis that is in the plant minimal is probe axis (a) measurement center), Pointization 8 i.e.,  $\theta = 0$  is normal to probe axial information used in DASY system to align probe sensor X to the robot coordinate system. Connector Angle

# Calibration is Performed According to the Following Standards:

- IEEE Sid 1528-2013, VIEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices. Meanweimant
- b)
- Abstraction of the set (hequency range of 300 MHz to 3 GHz)". February 2005
   EC 62209-1. "Procedure to measure the Strectile Absorption Rate (SAR) for hand-held devices used in close proximity to the set (hequency range of 300 MHz to 3 GHz)". February 2005
   EC 62209-2. "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)". March 2010
   KDB 855664, "SAR Measurement Requirements for 100 MHz to 6 GHz".

# Mothods Applied and Interpretation of Parameters:

- NORMx, y, z: Assessed for E-field potenzation 0 = 0 (f ± 900 MHz in TEM-odi, f > 1800 MHz; R22 waveguidé) NORMx, y, z are only intermediate values, Le , the uncertainties of NORMx, y, z does not affect the E<sup>2</sup> field uncertainty inside TSL (see bolow CorvF).
- NORM(1)x,y,z = NORMA,y,z \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. This uncertainty of the frequency response is included
- In the stated undertainty of ConVF DCPx, y.z. DCP are numerical linearization parameters assessed based on the data of power aweep with CW
- signal (no incensinty required). DCP does not depend on frequency nor media. PVP: PAR is the Peak = Avmage Ratio that is not calibrated but determined based on the signal.
- characteristics Ax, y, z; Bx, y, z; Cx, y, z; Dx, y, z; VRx, y, z; A, B, C, D are numerical linearization patemetics appeared based on the data of power sweep for specific inadulation signal. The parameters do not depend on frequency nor modia. VR is the multimum calibration range symposed to RMS voltage arrows the diade. ConvF and Boundary Effort Parameter's Assessed in flat plantom using Effect (or Temperature Transfer characteristics
- Standard for ( < 800 MHz) and inside wavequina using analytical field distributions based on oower measurements for ( > 800 MHz. The same setups are used for assessment of the parameters applied for measurements for L= 600 MHz. The some setups are used for assessment of the detained is append to foundary compensation (albits, depth) of which typical uncertainty values are given. There parameters are used in DASY's oftware to improve probe source; close to the boundary. The sensitivity in TSL corresponde is NORMs y.z.\* ConvE whereby the uncertainty corresponds to that given for ConVE. A frequency dependent ConVE is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± \*00. MHz.
  - Spherical isolropy (3D deviation from isolropy); In a hold of low gradients ratilized using a fist phentom exposed by a patch antenna
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe lip (on probe axis). No tolerance required
- Connector Angle: The angle is assessed using the information gained by determining the NORMir (no Uncertainty required)

-Certilicate No: EX3-3531\_Jan11

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Report No. : E5/2017/90023 Page : 201 of 274

EX30V4 - SN 3634

anuary 23-2017

# Probe EX3DV4

# SN:3831

Manufactured: Calibrated: September 6, 2011 January 23, 2017

(Nale: non-compatible with DASY2 systems)

Centilizate No. EK3-3831 Jan17

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EX30V4- SN:3531

January 25 (2017)

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831

#### **Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Une (#=2
Norm (µV/(V/m) <sup>2</sup> ) <sup>n</sup>	0.43	0.41	0.42	# 107.1 %
DCP (mV)"	101.7	102.0	100.6	

Modula	ation Calibration Parameters						-	
mo	Communication System Name		A ttB	B dBõV	G	D dB	V用 田V	Una" (K=R)
D	EW	x	0.0	0.0	1.0	0.00	149,2	42.2%
		×.	0.0	0.0	1.0	1	138 4	
	1	2	0.0	00	1.0		142.6	-

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 85%.

The analitances of Norm X.Y.Z no not offect the E-Bed uncertainty more TEL (net Pages 5 and 6).

Numerical the exception permission and all data within the information re-product within gradient and is expressed for the required that the features that the features and the required that the features and the required that the second set of the required that the second set of the required that the features are the required to the

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EX30VA- SN 3631

January 23, 2017

f (MHz) =	Relative Permittivity"	Conductivity (S/m)/	Convil X	ConvF Y	ConvFZ	Alpina <sup>10</sup>	Depth <sup>o</sup> (mm)	Unc (k=2)
750	419	0.89	9.83	£8.8	9.63	0,57	0.80	± 42.0 %
835	41.5	0.90	9.15	9,15	9.15	0.53	0.21	± 12.0 %
900	41.5	0.97	9.08	9.08	9,08	0.42	0,86	± 12.0 %
1450	402.5	1,20	8.41	8.41	8.41	0.35	0,80	1 12.0 %
1750	40.3	1.32	8.17	8.17	8,47	0.32	0.80	= 12.0 8
1900	40,0	1.40	7.86	7.85	7.86	0.39	0.80	± 12.0 3
2000	40.0	1.40	7.80	7,80	7.80	0.35	0.80	3 12.0 %
2300	39.5	1.87	7.59	7.59	7.69	0.25	1.02	±12.0 %
2450	39.2	1.80	7.21	7,21	7.21	0.40	0.80	± 12.0.3
2600	39.0	1,95	6.99	8.99	6.99	D.38	0,60	£12.05
3500	37.9	2.91	6.55	8.55	6.55	0.30	1.20	±13,7.9
5200	36.0	4.66	5.02	5,02	5.02	0,30	1.80	=13,1.9
5300	35.9	4.76	4.70	4.70	-4.70	0.35	1.80	±1313
5600	35.5	5.07	4.51	4.59	4.51	0.40	1.80	±18.1 %
5900	35.3	6.27	4,45	4.46	4.48	0.40	T.80	± 13:1 5

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831

<sup>1</sup> Frequency validity gbore 100 MHz of a 110 MHz only applies for DASY v4.4 and higher (van Page 2), escills in writebie) to 5.50 MHz. The uncertainty is the RSS of the ConvElumentary of calibration (sequence) and the uncertainty is the RSS of the ConvElumentary of the second sequence within the second sequence based 20, 40, 50 and 210 MHz respectively. Above 5 GHz frequency validity can be extended to a 10, 25, 40, 50 and 20 MHz for ConvElumentary and 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to a 10, 25, 40, 50 MHz.

Validity can be extended to a 110 Meta. "A thing encies balaw 3 GHz, the validity of taske perameters is and all can be reased to a 10%, il load concension formula is applied to measures SAR values. At trapancies along of taske perameters is and all can be reased to a 10%, il load concension formula is applied to measures SAR values. At trapancies along a GHz the validity of taske parameters is and in it is instructed to a 5%. The uncertainty is the RES of the Cover uncompany for inforcing target baske parameters. "Applicitle is a determinent SPR of Cover and the second parameters are not in its instructed to a 5%. The uncertainty is the RES of "Applicitle in a determinent SPR of Cover and the second parameters are not in its instructed to a 5%. The uncertainty is the RES of always bas that 4 ms to the memory and cover a cover and the second parameters is and in the boundary effect after comparison on always bas that 4 ms to interprete second a CHz and being ± 2% to a linear cover and between 3-6 CH to a my transmiss larger than full the probes the reasers from the boundary.

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EX0004-SN 3831

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Jammary 73. 2017

(MHz)<	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvFY	ConvF Z	Alpha	Depth <sup>C</sup> (min)	Unc (k=2)
750	55.5	0.96	9.59	9.69	9.59	0.46	0.80	±12.0 %
835	55.2	0.97	9.25	9.25	9.25	0.48	0.80	+12.0 %
900	35.0	1,05	8,15	8/15	9.15	8.35	0.80	±12.0 %
1750	53.4	1,49	7.78	7.78	7.78	0,36	0.80	1 12.0 %
1900	59.3	1,52	7.83	7.53	7.53	0.38	0.80	1 12.0 %
2000	63.3	1.52	7.66	7.66	7.66	0,32	0.80	±12.0 %
2300	62.9	181	7.32	7.32	7.32	0.29	1.00	± 12.0 %
2450	52.7	1.95	7.30	7.30	7.30	0.33	0.80	±12.0 %
2800	52.5	2.16	7.05	7.05	7.05	D.30	0.80	± 12.0.1
5200	49,0	5.30	4.47	4.47	4.87	0.40	1.90	±13.1 %
5300	48.9	5.42	4.21	4.21	4.21	0.45	1,90	= 13.1 9
5600	48.5	5,77	3.67	3,67	3.67	0.50	1.90	#13.1 1
5800	48.2	6.00	3.47	3.87	3,87	0.50	1.90	± 13.4 9

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831

Frequency volidity acres 300 MHz of a 100 MHz rink oppose for DASY wild and higher (see Page 2), also (ii) a restricted to a 50 MHz. The anisotherity is the RSS of the Crow' underskilly at calibration fremienty and the uncentainty for the inducted frequency of both The packer 300 MHz (iii) 10, 25, 40, 50 and 70 MHz for Crow' assessments in 30, 64, 120, 150 and 220 MHz respectively. Above 6 CHz frequency solidity can be excluded to 4 110 MHz. The voltance plasmeness (i) and in the exclusion to 120 MHz respectively. Above 6 CHz frequency solidity can be excluded to 4 110 MHz. The voltance of an anisotron ten end to the exclusion to 120 MHz respectively. Above 6 CHz frequency and frequencies based and 0.4 110 MHz. The voltance of GHz, the validity of tesses permitting (a) and by is detended to 150. The uncentainty is the RSS of the CorwF uncertainty for indicated traget feases parameters. 7 Anti-tegrands are detended to 164, the voltance of GHz and addity of tesses permitting (a) and by is detended to 150. The uncertainty is the RSS of the CorwF uncertainty for indicated traget feases parameters. 7 Anti-tegrands are detended to 164, the foreigned tesses permitting the time working sequences to 150. The uncertainty is the RSS of the CorwF uncertainty for indicated traget feases parameters. 7 Anti-tegrands are detended to 2 GHz and below ( 3% for frequencies between 3 K CHz) at any distance larger from the line indication deminister from the Execution?

