

# SAR TEST REPORT

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

Equipment Under Test	PDA Phone
Brand Name	Sony
Type No.	PM-0731-BV
Company Name	Sony Mobile Communications AB
Company Address	Nya Vattentornet 22188 Lund/Sweden
Standards	OET 65 supplement C, IEEE /ANSI C95.1 , C95.3, IEEE 1528
FCC ID	PY7PM-0731
FCC KDB inquiry tracking	955034
Date of Receipt	Jan. 21 , 2014
Date of Test(s)	Jan. 30, 2014 ~ Feb. 22, 2014
Date of Issue	Apr. 18, 2014

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

This report details the results of the testing carried out on three samples, 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.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Taiwan Electronic & Communication Laboratory or testing done by SGS Taiwan Electronic & Communication Laboratory in connection with distribution or use of the product described in this report must be approved by SGS Taiwan Electronic & Communication Laboratory in writing.

### Signed on behalf of SGS

Engineer

ason Wu

Mason Wu Date: Apr. 18, 2014 Asst. Manager

<u>Kelly Tsai</u> Date: Apr. 18, 2014

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# Version

Report Number	Revision	Description	Issue Date
ES/2014/10005	00	Initial Version	Apr. 18, 2014

This test report contains a reference to the previous version test report that it replaces.

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### **1. General Information**

### 1.1 Testing Laboratory

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Internet	http://www.tw.sgs.com/		

### **1.2 Details of Applicant**

Company Name	Sony Mobile Communications AB
Company Address	Nya Vattentornet 22188 Lund/Sweden

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#### **1.3 Description of EUT**