Certificate No: EX3-3831\_Lan1

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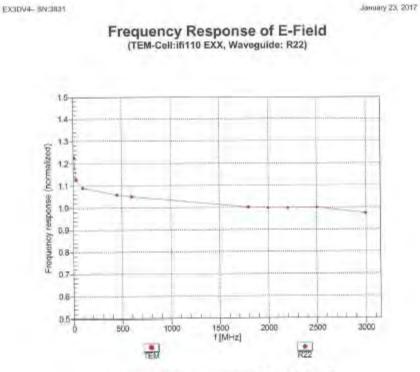
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Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)



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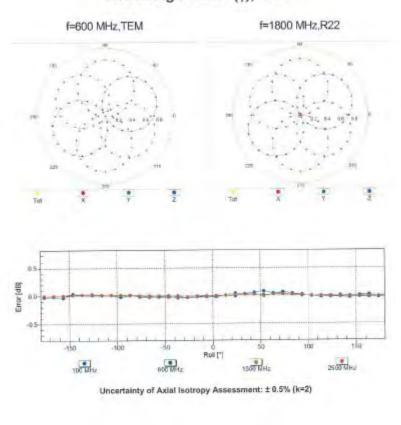
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EX3DV4-SN:3831

January 23, 2017



Receiving Pattern (\$), 9 = 0°

Cartificate No: EX3-3831\_Jan17

Page 8 of 11

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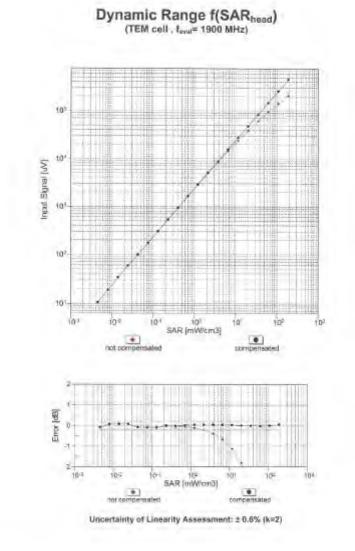
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Report No. : E5/2017/90023 Page : 207 of 274

EX30V4- SN:3831

Manuary 23. 2017



Centificate No. EX3-3831\_Jan17

Pege 0 of 11

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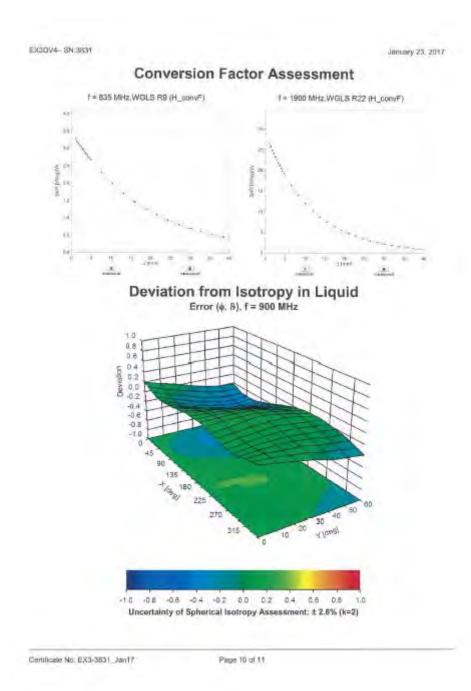
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EXIDVA-SN:3331

January 25, 2017

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	-16.8
Mechanical Surface Datection Mode	enablari
Optical Surface Dataction Mode	disabled
Probe Overall Length	337 mm
Probe Body Diemeter	10 mm
Tip Length	3 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sevaar Y Calibration Point	7 mm
Probe Tip to Sensor Z Calibration Point	Tirim
Recommended Measurement Distance from Surface	1.4 mm

Certificate No: EX3-3831 Jan17

Page 11 cf 11

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# 8. Uncertainty Budget

A	С	D	е		f	g	h=c * f / e	i=c * g / e	k
Source of Uncertainty	Tolerance/ Uncertainty	Probabilit y	Div	Div Value	ci (1g)	ci (10g)	Standard uncertainty	Standard uncertainty	vi, or Veff
Measurement system									
Probe calibration	6.00%	Ν	1	1	1	1	6.00%	6.00%	8
Isotropy , Axial	3.50%	R	√3	1.732	1	1	2.02%	2.02%	8
lsotropy, Hemispherical	9.60%	R	√3	1.732	1	1	5.54%	5.54%	8
Modulation Response	2.40%	R	√3	1.732	1	1	1.40%	1.40%	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Boundary Effect	1.00%	R	√3	1.732	1	1	0.58%	0.58%	8
Linearity	4.70%	R	√3	1.732	1	1	2.71%	2.71%	8
Detection Limits	1.00%	R	√3	1.732	1	1	0.58%	0.58%	8
Readout Electronics	0.30%	Ν	1	1	1	1	0.30%	0.30%	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Response time	0.80%	R	√3	1.732	1	1	0.46%	0.46%	$\infty$
Integration Time	2.60%	R	√3	1.732	1	1	1.50%	1.50%	~
Measurement drift (class A evaluation)	1.75%	R	√3	1.732	1	1	1.01%	1.01%	~
RF ambient condition - noise	3.00%	R	√3	1.732	1	1	1.73%	1.73%	8
RF ambient conditions - reflections	3.00%	R	√3	1.732	1	1	1.73%	1.73%	~
Probe positioner Mechanical restrictions	0.40%	R	√3	1.732	1	1	0.23%	0.23%	8
Probe Positioning with respect to phantom	2.90%	R	√3	1.732	1	1	1.67%	1.67%	8
Post-processing	1.00%	R	√3	1.732	1	1	0.58%	0.58%	~
Max SAR Eval	1.00%	R	√3	1.732	1	1	0.58%	0.58%	~
Test Sample related									
Test sample positioning	2.90%	N	1	1	1	1	2.90%	2.90%	M-1
Device Holder Uncertainty	3.60%	Ν	1	1	1	1	3.60%	3.60%	M-1
Drift of output power	5.00%	R	√3	1.732	1	1	2.89%	2.89%	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Phantom and Setup									
Phantom Uncertainty	4.00%	R	√3	1.732	1	1	2.31%	2.31%	$\infty$
Liquid permittivity (mea.)	4.07%	N	1	1	0.64	0.43	2.60%	1.75%	М
Liquid Conductivity (mea.)	4.30%	N	1	1	0.6	0.49	2.58%	2.11%	М
Combined standard uncertainty		RSS					11.99%	11.73%	
Expant uncertainty (95% confidence							23.98%	23.46%	

Measurement Uncertainty evaluation template for DUT SAR test (0.3-3G)

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# 9. Phantom Description

### Sohmus & Panner Engineering AG

е

Zeughausetmees 42, 8004 Zurich, Switzellav Phone +41 1 245 9700, Fax +41 1 245 9779 info@spasg.com.http://www.spasg.com

Certificate of Conformity / First Article Inspection

tem	SAM Twin Phentom V4.0	
Type No .	QD 000 P40 C	
Series No	TP-1150 and higher	
Manufacturer	SPEAG Zeughausstrasse 43 GH-8004 Zörich Switzerland	

#### Tests

Tess: The series production process used allows the imitation to test of first articles. Complete tests were made on the pre-series Type No. GD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. GD 000 P40 BA, Serial No. TP-1006. Certain parameters have been releated using further series items (called samples) or are tested at each item.

Test	Requirement	Details	Units tested
Dimensions	Compliant with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness of shell	Compliant with the requirements according to the standards	2mm +/- 0.2mm in flat and specific areas of head section	First article, Samples, TP-1314 ff,
Material thickness at ERP	Compliant with the requirements according to the standarda	6mm +/- 0.2mm at ERP	First article, All items
Material parameters	Dielectric parameters for required frequencies	300 MHz - 0 GHz; Relative permittivity < 5. Loss tangent < 0.05	Material samples
Material resistivity	The material has been fested to be compatible with the liquids defined in the standards if handled and cleaned according to the instructions. Observe technical Note for niaterial compatibility.	DEGMBE based simulating liquids	Pre-series, First article, Material samples
Sagging	Compliant with the requirements according to the standards. Sagging of the flat section when filled with fissue simulating liquid.	< 1% typical < 0.6% if slied with 155mm of HSL900 and without OUT below	Prototypes, Sample testing

#### Standards

CENELEC EN 50361 IEEE Std 1528-2003 IEC 62209 Part I 1234

- The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of the other documents.

#### Conformity

Based on the sample tests abovo, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standards [1] to [4]

Date 07.07.2005 Signature / Stamp		Subject of Pagenary Engineering AG Subject of Pagenary Engineering AG Strategies 43, 8094 (2016), Subject and Phone 40, 2, 345 97500 (2014) (21, 547) Into Pagenag, com, http://www.aparing.com
Doc He MIT - OD 000 PAD C		Page 111

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# **10. System Validation from Original Equipment Supplier**

		million	
condited by the Swiss Accredit In Swiss Accreditation Service utilizateral Agreement for the n	e is one of the signatorie	is to the EA	accessibilition No.: SCS 0108
ieni SGS-TW (Aude			o: D750V3-1015_Aug16
ALIBRATION C	CERTIFICATE		
Nejoci	D750V3 - SN: 10	15	
Calibration proceduro(s)	QA CAL-05.v9 Calibration proce	edure for dipole validation kits ab	ove 700 MHz
Calibration date:	August 30, 2016		
All calibrations have been condu	ched in the closed laborato	robability are given on the following pages $a$ ry factility: environment temperature ( $22 \pm 3$ )*	
N calibrations have been condu Calibration Equipment used (M&	cted in the closed laborato	ry facility: anvironment temperature (22 z 3)*	
Al calbrations have been condu Calibration Ecutoment used (M& Primary Standards	ched in the closed laborato		G and humidity < 70%.
Al calibrations have been condu Calibration Ecutoment used (M& Primary Standards Power mater NRP	ched in the closed laborato TE critical for calibration( ID A	ry facility: anvironment temperature (22 ± 3)* Cal Date (Certificate No.)	G and humidity < 70%. Schaduled Calibration
M calibrations have been condu Calibration Equipment used (M& Virmary Standards Yowar mater NRP Yowar sensor NRP-291	cted in the closed laborato TE ontice) for calibration( ID # SN: 104778	ry facility: environment temperature (22 ± 3)* Cal Date (Centilicate No.) 06-Apr-16 (No. 217-02288/02288)	G and humidity < 70%. Echaduled Calibration Apr-17
M calibrations have been condu Calibration Equipment used (M& Primary Standards Power motor NRP Power sensor NRP-791 Power sensor NRP-791	cted in the closed laborato TE critical for celebration) ID A SN: 104778 SN: 103244	ry facility: environment temperature (22 ± 3)* Cal Date (Centificate No.) 06-Apr-16 (No. 217-02288/02288) 06-Apr-16 (No. 217-02288)	G and humidity < 70%. Schaduled Calibration Apr-17 Apr-17
All calibrations have been condu Calibration Ecutoment used (M& Primary Standards Power sensor NRP Power sensor NRP-Z91 Peterence 20 cB Attonuator	cted in the closed laborato FE-critical for celibration) ID A SN: 104778 SN: 103244 SN: 103245	ry facility: environment temperature (22 ± 3)* Cal Date (Centilicate No.) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02288)	G and humidity < 70%. EchackJed Calibration Apr-17 Apr-17 Apr-17
M calibrations have been condu Calibration Eculpment used (M& Primary Standards Power sensor NRP Power sensor NRP-291 Asternoc 20 GB Attonuator Yope-N mismatch combination Reference Prote EX3094	ctad in the closed laborato TE critical for calibration) ID A SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349	ry facility: environment temperature (22 ± 3)* Cal Date (Certificate No.) 06-Apr-16 (No. 217-02288/02288) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02289) 06-Apr-16 (No. 217-02290) 06-Apr-16 (No. 217-02290) 15-Jun-16 (No. EX3-7349_aun16)	G and humidity < 70%. Schaduled Calibration Apr-17 Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Jun-17
M calibrations have been condu Calibration Eculpment used (M& Primary Standards Power sensor NRP Power sensor NRP-291 Asternoc 20 GB Attonuator Yope-N mismatch combination Reference Prote EX3094	cted in the closed laborato TE critical for calibration) ID A SN: 104778 SN: 103244 SN: 103245 SN: 5068 (20k) SN: 5047.2 / 06327	ry facility: environment temperature (22 ± 3)* Cal Date (Certificate No.) 06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02289) 06-Apr-16 (No. 217-02292) 06-Apr-16 (No. 217-02295)	G and humidity < 70%. Echactulact Calibration Apr-17 Apr-17 Apr-17 Apr-17 Apr-17 Apr-17
All calibrations have been condu Calibration Ecutoment used (M& Primary Standards Power sensor NRP-Z91 Power sensor NRP-Z91 Reterence 20 dB Attanuator Type-N mismatch combination Reterence Prote EX30V4 DAE4	ctad in the closed laborato TE critical for calibration) ID A SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349	ry facility: environment temperature (22 ± 3)* Cal Date (Certificate No.) 06-Apr-16 (No. 217-02288/02288) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02289) 06-Apr-16 (No. 217-02290) 06-Apr-16 (No. 217-02290) 15-Jun-16 (No. EX3-7349_aun16)	G and humidity < 70%. Schaduled Calibration Apr-17 Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Jun-17
All calibrations have been conduct Calibration Equatment used (M& Primary Standards Power sensor NRP-Z91 Power sensor NRP-Z91 Raterence 20 dB Attanuator Type-N mismatch combination Reterence Prote EX3094 DAE4 Secondary Standards	cted in the closed laborato TE critical for cellibration) D A SN: 104778 SN: 103244 SN: 103245 SN: 5064 (20k) SN: 5047.2 / 05327 SN: 5047.2 / 05327 SN: 7349 SN: 601	ry facility: environment temperature (22 ± 3)* Cal Date (Certificate No.) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02289) 05-Apr-16 (No. 217-02299) 06-Apr-16 (No. 217-02296) 15-Jun-16 (No. 217-02296) 15-Jun-16 (No. 217-02296) 30-Cec-15 (No. DAE4-601_Dec15)	G and humidity < 70%. ExhactLact Calibration Apr-17 Apr-17 Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Dac-16
All calibrations have been condu Calibration Ecutoment used (M& Primary Standards Power sensor NRP- Power sensor NRP-291 Retarence 20 GB Attanuator Type-N mismatch combination Reterence Prote EX3DV4 DAE4 Secondary Standards Power motor EPM5442A Power appsor HP 8481A	ctad in the closed laborato TE critical for calibration) ID A SN: 104778 SN: 103244 SN: 103244 SN: 103244 SN: 103244 SN: 103245 SN: 5058 (20x) SN: 5047.2 / 05327 SN: 7349 SN: 601 ID 4 SN: 6037460704 SN: US37292783	ry facility: environment temperature (22 ± 3)* Cal Date (Certificate No.) 06-Apr-16 (No. 217-02288/02288/) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02289) 06-Apr-16 (No. 217-02295) 15-Jun-16 (No. EX3-7349_sturif6) 30-Cec-15 (No. DAE4-601_Dec15) Check Date (in house) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02222)	G and humidity < 70%. Schaduled Calibration Apr-17 Apr-17 Apr-17 Apr-17 Apr-17 Jus-17 Dec-16 Scheduled Check In house check: Oct-16 In house check: Oct-16
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughauseinsse 43, 1004 Zurich, Switzerland



S Schweizerlicher Kalierierds C Service suisse d'étalonnage Service suisse d'étalonnage S Swiss Calieration Service

Accreditation No.: SCS 0108

According by the Bass Accreditation Service (SAS)

The Series Accorditation Service is one of the signatories to the EA Multiplierni Agreement for the recognition of calibration certificance Glossary:

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

### Calibration is Performed According to the Following Standards.

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) In the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

e) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

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#### Measurement Conditions

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

DASY Version	DASYS	V52.8.8
Extrapolation	Advanced Extrapolation	
Phanton	Modular Flat Phantom	
Distance Dipole Center - TSL.	13 mm.	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

#### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.4 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

### SAR result with Head TSL

SAR averaged over 1 cm <sup>4</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.32 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>2</sup> (10 c) of Head TSL	condition	
SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	1.36 W/kg

### **Body TSL parameters**

	Temperature	Permittivity	Conductivity
Nominel Body TSL parameters	22.0 °C	55.5	0,96 inho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.9 ± 6 %	0.99 mbio/m ± 6 %
Body TSL temperature change during test	<0.5 °C	(	-

### SAR result with Body TSL

SAR averaged over 1 cm <sup>2</sup> (1 g) of Body TSL	Condition	
SAFI measured	250 mW input power.	2;25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.77 W/kg + 17.0 % (k=2)
and itser trattictum menery and hereits status		
SAR averaged over 10 cm <sup>1</sup> (10 g) of Body TSL	condition	
	condition 250 mW input power	1,47 ₩/kg

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### Appendix (Additional assessments outside the scope of SCS 0108)

# Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.1 Q - 0.2 jQ	
Retwo Loss	-30.5 dB	

#### Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.0 0 - 2.8 j0
Return Loss	· 30.6 HB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.037 ns

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

The dipole is made of standard semingid coaxial cable. The center conductor of the leading line is directly connected to the second arm of this dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excassive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	March 22, 2010	

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#### **DASY5 Validation Report for Head TSL**

Date: 30,08.2016

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1015

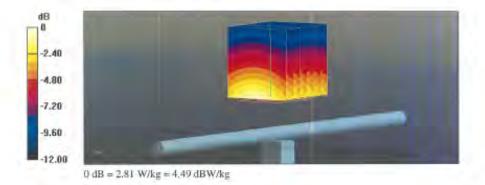
Communication System: UID 0 - CW; Frequency: 750 MHz Medium parameters used: f = 750 MHz,  $\sigma = 0.91$  S/m;  $v_c = 42.4$ ; p = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(10.07, 10.07, 10.07); Calibrated: 15.06.2016;
- · Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- · Electronics: DAE4 Sn601; Calibrated: 30.12,2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

# Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 58.26 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 3.16 W/kg SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.38 W/kg Maximum value of SAR (measured) = 2.81 W/kg



Certificate No: D750V3-1015\_Aug16

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## DASY5 Validation Report for Body TSL

Date: 30.08.2016

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1015

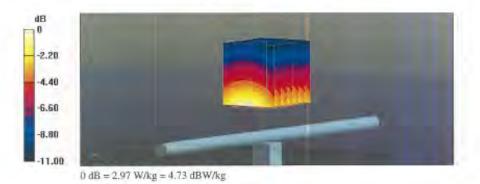
Communication System: UID 0 - CW; Frequency; 750 MHz Medium parameters used: t = 750 MHz;  $\sigma = 0.99$  S/m;  $\epsilon_c = 54.9$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(9.99, 9.99, 9.99); Calibrated: 15.06.2016;
- · Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30,12.2015
- · Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 57.47 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 3.39 W/kg SAR(1 g) = 2.25 W/kg; SAR(10 g) = 1.47 W/kg Maximum value of SAR (measured) = 2.97 W/kg



Certificate No: D750V3-1015\_Aug16

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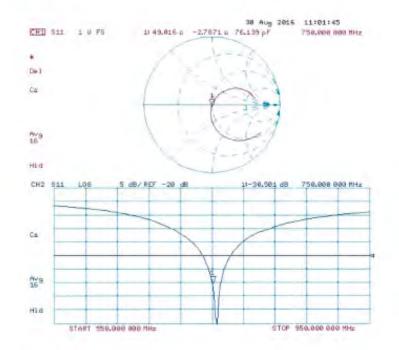
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Report No. : E5/2017/90023 Page : 218 of 274

Impedance Measurement Plot for Body TSL



Certificate No: D750V3-1015\_Aug16

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coredited by the Swiss Accredite he Swise Accreditation Bervice hultilateral Agreement for the re	is one of the signatorie	a to the EA	creditation No.: SCS 0108	
SGS-TW (Aude			e: D835V2-4d063_Aug16	
CALIBRATION C	ERTIFICATE			
Dijoci	D835V2 - SN:4d6	063		
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits ab	ove 700 MHz	
Calibolium daan	August 25, 2016			
Calibration Equipment issed (M&T	TE entroal for collibration)	ry lectility, environment temperature (22 = 3) Gal Deter (Certificatio No.)	Scheduled Calibration	
Primary Standards Power mixes NHP	ID # 5% 104778	De Apr-15 (No. 217-02288/02289)	Apr-17	
Power sensor MRP-291	SN: 103244	16-Ap/-16 (No. 217-02288)	Apr-T7	
CWRI SHISOI NRP-ZUT	SNL 103240	06-Apr-10 (No. 217-02289)	Apt-57	
Reference 20 dB Attenuator	EN: 5058 (20k)	05 Apr-16 (No. 217-02292)	Apr-17	
Fyce-N mismatch combination	SN: 5047.2706327	(15-Apr-16 (No. 217-02295)	Apr-17	
Reference Probe EX3DV4	SN: 7340	15-Jun-16 (No. EX3-7340_Jun16)	Jun-17	
DAE4	SN: 601	30-Dec-15 (No. DAE4-801_Dec15)	Det://6	
Bacondary Standards	ID #	Check Date (in house)	Beneduled Check	
Power meter EPMF-142A	SN: GB37480704	07-Dct-15 (No. 217-02222)	In house theok: Oct-15	
Power sensor HP 5481A	SN: US37292783	07-Oct-18 (No. 217-02222)	In house check: Ocl-16	
PERSONAL PROPERTY AND ADDRESS OF ADDRES	SN: MY41002317	07-Oct 16 (No. 217-02223)	Hrhouse check: Dct-16 In house check: Dct-16	
	SN: 100972	15-Jun-15 (in house check Jun-10)	ULUCIONE CHECK (TET)-ID	
RE generator F&S SMT-DE	CNF LICEPTONTERS		In industry preside Click-10	
TF generator F&S SMT-DE	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-18	
RF generator F&S 5MT-06 Network Analyzen HP 8753E	Name	Function	In house check: Oct-18 Signature	
DF generator F&S 5MT-06 Network Analyzen HP 8753E	and a second second			
Power sensor HP 3481A IF generator F&S SMT-06 Network Ansiyom HP 8753E Calibrated by: Approved by:	Name	Function		

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Celibration Laboratory of Schmid & Partner Engineering AG Zaughausstrasse 43, 8004 Zarich, Switzenami



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Accreditation No.: SCS 0108

Accession by the Swiss Accession Service (SAS)

The Swee Accreditation Service is one of the signatories to the EA Multi-anal Agreement for the moogention of calibration certification Glossary; TSL tissue simulating tiquid

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

## Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) (or hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)". February 2005
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Flate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)<sup>6</sup>, March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### Additional Documentation:

e) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

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#### Measurement Conditions

DASY system configuration.	as lar as not given on page 1.
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DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz = 1 MHz	

## Head TSL parameters

	Temperature	Parmittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.1 ± 8 %	0.93 mha/m ± 6 %
Head TSL lemperature change during tast	< 0.5 °C		

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	Wf of basilermon	9.40 W/kg = 17.0 % (k=2)
SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	1.54 W/kg

#### **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mhovm
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.7 ± 6.%	1.01 mborm = 6 %
Body TSL temperature change during test	< 0.5 °C	-	-

## SAR result with Body TSL

SAR averaged over 1 cm <sup>7</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.47 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.57 W/kg ± 17.0 % (k=2)
	the second se	
	candition	
SAR averaged over 10 cm <sup>2</sup> (10 g) of Body TSL SAR measured	candition 250 mW input power	1.81 W/kg

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## Appendix (Additional assessments outside the scope of SCS 0108)

## Antenna Parameters with Head TSL

impedance, transformed to feed point	51.2 Ω - 2.8 jΩ
Return Loss	- 30.3 dB

#### Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.3 Ω - 5,5 jΩ
Return Loss	-24.0 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.392 ns
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After long term use with 100W rediated power, only a slight warming of the dipola near the leadpoint can be measured

The dipole is made of standard seminigid coastal cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Messurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend of the subleved connections near the feedpoint may be damaged.

### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 27, 2006

Centilicate No. D635V2-4d003\_Aug16

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## **DASY5 Validation Report for Head TSL**

Date: 25.08.2016

Test Laboratory: SPEAG, Zurich, Switzerland

## DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d063

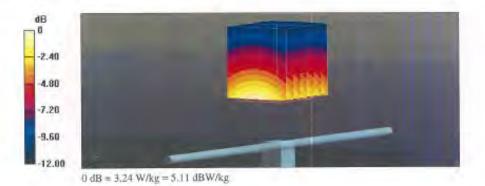
Communication System: UID 0 - CW; Frequency: 835 MHz Medium parameters used: f = 835 MHz;  $\sigma = 0.93$  S/m;  $v_e = 42.1$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

**DASY52** Configuration:

- Probe: EX3DV4 SN7349; ConvF(9.72, 9.72, 9.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1,4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

# Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 61.75 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 3.65 W/kg SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.54 W/kg Maximum value of SAR (measured) = 3.24 W/kg



Certificate No: D835V2-4d063\_Aug16

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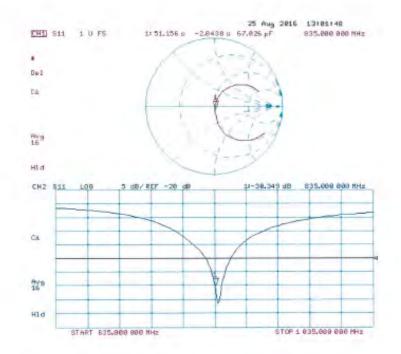
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Impedance Measurement Plot for Head TSL



Certificate No: D835V2-4d063\_Aug16

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### DASY5 Validation Report for Body TSL

Date: 25.08.2016

Test Laboratory: SPEAG, Zurich, Switzerland

## DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d063

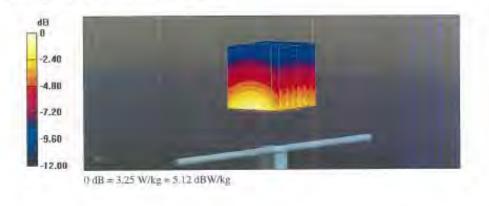
Communication System: UID 0 - CW; Frequency; 835 MHz Medium parameters used: f = 835 MHz;  $\sigma = 1.01$  S/m; c = 54.7;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63 19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(9.73, 9.73, 9.73); Calibrated: 15.06.2016;
- · Sensor-Surface. I.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Su601; Calibrated: 30.12.2015
- · Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 59.83 V/m; Power Drift = -0.00 dB Peak SAR (extrapolated) = 3.63 W/kg SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.61 W/kg Maximum value of SAR (measured) = 3.25 W/kg



Certilicate No: DB35V2-4d003\_Aug16

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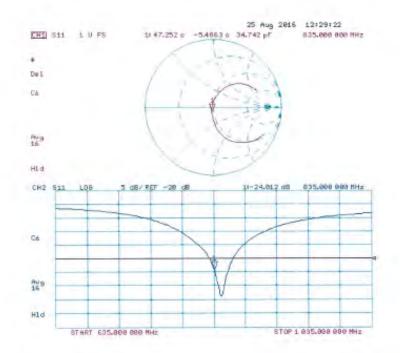
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Impedance Measurement Plot for Body TSL



Certificate No: D835V2-4d063\_Aug16

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ALIBRATION C	CERTIFICATE		
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albraiko procedure(s)	QA CAL-05 v9 Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date	August 21, 2017		
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Calibration Laboratory of Schmid & Partner Engineering AG Zeoghaussbasse 43, 8004 Zurich, Switzeland



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Accreditation No.: SCS 0108

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

#### Glossary:

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

## Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

## Additional Documentation:

DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

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#### Measurement Conditions

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

DASY Version	DASYS	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Fiel Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, d2 = 5 mm	
Frequency	835 MHz ± 1 MHz	

#### Head TSL parameters

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 minuter
Measured Head TSL parameters	(22.0±0.2) C	40.9±6%	0.93 mho/m ± 8 %
Head TSL temperature change during test	<0.5 °C		

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.40 VV/kg
SAR for nominal Head TSL parameters	monthalized to 1W	9,34 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	1.55 W/kg

# **Body TSL parameters**

 The following parameters and calculations were applied.
 Temperature
 Permittivity
 Conductivity

 Nominal Body TSL parameters
 22.0 °C
 55.2
 0.97 mho/m

 Measured Body TSL parameters
 (22.0 ± 0.2) °C
 55.3 ± 6 %
 0.98 mho/m ± 6 %

 Body TSL temperature change during test
 <0.5 °C</td>
 —
 —

#### SAR result with Body TSL

SAR averaged over 1 cm <sup>1</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.57 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>2</sup> (10 g) of Body TSL	condition	
SAR averaged over 10 cm <sup>2</sup> (10 g) of Body TSL SAR measured	condition 250 mW input power	1,68 W/kg

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# Appendix (Additional assessments outside the scope of SCS 0108)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point.	51.1 17 - 2.7 (12	
Return Loss	- 30.6 dB	

#### Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.2 Ω - 5,2 jΩ
Return Loss	- 24.4 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.367 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuided for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the cipcle arms, because they might bend or the soldered connections near the teedpoint may be damaged.

## Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 27, 2006

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# DASY5 Validation Report for Head TSL

Date: 18.08.2017

Test Laboratory: SPEAG, Zurich, Switzerland

## DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d063

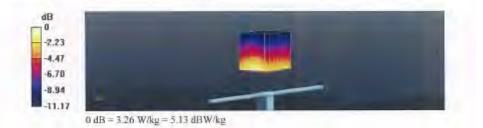
Communication System: UID 0 - CW; Frequency: 835 MHz Medium parameters used: f = 835 MHz;  $\sigma$  = 0.93 S/m;  $\epsilon_c$  = 40.9;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANS) C63,19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(10.07, 10.07, 10.07); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA: Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

## Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx-5mm, dy-5mm, dz-5mm Reference Value = 61.74 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 3.71 W/kg SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.55 W/kg Maximum value of SAR (measured) = 3.26 W/kg



Certificate No: D835V2-4d063\_Aug17

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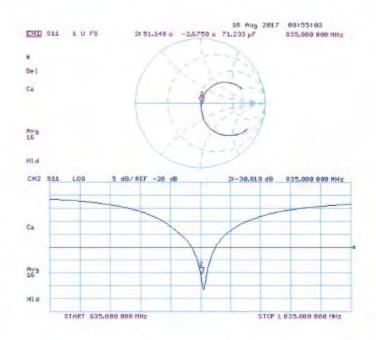
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#### Impedance Measurement Plot for Head TSL



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## DASY5 Validation Report for Body TSL

Date: 21.08.2017

Test Laboratory: SPEAG, Zurich, Switzerland

## DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d063

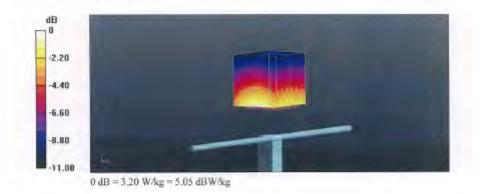
Communication System: UID 0 - CW; Frequency: 835 MHz Medium parameters used: f = 835 MHz;  $\sigma$  = 0.98 S/m;  $\epsilon_r$  = 55.3;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(10.2, 10.2, 10.2); Calibrated: 31.05.2017;
- · Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- · Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

### Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx-5mm, dy-5mm, dz-5mm Reference Value = 59.86 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 3.64 W/kg SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.58 W/kg Maximum value of SAR (measured) = 3.20 W/kg



Certificate No: D835V2-4d063\_Aug17

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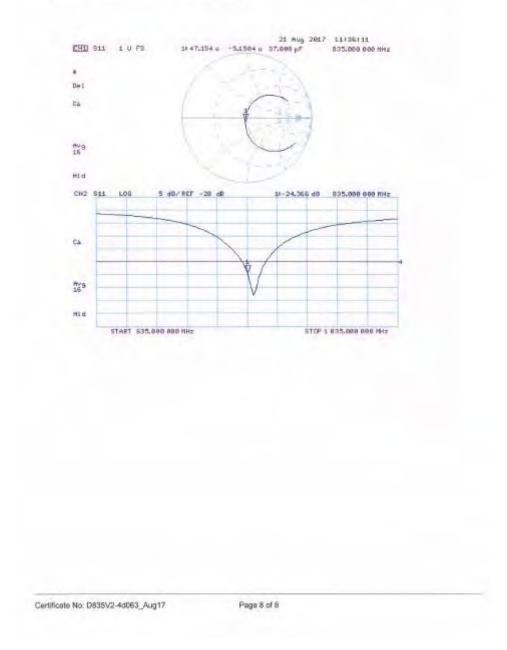
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## Impedance Measurement Plot for Body TSL



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# Report No. : E5/2017/90023 Page : 235 of 274

alibration Laboratory chmid & Partner Engineering AG eeghausstresse 43, 8004 Zurich		RAC MRA	Schweizerischer Kalibrierdienef Servizio suisse d'étalonnage Servizio svizzero di tantura Swiss Calibration Service
ccredited by the Swiss Accredital he Swiss Accreditation Service uitilateral Agreement for the re	is one of the signatories	s to the EA	creditation No.: SCS 0108
lient Audon		Cartificate No	: D835V2-4d120_Jul17
CALIBRATION C	ERTIFICATE		
Dieci	D835V2 - SN:4d1	20	
Calibuation proceedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits abo	ve 700 MHz
Calibration date:	July 03, 2017		
Calibration Equipment used (M&)			
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Api-17 (No. 217-02521/02522)	Apr-18 Apr-16
Powel sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522)	Apr 18
ower sensor NRP-Z91	SN: 103245 SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Reference 20 dB Alteruator	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-16 Apr-18
Type-N mismatch combination Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349, May17).	May-10
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18
	1000		
Secondary Standards	ID #	Check Date (in house)	Scheduled Chook
Power meter EFM-442A	SN: GB37490704	07-Ocl-15 (in house check Ocl-16)	
	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
			In house check: Oct-18
Power sensor HP 6481A	SN: MY41002317	07 Oct-15 (in house check Oct-16)	In house check: Oct-18 In house check: Uct-18
Power sensor HI <sup>D</sup> 8481Å RF generator R&S SMT-06	SN: MY41002317 SN 109972	07 Oct-15 (in house check Oct-16) 15 Jun-15 (in house check Oct-16)	In house check: Oct-18 In house check: Oct-18 In house check: Oct-18
Power sensor HI <sup>D</sup> 6481Å RF generator R&S SMT-06	SN: MY41002317	07 Oct-15 (in house check Oct-16)	In house check: Oct-18 In house check: Uct-18
Power sensor HP 8481A Power sensor III <sup>0</sup> 6481A RF-generator R&S SMT-06 Network Analyzer HP 8753E	SN: MY41002317 SN 109972	07 Oct-15 (in house check Oct-16) 15 Jun-15 (in house check Oct-16)	In house check: Oct-18 In house check: Oct-18 In house check: Oct-18
Power sensor HI <sup>D</sup> 6481Å RF-generator R&S SMT-06	SN: MY41002317 SN 100972 SN: US37390585	07 Oct-15 (in house check Oct-16) 15 Jun-15 (in house check Oct-16) 18-Oct-01 (in house check Oct-16)	In house check: Oct-18 In house check: Oct-18 In house check: Oct-18 In house check: Oct-17
Power sensor 149 6481 Å RF-generator R&S SMT-06 Network Analyzer HP 8753E	SN: MY41002317 SN 100972 SN: US37390585 Name	07 Oct-15 (in house check Oct-16) 15-Jun-15 (in house check Oct-16) 18-Oct-01 (in house check Oct-16) Function	In house check: Oct-18 In house check: Oct-18 In house check: Oct-18 In house check: Oct-17

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Certificate No: D835V2-4d120, Jul 17

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



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Accreditation No.: SCS 0106

Accruding by the Swiss Accreditation Service (SAS)

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

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

## Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless
- Communications Devices: Measurement Techniques", June 2013 b) IEC 62209-1 "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of
- 300 MHz to 6 GHz)", July 2016 c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless
- communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 8 GHz"

### Additional Documentation:

e) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

Contribution No. 13835/3-4d120\_04/17

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#### Measurement Conditions

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

DASY Version	DASYS	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

## Head TSL parameters

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) "C	41.0 = 6 %	0.93 mha/m ± 6 %
Head TSL temperature change during test	~0.5 °C	-	2000

### SAR result with Head TSL

SAR averaged over 1 cm <sup>4</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.50 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	1,58 W/kg

#### **Body TSL parameters**

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.7 ± 8 %	1,00 mbahn ± 8 %
Body TSL temperature change during test	< 0.5 °C	_	2000

#### SAR result with Body TSI

SAR averaged over 1 cm <sup>4</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.48 W/kg
SAR for nominal Body TSL parameters	noimalized to 1W	9.68 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>4</sup> (10 g) of Body TSL	condition	
	condition 250 mW input power	1.62 W/kg

Certificate No: D635V2-4d120\_Jult7

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Appendix (Additional assessments outside the scope of SCS 0108)

## Antenna Parameters with Head TSL

Impetiance, inansformed to feed point	51.212-23(0
Return Loss	-37.7 dB

## Antenna Parameters with Body TSL

mpedance, transformed to feed point	相312-4710
Rehim Lass	-25.9.08

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.397 //is
----------------------------------	------------

After long term use with 100W radiated power, only a slight warming of the opcio mar the lendpoint dart be measured.