EUT Name         PDA Phone           Brand Name         Sony           Type No.         PM-0731-BV           HW Version         A           SW Version         18.1.A.0.9           2G/3G: YT910MAPFF           Serial No.         LTE: YT910MAPHZ           WLAN: YT910MAPJO           2G/3G: 00440245-203638-1           IMEI Code         LTE: 00440245-203680-3           WLAN: 00440245-203677-9           FCC ID         PY7PM-0731           Mode of         Operation           QSM         QGPRS           HSUPA         LTE FDD           Multislot class:33 Max 4 Uplink         1/2 (1Dn4UP)           Multislot class:33 Max 4 Uplink         1/2.76 (1Dn3UP)           Duty Cycle         EDGE (Multislot class:33 Max 4 Uplink Slots)         1/2.76 (1Dn3UP)           WCDMA         1	vescription of	LUI			
Type No.         PM-0731-BV           HW Version         A           SW Version         18.1.A.0.9           2G/3G: YT910MAPFF           Serial No.         LTE: YT910MAPHZ           WLAN: YT910MAPJO           2G/3G: 00440245-203638-1           IMEI Code         LTE: 00440245-203680-3           WLAN: 00440245-203677-9           FCC ID         PY7PM-0731           Mode of         QGSM           Operation         QGSM           Bluetooth         1/8.3           GPRS         1/2 (1Dn4UP)           Multislot class:33 Max 4 Uplink         1/2.76 (1Dn3UP)           J1/2.76 (1Dn3UP)         1/2.76 (1Dn3UP)           1/2.76 (1Dn3UP)         1/2.76 (1Dn3UP)           1/4.1 (1Dn2UP)         1/2.76 (1Dn3UP)           1/8.3 (1Dn1UP)         1/8.3 (1Dn1UP)	EUT Name	PDA Phone			
Jim         HW Version         A           SW Version         18.1.A.0.9         2G/3G: YT910MAPFF           Serial No.         LTE: YT910MAPHZ         2G/3G: 00440245-203638-1           IMEI Code         2G/3G: 00440245-203680-3         2G/3G: 00440245-203677-9           FCC ID         PY7PM-0731         Mode of Operation         QGSM         QGPRS         EDGE         WCDMA         MHSDPA           Mode of Operation         QGSM         QGPRS         Interform (20M/40M)         MHSUPA         Interform (20M/40M)         MHSUPA         Interform (20M/40M)         Inter	Brand Name	Sony			
SW Version       18.1.A.0.9         2G/3G: YT910MAPFF         Serial No.       LTE: YT910MAPHZ         WLAN: YT910MAPJ0         2G/3G: 00440245-203638-1         IMEI Code       LTE: 00440245-203680-3         WLAN: 00440245-203677-9         FCC ID       PY7PM-0731         Mode of       Operation         QBUEtooth       Multislot class:33 Max 4 Uplink         GPRS       1/2 (1Dn4UP)         (Multislot class:33 Max 4 Uplink       1/2 (1Dn4UP)         J1/2 (1Dn4UP)       1/2.76 (1Dn3UP)         J1/3 (1Dn1UP)       1/3.3 (1Dn1UP)	Type No.	PM-0731-BV			
Serial No.         2G/3G: YT910MAPFF           Serial No.         LTE: YT910MAPHZ           WLAN: YT910MAPJO         2G/3G: 00440245-203638-1           IMEI Code         LTE: 00440245-203680-3           WLAN: 00440245-203677-9         WLAN: 00440245-203677-9           FCC ID         PY7PM-0731           Mode of Operation         GSM         GPRS           Molt of Operation         GSM         GPRS           Multislot class:33 Max 4 Uplink         1/2 (1Dn4UP)           Multislot class:33 Max 4 Uplink         1/2 (1Dn4UP)           Mode Slots)         1/2 (1Dn4UP)           Multislot class:33 Max 4 Uplink         1/2 (1Dn4UP)           Mode Slots)         1/2 (1Dn4UP)           Multislot class:33 Max 4 Uplink         1/2.76 (1Dn3UP)           Multislot class:33 Max 4 Uplink         1/4.1 (1Dn2UP)           Multislot class:33 Max 4 Uplink         1/4.3 (1Dn1UP)	HW Version	A			
Serial No.         LTE: YT910MAPHZ WLAN: YT910MAPJ0           2G/3G: 00440245-203638-1         2G/3G: 00440245-203680-3 WLAN: 00440245-203677-9           FCC ID         PY7PM-0731           Mode of Operation         SGSM         GPRS           Mode of Operation         GSM         GPRS           Multislot class:33 Max 4 Uplink Slots)         1/2 (1Dn4UP)           1/2.76 (1Dn3UP)         1/8.3 (1Dn1UP)           Duty Cycle         EDGE (Multislot class:33 Max 4 Uplink Slots)         1/2.76 (1Dn3UP)	SW Version	18.1.A.0.9			