The dipole is made of standard semingid coaxial cable. The center conductor of the leading line is directly connected in the second arm of the dipole. The antenna is therefore short-biculied for DC-signals. On some of the dipoles, small and caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" persgraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the cipole arms, because they might bend on the soldered connections near the leadpoint may be damaged.

#### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	Juna 29, 2010
start of the start	

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#### DASY5 Validation Report for Head TSL

Date: 03.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

## DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d120

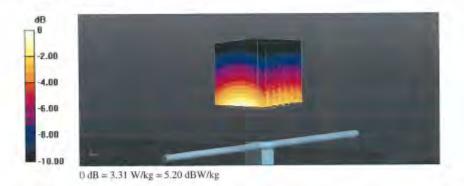
Communication System: UID 0 - CW; Frequency: 835 MHz Medium parameters used: f = 835 MHz; σ = 0.93 S/m; ε<sub>r</sub> = 41; p = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe; EX3DV4 SN7349; ConvF(10.07, 10.07, 10.07), Calibrated: 31.05.2017;
- · Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

#### Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 62.12 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 3.77 W/kg SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.58 W/kg Maximum value of SAR (measured) = 3.31 W/kg



Certificate No: D835V2-4d120\_Jul17

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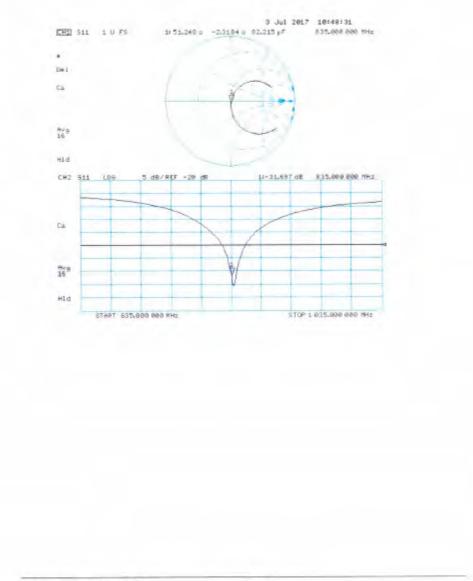
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### Impedance Measurement Plot for Head TSL



Certificate No: D835V2-4d120\_Jul17

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# **DASY5 Validation Report for Body TSL**

Date: 03.07.2017

Test Laboratory: SPEAG, Zurich, Switzerland

### DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d120

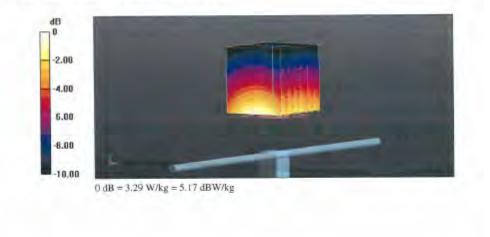
Communication System: UID 0 - CW; Frequency: 835 MHz Medium parameters used: f = 835 MHz;  $\sigma$  = 1 S/m;  $\varepsilon_r$  = 54.7;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(10.2, 10.2, 10.2); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 60.53 V/m; Power Drift = -0.08 dB. Peak SAR (extrapolated) = 3.75 W/kg SAR(1 g) = 2.48 W/kg; SAR(10 g) = 1.62 W/kg Maximum value of SAR (measured) = 3.29 W/kg



Certificate No: D835V2-4d120\_Jul17

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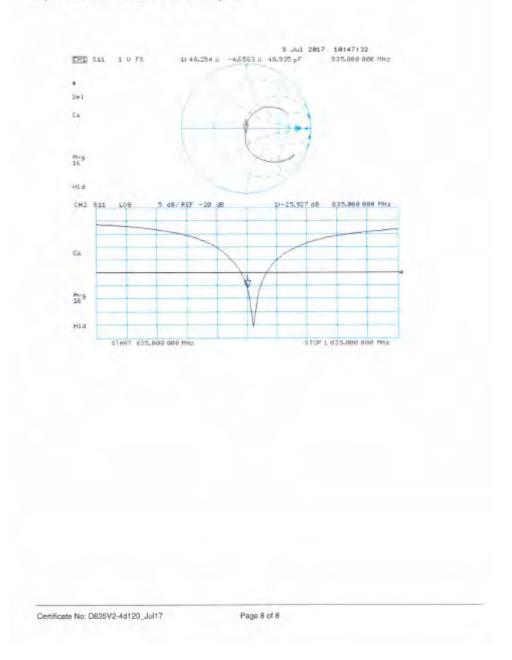
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## Impedance Measurement Plot for Body TSL



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condisc by the Swiss Accredits a Swiss Accreditation Servic utilizeral Agreement for the n	e is one of the signatoria	114	creditation No SCS 0108
annarcial signeeniens for the n	ecognition of calibration		creditation No.> aCa 0100
int SGS-TW (Aude	in)	Cartificate No	c D1750V2-1008_Aug16
ALIBRATION C	CERTIFICATE		
20ject	D1750V2 - SN:10	800	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits abc	we 700 MHz
Calibration date:	August 31, 2016		
Calibration Equipment used (M&	TE critical for calibration)	ry lacility; environment temperature (22 ± 3) (	C and humidity < 70%.
Primary Standards	ID #	Cal Data (Certificata No.)	Scheduled Catholicen
Primary Standards Power meter NAP	1D # SN: 164778	Cal Date (Certificate No.) 06-April 16 (No. 217-02288/02299)	Scheduled Calibration
Primary Standards Power meter NAP Power sensor NAP/291	1D # SN: 104778 SN: 103244	Cal Date (Certificate No.) 06-Apr-16 (No. 217-02288/02289) 06-Apr-18 (No. 217-02288)	Schoduled Calibration Apr-17 Apr-17
Primary Blandards Power meter NAP Power sensor NAP-7291 Power sensor NAP-7291	10 # SN: 164778 SN: 103244 SN: 103245	Cal Date (Certificata No.) 06-April 6 (No. 217-02288/02299) 06-April 6 (No. 217-02288) 06-April 6 (No. 217-02288)	Schodulad Calibration Apr-17 Apr-17 Apr-17
Primary Standards Power meter NAP Power sensor NAP-/291 Power sensor NAP-/291 Reference 20 dB Attenuator	1D # SN: 164778 SN: 103244 SN: 103245 SN: 5058 120k)	Cal Data (Cerrificata No.) 06-Api-16 (No. 217-02288/02289) 06-Api-16 (No. 217-02288) 06-Api-16 (No. 217-02288) 06-Api-16 (No. 217-02282)	Scheduled Calibration Apr-17 Apr-17 Apr-17 Apr-17
Primary Blandards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combinistion	10 # SN: 164778 SN: 103244 SN: 103245	Cal Date (Certificate No.) 06-Api-16 (No. 217-02288/02299) 06-Api-16 (No. 217-02288) 06-Api-16 (No. 217-02280) 05-Api-16 (No. 217-02282) 05-Api-16 (No. 217-02295)	Schodulad Calibration Apr-17 Apr-17 Apr-17
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatich combinistion Reference Pilobe EX30V4	1D # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20%) SN: 5047.2 / 06327	Cal Data (Cerrificata No.) 06-Api-16 (No. 217-02288/02289) 06-Api-16 (No. 217-02288) 06-Api-16 (No. 217-02288) 06-Api-16 (No. 217-02282)	Scheduled Galibration Apr-17 Apr-17 Apr-17 Apr-17 Apr-17
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Retence 20 dB Attenuator Type-N mismatch combinetion Reference Probe EX3DV4 DAE4	10.# SN: 164778 SN: 163244 SN: 163245 SN: 5658 (20%) SN: 5047.2 / 06327 SN: 7349	Cal Data (Certificata No.) 06-Apr-16 (No. 217-02288/02299) 06-Apr-16 (No. 217-02288) 06-Apr-16 (No. 217-02289) 06-Apr-16 (No. 217-02290) 06-Apr-16 (No. 217-02296) 15-Jun-16 (No. EX3-7349_Jun16)	Scheduled Galibration Apr-17 Apr-17 Apr-17 Apr-17 Apr-17 Jun-17
Primary Standards Power meter NRP-Z91 Power sensor NRP-Z91 Relevence 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards	ID # SN: 164778 SN: 103244 SN: 103245 SN: 5058 (20x) SN: 5057.2 / 06327 SN: 7349 SN: 601	Cal Date (Certificata No.) 06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02289) 06-Apr-16 (No. 217-02282) 06-Apr-18 (No. 217-02282) 15-Jun-16 (No. 217-02285) 15-Jun-16 (No. 217-02285) 30-Dec-15 (No. DAE4-601_Dec15)	Scheduled Calibration Apr-17 Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Jun-17 Dac-16 Scheduled Check In house check: Oct-16
Primary Blandards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Relearce 20 dB Attenuator Type-N mismatch combinetion Reference Probe EX30V4 DAE4 Secondary Standards Power meter EPN-442A	10.# SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20%) SN: 5047.2 / 06827 SN: 7349 SN: 601 ID.4 SN: 6837480704 SN: 0137292783	Cal Data (Cerificata No.) 06-Ap-16 (No. 217-02288/02289) 06-Ap-16 (No. 217-02288/ 06-Ap-16 (No. 217-02288) 06-Ap-16 (No. 217-0228) 05-Ap-16 (No. 217-02295) 15-Jun-16 (No. 217-02295) 15-Jun-16 (No. 217-02295) 05-Oct-15 (No. DAE4-601_Dec15) Check Date (in house) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02222)	Scheduled Galibration Apr-17 Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Dec-16 Scheduled Check In house check: Oct-16 In house check: Oct-16
Primary Standards Power meter NRP Power sensor NRP-Z91 Relearce 20 0B Attenuator Type-N mismatch combiniston Relearce Piobe EX30V4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A	10.8 SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047,2 / 06827 SN: 7349 SN: 601 ID 4 SN: 6837480704 SN: US37292783 SN: MY41092317	Cal Date (Certificate No.) 06-Ap-16 (No. 217-02288/02289) 06-Ap-16 (No. 217-02288) 06-Ap-16 (No. 217-02280) 05-Ap-16 (No. 217-02280) 05-Ap-16 (No. 217-02282) 05-Ap-16 (No. 217-02282) 05-Date-15 (No. DAE4-601_Dat15) Check Date (in house) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02223)	Schedulad Galibration Apr-17 Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Dec-16 Scheduled Check In house check: Oct-16 In house check: Oct-16 In house check: Oct-16
Primary Standards Power meter NAP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Prover meter EPN-442A Power sensor HP 8491A RF generator R85 SIMT-05	ID # SN: 164778 SN: 163244 SN: 103245 SN: 5658 (20k) SN: 5658 (20k) SN: 5658 (20k) SN: 7349 SN: 7349 SN: 601 ID # SN: 6637480704 SN: 6637480704 SN: 0537292783 SN: 100972	Cal Date (Certificata No.) 06-Api-16 (No. 217-02288/02289) 06-Api-16 (No. 217-02288/02289) 06-Api-16 (No. 217-02289) 06-Api-16 (No. 217-02289) 06-Api-16 (No. 217-02289) 06-Api-16 (No. 217-02289) 15-Jun-16 (No. 217-02289) 07-Oct-15 (No. 217-02280) 07-Oct-15 (No. 217-02228) 07-Oct-15 (No. 217-02228) 07-Oct-15 (No. 217-02228) 07-Oct-15 (No. 217-02228) 15-Jun-15 (in focuse check Jun-15)	Schedulad Galibration Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Jun-17 Dac-16 Scheduled Check In house check: Oct-16 In house check: Oct-16 In house check: Oct-16 In house check: Oct-16 In house check: Oct-16
Primary Standards Power meter NAP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Prover meter EPN-442A Power sensor HP 8491A RF generator R85 SIMT-05	10.8 SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047,2 / 06827 SN: 7349 SN: 601 ID 4 SN: 6837480704 SN: US37292783 SN: MY41092317	Cal Date (Certificate No.) 06-Ap-16 (No. 217-02288/02289) 06-Ap-16 (No. 217-02288) 06-Ap-16 (No. 217-02280) 05-Ap-16 (No. 217-02280) 05-Ap-16 (No. 217-02282) 05-Ap-16 (No. 217-02282) 05-Date-15 (No. DAE4-601_Dat15) Check Date (in house) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02223)	Schedulad Galibration Apr-17 Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Dac-16 Schedulad Check In house check: Oct-16 In house check: Oct-16 In house check: Oct-16
Primary Blandards Power meter NAP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combinetion Reference Probe EX30V4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 1401% Power sensor HP 1401% Power sensor HP 8451% PF generator RSS SIMT-05 Network Analyzer HP 8753E	10.# SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20%) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID 4 SN: GB37480704 SN: US37292783 SN: MY41032317 SN: 103972 SN: US37390586 Neme	Cal Date (Cerificate No.) 06-Ap-16 (No. 217-02288/02289) 06-Ap-18 (No. 217-02288/02289) 06-Ap-16 (No. 217-02288) 05-Ap-16 (No. 217-02282) 05-Ap-16 (No. 217-02282) 05-Ap-16 (No. 217-02282) 05-Dec-15 (No. DAE4-601_Dec15) Check Date (in house) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02223) 15-Jun-15 (in focuse check Jun-15) 18-Oct-01 (in house check Jun-15) 18-Oct-01 (in house check Jun-15)	Schedulad Galibration Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Dac-16 Scheduled Check In house check: Oct-16 In house check: Oct-16 In house check: Oct-16 In house check: Oct-16 In house check: Oct-16
Primary Standards Power meter NRP-Z91 Power sensor NRP-Z91 Relevence 20 dB Attenuator Type-N mismatch combination Relevence 20 dB Attenuator Type-N mismatch combination Relevence Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8401A PF generator R85 SMT-05	10.8 SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID 4 SN: 6637480704 SN: 0537292783 SN: MY41032317 SN: 103972 SN: 103972 SN: 103972	Cal Data (Cerificata No.) 06-Api-16 (No. 217-02288/02289) 06-Api-16 (No. 217-02288) 06-Api-16 (No. 217-02288) 06-Api-16 (No. 217-02280) 05-Api-16 (No. 217-02296) 15-Jun-16 (No. EX9-7349_Jun16) 30-Dec-15 (No. EX9-7349_Jun16) 30-Dec-15 (No. 217-0228) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02223) 15-Jun-15 (In focuse check Jun-15) 16-Oct-01 (In focuse check Jun-15)	Scheduled Galibration Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Dac-16 Scheduled Check In house stredi: Oct-16 In house stredi: Oct-16 In house scheck. Oct-16
Calibration Equipment used (M& Primary Blandards Power meter NHP Power sensor NHP/291 Power sensor NHP/291 Reference 20 dB Attenuator Type-N mismatch combinesion Reference Probe EX30V4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8491A Power sensor HP 8491A Power sensor HP 8491A Power sensor HP 8491A Power sensor HP 8491A RF generator RSS SIMT-05 Network Analyzar HP 8753E Calibrated by: Approved by:	10.# SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20%) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID 4 SN: GB37480704 SN: US37292783 SN: MY41032317 SN: 103972 SN: US37390586 Neme	Cal Date (Cerificate No.) 06-Ap-16 (No. 217-02288/02289) 06-Ap-18 (No. 217-02288/02289) 06-Ap-16 (No. 217-02288) 05-Ap-16 (No. 217-02282) 05-Ap-16 (No. 217-02282) 05-Ap-16 (No. 217-02282) 05-Dec-15 (No. DAE4-601_Dec15) Check Date (in house) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02222) 07-Oct-15 (No. 217-02223) 15-Jun-15 (in focuse check Jun-15) 18-Oct-01 (in house check Jun-15) 18-Oct-01 (in house check Jun-15)	Schedulad Calibration Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Dac-16 Scheduled Check In house check Od-16 In house check Od-16
Primary Standards Power meter NAP Power sensor NRP-Z91 Power sensor NRP-Z91 Relevence 20 dB Attenuator Type-N mismatch combinetion Reference Protect EX3DV4 DAE4 Secondary Standards Power meter EPN-442A Power sensor HP 8491A Power sensor HP 8491A Ref generator RSS SMT-06 Network Analyzer HP 8753E Calibrated by:	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID # SN: 66337450704 SN: 0537292783 SN: 01337290585 Name Johannes Kunkca	Cal Date (Certificata No.) 06-Ap-16 (No. 217-02288/02289) 06-Ap-16 (No. 217-02288/02289) 06-Ap-16 (No. 217-02280) 06-Ap-16 (No. 217-02280) 06-Ap-18 (No. 217-02280) 15-Jun-16 (No. 217-02280) 15-Jun-16 (No. 217-02280) 07-Oct-15 (No. 217-02282) 07-Oct-15 (No. 217-02282) 07-Oct-15 (No. 217-02282) 15-Jun-15 (In focuse check Jun-15) 16-Oct-01 (In	Schedulad Calibration Apr-17 Apr-17 Apr-17 Apr-17 Jun-17 Dac-16 Scheduled Check In house check Od-16 In house check Od-16

Certificate No: D1750V2-1008\_Aug16

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Calibration Laboratory of Schmid & Partner Engineering AG Jeuchaustrass 43, 8004 Zurich, Seitzerland



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Accreditation No.: SCS 0108

Accredited by the Swise Accredition Service (SAS)

The Swiss Accreditation Service is one of the signaturies to the EA MultiInteral Agreement for the recognition of calibration certificates Glosspary:

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

# Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30) MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

e) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

Geridicate No: D1750V2-1006, Aug 18

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台灣檢驗科技股份有限公司 t (886-2) 2299-3279

f (886-2) 2298-0488



#### Measurement Conditions

DASY system conliguration, as far as not given an per		DASV	system	cordigu	alion.	88	nr as	nct	given	an.	per
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DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Specer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

#### Head TSL parameters

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °G	40:3 ± 6 %	1.37 mha/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	-	1

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.2 W/kg = 17.0 % (k=2)
SAR everaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR everaged over 10 cm <sup>5</sup> (10 g) of Head TSL SAR measured	250 mW input power	4.90 W/kg

# Body TSL parameters

The following parameters and calculations ware applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53,4	1,d9 mha/m
Maasured Body TSL parameters	(22.0 ± 0.2) °C	50.1±6 %	1.49 mho/m ± 6.%
Body TSL temperature change during test	<0.5 °C	-	

## SAR result with Body TSL

SAR averaged over 1 cm <sup>2</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.34 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.3 W/kg + 17.0 % (k=2)
and the second distance in the second distance in the second distance is a		
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL SAR measured	condition 250 mW input power	4.36 W/kg

Certificate No: D1750V2-1008\_Aug18

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## Appendix (Additional assessments outside the scope of SCS 0108)

#### Antenna Parameters with Head TSL

Impedance, transformed to load point	51.0 Ω - 0.2 jΩ
Return Loss	- 40.1 dB

### Antenna Parameters with Body TSL

Impedance, transformed to feed point	-46.7 Ω - 0.5 jΩ
Return Loss	- 29,3 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.221 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circulied for DC-signals. On some of the dipoles, small end cape are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections hear the feedpoint may be damaged.

## Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 27, 2003

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### DASY5 Validation Report for Head TSL

Date: 24.08.2016

Test Laboratory: SPEAG, Zurich, Switzerland

### DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1008

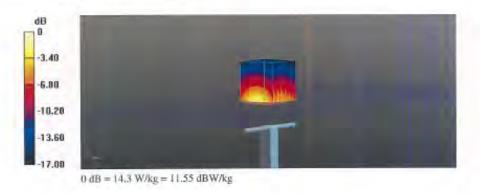
Communication System: UID 0 – CW; Frequency: 1750 MHz Medium parameters used: f = 1750 MHz;  $\pi = 1.37$  S/m;  $\epsilon_r = 40.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard; DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(8.46, 8.46, 8.46); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52,8.8(1258); SEMCAD X 14.6.10(7372)

# Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 105.8 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 17.2 W/kg SAR(1 g) = 9.28 W/kg; SAR(10 g) = 4.9 W/kg Maximum value of SAR (measured) = 14.3 W/kg



Certificate No: D1750V2-1008\_Aug16

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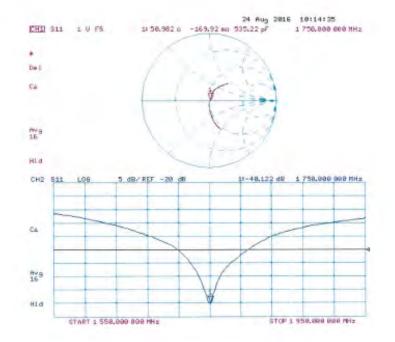
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# Impedance Measurement Plot for Head TSL



Certificate No: D1750V2-1008\_Aug16

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## **DASY5 Validation Report for Body TSL**

Date: 31.08 2016

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1008

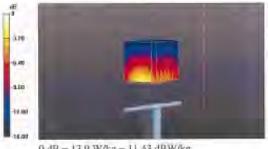
Communication System: UID 0 - CW: Frequency: 1750 MHz Medium parameters used: f = 1750 MHz; o = 1.49 S/m; e = 53.1; p = 1000 kg/m3 Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(8.25, 8.25, 8.25); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back), Type: QD000P50AA, Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 100.8 V/m; Power Drift = -0.02 dB Peak SAR (extrapolated) = 16.4 W/kg SAR(1 g) = 9.34 W/kg; SAR(10 g) = 4.98 W/kg Maximum value of SAR (measured) = 13.9 W/kg



0 dB = 13.9 W/kg = 11.43 dBW/kg

Certificate No: D1750V2-1008\_Aug16

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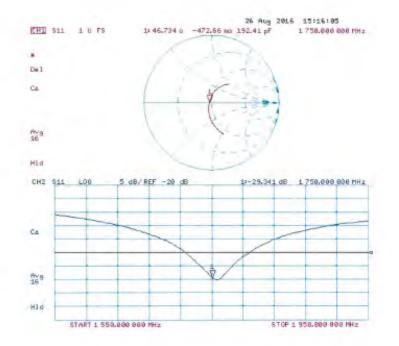
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## Impedance Measurement Plot for Body TSL



Certificate No: D1750V2-1008\_Aug16

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Calibration Laborate Schmid & Partner Engineering AG eugheusstrasse 43, 8004 Zui	Nac-MBA	S Schweizerischer Kallbrierdienst C Service suisse d'étalonnage Servizie svizzero di taratura S wiss Calibration Service
	fitation Service (SAS) rice is one of the signatories to the EA a recognition of calibration certificates	Accreditation No.: SCS 0108
Client SGS-TW (Auden)		Certificate No: D1900V2-5d173_May17
CALIBRATION	CERTIFICATE	
Object	D1900V2 - SN:5d173	
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipo	le validation kits above 700 MHz

Calibration date:

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)

May 31, 2017

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NEP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7460	19-May-17 (No. EX3-7460_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18
Secondary Standards	10#	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	in house check: Oct-17
	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	que
Approved by	Katja Pokovic	Technical Manager	10-

Certificate No: D1900V2-5d173\_May17

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# Report No. : E5/2017/90023 Page : 252 of 274

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



Schweizerischer Kallbrierdienst Service suisse d'étalonnage Servizio svizzero di tarature Swiss Callbration Service

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Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS) The Swiss Accreditation Service is one of the signatories to the EA

## Multilateral Agreement for the recognition of calibration certificates Glossary:

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

## Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

e) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

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## **Measurement Conditions**

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

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

# Head TSL parameters

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.3±6%	1.40 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		1

## SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.7 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	5.26 W/kg

## Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 "C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) "C	54.2 ± 6 %	1.51 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

## SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.98 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	40.2 W/kg ± 17.0 % (k=2)
	the second se	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
	condition 250 mW input power	5.30 W/kg

Certificate No: D1900V2-5d173\_May17

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## Appendix (Additional assessments outside the scope of SCS 0108)

## Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.3 Ω + 4.9 ]Ω	
Return Loss	- 26.1 dB	

#### Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.5 Ω + 6.0 βΩ
Return Loss	- 23.5 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 ns
----------------------------------	----------

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

The dipole is made of standard seminigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

## Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	June 08, 2012	

Certificate No: D1900V2-5d173\_May17

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## **DASY5 Validation Report for Head TSL**

Date: 31.05.2017

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d173

Communication System: UID 0 - CW; Frequency: 1900 MHz Medium parameters used: f = 1900 MHz;  $\sigma$  = 1.4 S/m;  $\varepsilon_r$  = 41.3;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard; DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7460; ConvF(7.98, 7.98, 7.98); Calibrated: 19.05.2017;
- · Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 107.7 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 18.9 W/kg SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.26 W/kg Maximum value of SAR (measured) = 15.3 W/kg



Certificate No: D1900V2-5d173\_May17

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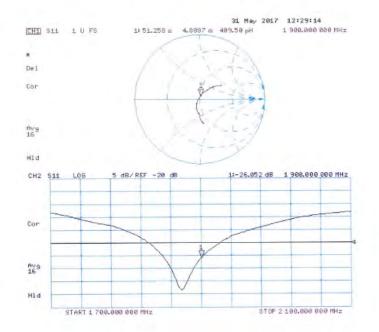
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## Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-5d173\_May17

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## DASY5 Validation Report for Body TSL

Date: 31.05.2017

Test Laboratory: SPEAG, Zurich, Switzerland

## DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d173

 $\begin{array}{l} \mbox{Communication System: UID 0-CW; Frequency: 1900 MHz} \\ \mbox{Medium parameters used: } f = 1900 MHz; \ \sigma = 1.51 \ S/m; \ \epsilon_r = 54.2; \ \rho = 1000 \ kg/m^3 \\ \mbox{Phantom section: Flat Section} \\ \mbox{Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)} \\ \end{array}$ 

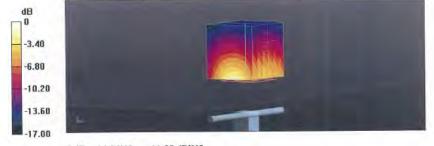
DASY52 Configuration:

- Probe: EX3DV4 SN7460; ConvF(7.82, 7.82, 7.82); Calibrated: 19.05.2017;
- · Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 102.9 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 17.5 W/kg SAR(1 g) = 9.98 W/kg; SAR(10 g) = 5.3 W/kg

Maximum value of SAR (measured) = 14.3 W/kg



0 dB = 14.3 W/kg = 11.55 dBW/kg

Certificate No: D1900V2-5d173\_May17

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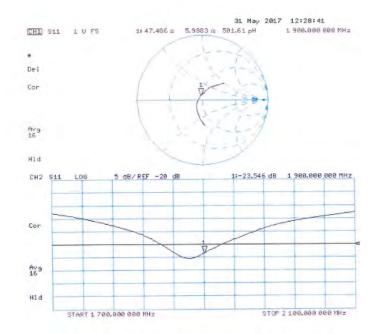
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## Impedance Measurement Plot for Body TSL



Certificate No: D1900V2-5d173\_May17

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ccredited by the Swiss Accreditat he Swiss Accreditation Service lutilateral Agreement for the re	is one of the signatorie	s to the EA	coreditation No.: SCS 0108
lient SGS -TW (Aude			a: D2450V2-727_Apr17
CALIBRATION C	ERTIFICATE		
Dbject	D2450V2 - SN: 7	27	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	April 21, 2017		
		ry facility: environment temperature (22 $\pm$ 3)"	C and humidity < 70%.
Calibration Equipment used (M&)		ry facility: environment temperature (22 ± 3)" Cal Date (Certificate No.)	C and humidity < 70%. Scheduled Calibration
alibration Equipment used (M&T Primary Standards	TE critical for calibration)		
alibration Equipment used (M&) himury Standards hower motor NBP	TE critical for calibration)	Cal Date (Certificate No.)	Scheduled Calibration
alibration Equipment used (M&) trimury Standards 'ower motor NRP 'ower sensor NRP-291	TE critical for calibration)	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522)	Scheduled Calibration
alibration Equipment used (M&T himiury Standards Yowar motor NRP Yowar sensor NRP-Z91 Yowar sensor NRP-Z91	IE critical for calibration ID # SN: 104778 SN: 105244	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02522)	Scheduled Calibration Apr-18 Apr-18
Calibration Equipment used (M&T Primary Standards Power motor NRP Power sensor NRP-291 Power seinsor NRP-291 Feference 20 dia Attenuator Type -N mismatch combination	E critical for calibration ID # SN: 104778 SN: 103244 SN: 103245 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-18 Apr-16
Calibration Equipment used (M&) Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Altenuator Yope-N mismatch combination Reference Probe EX3DV4	E critical for calibration ID # SN: 104778 SN: 108244 SN: 103245 SN: 5058 (20k) SN: 5057 2 / 06327 SN: 7349	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 31-Dec-16 (No. EX3-7349_Dec16)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-18 Apr-16 Dec-17
Calibration Equipment used (M&) himary Standards fowor motor NRP lower sensor NRP-291 lower sensor NRP-291 teterence 20 dB Altenuator ype N mismatch combination teterence Probe EX3DV4	E critical for calibration ID # SN: 104778 SN: 103244 SN: 103245 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-18 Apr-16
talibration Equipment used (M&T trimury Standards fower meter NBP tower sensor NRP-291 tower sensor NRP-291 teterence 20 dB Attenuetor ype-N mismatch combination teterence Probe EX3DV4 iAkE4	ID # SN: 104778 SN: 103244 SN: 103245 SN: 103245 SN: 5047.2 / 06327 SN: 5047.2 / 06327 SN: 5047.2 / 06327 SN: 601	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 31-Dec-16 (No. EX3-7349_Dec16) 28-Mar-17 (No. DAE4-601_Mar17)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-18 Apr-16 Dec-17 Mar-18
Calibration Equipment used (M&T himary Standards hower motor NEP hower sensor NEP-291 hower sensor NEP-291 leference 20 dB Attenuator ype-N mismatch combination telerence Probe EX3DV4 bAE4 Becondary Standards	E critical for calibration ID # SN: 104778 SN: 103244 SN: 103244 SN: 103245 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 5047.2 / 06327 SN: 7349 SN: 601 ID #	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 31-Dec-16 (No. EX3-7349_Dec16) 28-Mar-17 (No. DAE4-601_Mar17) Check Date (in house)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-18 Apr-16 Dec-17 Mar-18 Scheduled Check
Calibration Equipment used (M&) Primary Standards Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Altenuator Vype-N mismath combination Reference Probe EX3DV4 JAE4 Secondary Standards Power miller EPM-442A	ID # SN: 104778 SN: 103244 SN: 103245 SN: 103245 SN: 5047.2 / 06327 SN: 5047.2 / 06327 SN: 5047.2 / 06327 SN: 601	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 31-Dec-16 (No. EX3-7349_Dec16) 28-Mar-17 (No. DAE4-601_Mar17)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-18 Apr-16 Dec-17 Mar-18
Calibration Equipment used (M&) Primary Standards Power meter NBP Power sensor NRP-291 Power sensor NRP-291 Power sensor NRP-291 Reterence 20 dB Attenuator Type-N mismatch combination Reterence Probe EX3DV4 DAE4 Power meter EPM-442A Power sensor HP 8481A	E critical for calibration ID # SN: 104778 SN: 108244 SN: 108245 SN: 5058 (20k) SN: 5054 (2 / 06327 SN: 5047 2 / 06327 SN: 7349 SN: 601 ID # SN: GB37480704	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 31-Dec-16 (No. EX3-7349_Dec16) 28-Mar-17 (No. DAE4-601_Mar17) Check Date (in house) 07-Oct-15 (in house check Oct-16)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-16 Dec-17 Mar-18 Scheduled Check In house check: Oct-16
Calibration Equipment used (M&T himiury Standards Nover motor NEP Nover sensor NEP-291 Nover sensor NEP-291 Teleference 20 dB Attenuetor ype-N mismatch combination teleference Probe EX3DV4 DAE4 Secondary Standards Nover meter EPM-442A Nover sensor HP 8481A Prover sensor HP 8481A	E critical for calibration) ID # SN: 105244 SN: 105244 SN: 105245 SN: 5058 (20k) SN: 5047 2 / 06327 SN: 5047 2 / 06327 SN: 601 ID # SN: GB37480704 SN: US37292783	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 01-Apr-16 (No. EX3-7349_Dec16) 28-Mar-17 (No. DAE4-601_Mar17) Check Date (in house) 07-Oct-15 (in house check Oct-16) 07-Oct-15 (in house check Oct-16)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-16 Dec-17 Mar-18 Scheduled Check In house check: Oct-18 In house check: Oct-18
Calibration Equipment used (M&T Primary Standards Power reensor NRP-291 Power sensor NRP-291 Teleference 20 dB Attenuator Type N mismatch combination Teleference Probe EX3DV4 DAE4 Becondary Standards Power meter EPM-442A Power meter EPM-442A Power sensor HP 84811A Power sensor HP 84811A Figenerator R&S SMT-06	E onticel for calibration ID # SN: 104778 SN: 103244 SN: 103245 SN: 103245 SN: 103245 SN: 103245 SN: 103245 SN: 10345 SN: 5047 2 / 06327 SN: 7349 SN: 601 ID # SN: GB37480704 SN: GB37480704 SN: GB37480704 SN: MY41092317	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02521) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 31-Dec-16 (No. EX3-7349_Dec16) 28-Mar-17 (No. DAE4-601_Mar17) Check Date (in house check Dct-16) 07-0cl-15 (in house check Dct-16) 07-0cl-15 (in house check Dct-16)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-18 Apr-16 Dec-17 Mar-18 Scheduled Check In house check: Oct-18 In house check: Oct-18 In house check: Oct-18
Calibration Equipment used (M&T Primary Standards Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8461A Power sensor HP 8461A HF generator R&S SMT-06	E optical for calibration ID # SN: 103244 SN: 103245 SN: 5047.2 / 06327 SN: 037292783 SN: 100972	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 31-Dec-16 (No. EX3-7349_Dec16) 28-Mar-17 (No. DAE4-601_Mar17) Check Date (in house (heck Oct-16) 07-Oct-15 (in house check Oct-16) 07-Oct-16 (in house check Oct-16) 15-Jun-15 (in house check Oct-16)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-16 Dec-17 Mar-18 Scheduled Check In house check: Oct-18 In house check: Oct-18 In house check: Oct-18 In house check: Oct-18
All calibrations have been conduct Calibration Equipment used (M&D Primary Standards Power motor NBP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8481A Power sensor HP 8481A Power sensor HP 8481A Power sensor HP 8481A PF generator R&S SMT-06 Network Analyzer HP 87531E	EE optical for calibration) ID # SN: 105244 SN: 105244 SN: 105245 SN: 5058 (20k) SN: 5058 (20k) SN: 5057 2 / 06327 SN: 7349 SN: 601 ID # SN: GB37480704 SN: US37292783 SN: MV41092317 SN: 100972 SN: 10537390585	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 31-Dec-16 (No. EX3-7349_Dec16) 28-Mar-17 (No. DAE4-601_Mar17) Check Date (in house check Dct-16) 07-Oct-15 (in house check Dct-16) 07-Oct-15 (in house check Dct-16) 07-Oct-16 (in house check Dct-16) 15-Jun-15 (in house check Dct-16) 16-Oct-01 (in house check Dct-16)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-16 Dec-17 Mar-18 Scheduled Check In house check: Oct-18 In house check: Oct-18
Calibration Equipment used (M&T Primary Standards Power motor NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Type-N mismatch combination Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power sensor HP 8481A Power sensor HP 8481A RF generator R&S SMT-06 Natwork Analyzer HP 8753E	E onticel for calibration ID # SN: 104778 SN: 103244 SN: 103244 SN: 103245 SN: 508 (20k) SN: 508 (20k) SN: 5047 2 / 06327 SN: 7349 SN: 6047 2 / 06327 SN: 7349 SN: 6047 2 / 06327 SN: 6047 2 / 0648 SN: 6047	Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02528) 31-Dec-16 (No. EX3-7349_Dec16) 28-Mar-17 (No. DAE4-601_Mar17) Check Date (in house check Oct-16) 07-Oct-15 (in house check Oct-16) 07-Oct-15 (in house check Oct-16) 15-Jun-15 (in house check Oct-16) 16-Oct-01 (in house check Oct-16) 16-Oct-01 (in house check Oct-16) 16-Oct-01 (in house check Oct-16)	Scheduled Calibration Apr-18 Apr-18 Apr-18 Apr-16 Dec-17 Mar-18 Scheduled Check In house check: Oct-18 In house check: Oct-18

Certificate No: D2450V2-727\_Apr17

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Accreditation No.: SCS 0108

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

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

## Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)\*, March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

## Additional Documentation:

e) DASY4/5 System Handbook

## Methods Applied and Interpretation of Parameters:

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

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

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## Measurement Conditions

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

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

## Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mhc/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.7 ± 6 %	1.87 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.2 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	6.18 W/kg

## Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.5 ± 6 %	2.03 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

# SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.9 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	50.6 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL SAR measured	condition 250 mW input power	6.01 W/kg

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# Appendix (Additional assessments outside the scope of SCS 0108)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	56.3 Ω + 2.1 jΩ
Return Loss	- 24.0 dB

## Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.1 Ω + 4.1 jΩ
Return Loss	- 27.5 dB

## General Antenna Parameters and Design

Electrical Delay (one direction)	1.148 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 09, 2003

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## **DASY5 Validation Report for Head TSL**

Date: 21.04.2017

Test Laboratory: SPEAG, Zurich, Switzerland

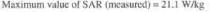
## DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 727

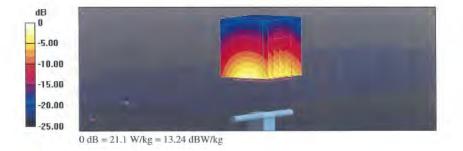
Communication System: UID 0 - CW; Frequency: 2450 MHz Medium parameters used: f = 2450 MHz;  $\sigma$  = 1.87 S/m;  $\epsilon_r$  = 37.7;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.72, 7.72, 7.72); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017 .
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1442); SEMCAD X 14.6.10(7413)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 109.8 V/m; Power Drift = -0.06 dB Peak SAR (extrapolated) = 27.3 W/kg SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.18 W/kg Maximum value of SAR (measured) = 21.1 W/kg





Certificate No: D2450V2-727\_Apr17

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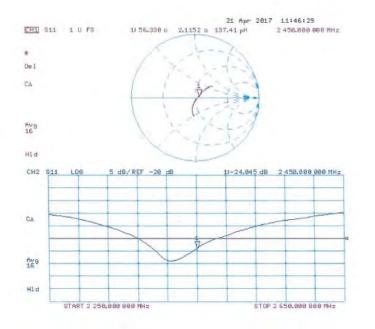
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## Impedance Measurement Plot for Head TSL



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## **DASY5 Validation Report for Body TSL**

Date: 21.04.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 727

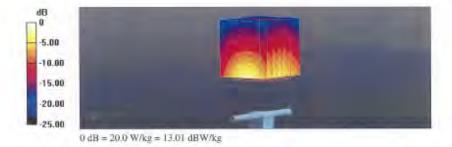
Communication System: UID 0 - CW; Frequency: 2450 MHz Medium parameters used: l = 2450 MHz;  $\sigma = 2.03$  S/m;  $\epsilon_l = 52.5$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63, 19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.79, 7.79, 7.79); Calibrated: 31.12,2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection) .
- · Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1442); SEMCAD X 14.6.10(7413)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 105.0 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 25.4 W/kg SAR(1 g) = 12.9 W/kg; SAR(10 g) = 6.01 W/kg Maximum value of SAR (measured) = 20.0 W/kg





Certificate No: D2450V2-727\_Apr17

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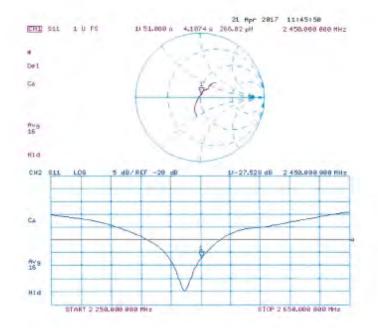
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## Impedance Measurement Plot for Body TSL



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CALIBRATION C	ERTIFICATE		
Dbject	D2600V2 - SN:10	005	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	January 25, 2017	7	
	rtainties with confidence o	robability are given on the following pages ar	to are part of the centificate.
All calibrations have been conduct	cted in the closed laborato	ry facility: environment temperature (22 $\pm$ 3)°	C and humidily < 70%.
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All calibrations have been conduct Calibration Equipment used (M&T Power meter NRP Power sensor NRP-291 Power sensor NRP-291 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A	Ited in the closed laborato           TE critical for calibration)           ID #           SN: 104778           SN: 103244           SN: 103245           SN: 103245           SN: 5058 (20%)           SN: 7349           SN: 601           ID #           SN: GB37480704	cy facility: environment temperature (22 ± 3)* Cal Date (Certificate No.) 06-Apr-16 (No. 217-02288/02289) 06-Apr-16 (No. 217-02289) 06-Apr-16 (No. 217-02289) 06-Apr-16 (No. 217-02292) 05-Apr-16 (No. 217-02295) 31-Dec-16 (No. 217-02295) 31-Dec-16 (No. EX3-7349_Dec16) 04-Jan-17 (No. DAE4-601_Jan17) Check Date (in house) 07-Oct-15 (in house check Oct-16)	C and humidity < 70%. Scheduled Calibration Apr-17 Apr-17 Apr-17 Apr-17 Dec-17 Jan-18 Scheduled Check In house check: Oct-18
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzenand



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## Glossary:

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

## Calibration is Performed According to the Following Standards:

- EEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664. "SAR Measurement Requirements for 100 MHz to 6 GHz"

## Additional Documentation:

a) DASY4/5 System Handbook

## Methods Applied and Interpretation of Parameters:

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

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

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#### Measurement Conditions

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

DASY Version	DASYS	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

## Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.95 mino/m
Measured Head TSL parameters	(22,0 ± 0,2) °C	37.4 ± 6 %	2.05 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

## SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	55.5 W/kg = 17.0 % (k=2)
SAR averaged over 10 cm <sup>8</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>8</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	6.32 W/kg

# Body TSL parameters

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.8 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.3 ± 6 %	2.20 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °G	(1000)	

## SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.9 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	55.1 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>2</sup> (10 g) of Body TSL	condition	
SAR averaged over 10 cm <sup>S</sup> (10 g) of Body TSL SAR measured	condition 250 mW input power	6.20 W/kg

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## Appendix (Additional assessments outside the scope of SCS 0108)

## Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.3 Ω - 4.7 JΩ	
Return Loss	- 26.5 dB	

#### Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.7 0 - 3.2 j0
Return Loss	-23.7 dB

## General Antenna Parameters and Design

I	
Electrical Delay (one direction)	1.154 ns

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

The dipole is made of standard semitigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small and caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not effected by this change. The overall dipole length is atili according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the teadpoint may be damaged.

#### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 23, 2006

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## **DASY5 Validation Report for Head TSL**

Date: 25.01.2017

Test Laboratory: SPEAG, Znrich. Switzerland

## DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1005

Communication System: UID 0 - CW; Frequency: 2600 MHz Medium parameters used: f = 2600 MHz;  $\sigma$  = 2.05 S/m;  $\epsilon_e$  = 37,4; p = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63,19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.56, 7.56, 7.56); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

## Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 116.2 V/m; Power Drift = -0.07 dB Peak SAR (extrapolated) = 30.5 W/kg SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.32 W/kg Maximum value of SAR (measured) = 24.2 W/kg



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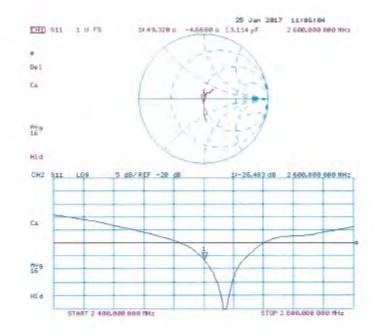
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## Impedance Measurement Plot for Head TSL



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## DASY5 Validation Report for Body TSL

Date: 18.01.2017

Test Laboratory: SPEAG, Zurich, Switzerland

## DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1005

Communication System: LID 0 - CW; Frequency: 2600 MHz Medium parameters used: f = 2600 MHz;  $\sigma = 2.2 \text{ S/m}$ ;  $z_c = 52.3$ ;  $p = 1000 \text{ kg/m}^3$ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.48, 7.48, 7.48); Calibrated: 31.12.2016;
- · Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- · Electronics: DAE4 Sn601; Calibrated: 04.01.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 108.8 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 28.8 W/kg SAR(1 g) = 13.9 W/kg; SAR(10 g) = 6.2 W/kg Maximum value of SAR (measured) = 23.3 W/kg



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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製

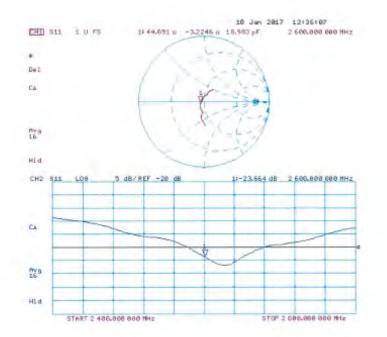
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## Impedance Measurement Plot for Body TSL



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# - End of 1<sup>st</sup> part of report -

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