WLAN: YT910MAPJ0         2G/3G: 00440245-203638-1         IMEI Code       LTE: 00440245-203680-3         WLAN: 00440245-203677-9         FCC ID       PY7PM-0731         Mode of Operation       GSM       GPRS         GSM       LTE FDD       WLAN802.11 a/b/g/n (20M/40M)         Bluetooth       1/8.3         GPRS       1/2 (1Dn4UP)         (Multislot class: 33 Max 4 Uplink Slots)       1/2.76 (1Dn3UP)         J1/2 (1Dn4UP)       1/2.76 (1Dn3UP)         1/2.76 (1Dn3UP)       1/2.76 (1Dn3UP)         J1/2.76 (1Dn3UP)       1/2.76 (1Dn3UP)         J1/2.76 (1Dn3UP)       1/4.1 (1Dn2UP)         J1/2.76 (1Dn3UP)       1/2.76 (1Dn3UP)         J1/2.76 (1Dn3UP)       1/2.76 (1Dn3UP)         J1/2.76 (1Dn3UP)       1/4.1 (1Dn2UP)         J1/8.3 (1Dn1UP)       1/8.3 (1Dn1UP)		2G/3G: YT910MAPFF			
IMEI Code         2G/3G: 00440245-203638-1           IMEI Code         LTE: 00440245-203680-3           WLAN: 00440245-203677-9           FCC ID         PY7PM-0731           Mode of Operation         SGSM         GPRS           Mode of Operation         SGSM         Image: Sign and the second and th	Serial No.	LTE: YT910MAPHZ			
IMEI Code       LTE: 00440245-203680-3 WLAN: 00440245-203677-9         FCC ID       PY7PM-0731         Mode of Operation       GSM       GPRS         Mode of Operation       GSM       LTE FDD         GSM       LTE FDD       WLAN802.11 a/b/g/n (20M/40M)         Bluetooth       1/8.3         GPRS       1/2 (1Dn4UP)         (Multislot class:33 Max 4 Uplink Slots)       1/2.76 (1Dn3UP)         Duty Cycle       EDGE (Multislot class:33 Max 4 Uplink Slots)       1/2 (1Dn4UP)         1/2 (1Dn4UP)       1/2.76 (1Dn3UP)         1/2.76 (1Dn3UP)       1/4.1 (1Dn2UP)         1/8.3 (1Dn1UP)       1/8.3 (1Dn1UP)		WLAN: YT910MAPJ0			
WLAN: 00440245-203677-9         FCC ID       PY7PM-0731         Mode of Operation       GSM       GPRS         Mode of Operation       HSUPA       LTE FDD         Mulana       Bluetooth       1/8.3         GPRS       GPRS       1/2 (1Dn4UP)         Multislot class:33 Max 4 Uplink       1/2.76 (1Dn3UP)         JN8.3 (1Dn1UP)       1/8.3 (1Dn1UP)		2G/3G: 00440245-203638-1			
FCC ID       PY7PM-0731         Mode of Operation       GSM       GPRS       EDGE       WCDMA       HSDPA         Mode of Operation       HSUPA       LTE FDD       WLAN802.11 a/b/g/n (20M/40M)         Bluetooth       1/8.3         GPRS (Multislot class:33 Max 4 Uplink       1/2 (1Dn4UP)         I/4.1 (1Dn2UP)       1/8.3 (1Dn1UP)         I/8.3 (1Dn1UP)       1/2.76 (1Dn3UP)         I/2 (1Dn4UP)       1/2.76 (1Dn3UP)         I/2 (1Dn4UP)       1/2.76 (1Dn3UP)         I/8.3 (1Dn1UP)       1/2.76 (1Dn3UP)         I/4.1 (1Dn2UP)       1/2.76 (1Dn3UP)         I/4.1 (1Dn2UP)       1/4.1 (1Dn2UP)         I/4.1 (1Dn2UP)       1/8.3 (1Dn1UP)	IMEI Code	LTE: 00440245-203680-3			
Mode of Operation       GSM       GPRS       EDGE       WCDMA       HSDPA         Mode of Operation       HSUPA       LTE FDD       WLAN802.11 a/b/g/n (20M/40M)         Bluetooth       GSM       1/8.3         GPRS (Multislot class:33 Max 4 Uplink       1/2 (1Dn4UP)         1/2.76 (1Dn3UP)       1/4.1 (1Dn2UP)         1/8.3 (1Dn1UP)       1/2 (1Dn4UP)         1/2 (1Dn4UP)       1/2.76 (1Dn3UP)         1/8.3 (1Dn1UP)       1/2 (1Dn4UP)         1/2 (1Dn4UP)       1/2.76 (1Dn3UP)         1/2 (1Dn4UP)       1/2.76 (1Dn3UP)         1/2 (1Dn4UP)       1/2.76 (1Dn3UP)         1/2.76 (1Dn3UP)       1/4.1 (1Dn2UP)         1/8.3 (1Dn1UP)       1/4.1 (1Dn2UP)		WLAN: 00440245-203677-9			
Mode of OperationHSUPALTE FDDWLAN802.11 a/b/g/n (20M/40M)BluetoothI/8.3GPRS (Multislot class:33 Max 4 Uplink Slots)1/2 (1Dn4UP) 1/2.76 (1Dn3UP) 1/4.1 (1Dn2UP) 1/8.3 (1Dn1UP)Duty CycleEDGE (Multislot class:33 Max 4 Uplink Slots)Duty CycleEDGE (Multislot class:33 Max 4 Uplink Slots)1/2 (1Dn4UP) 1/2.76 (1Dn3UP) 1/8.3 (1Dn1UP)1/2 (1Dn4UP) 1/2.76 (1Dn3UP) 1/2.76 (1Dn3UP) 1/4.1 (1Dn2UP) 1/8.3 (1Dn1UP)	FCC ID	PY7PM-0731			
GPRS (Multislot class:33 Max 4 Uplink Slots)         1/2 (1Dn4UP) 1/2.76 (1Dn3UP) 1/4.1 (1Dn2UP) 1/8.3 (1Dn1UP)           Duty Cycle         EDGE (Multislot class:33 Max 4 Uplink Slots)         1/2 (1Dn4UP) 1/2 (1Dn4UP) 1/2.76 (1Dn3UP) 1/2.76 (1Dn3UP) 1/2.76 (1Dn3UP) 1/4.1 (1Dn2UP) 1/8.3 (1Dn1UP)		HSUPA LTE FDD WLAN			
GPRS (Multislot class:33 Max 4 Uplink Slots)         1/2.76 (1Dn3ÚP) 1/4.1 (1Dn2UP) 1/8.3 (1Dn1UP)           Duty Cycle         EDGE (Multislot class:33 Max 4 Uplink Slots)         1/2 (1Dn4UP) 1/2.76 (1Dn3UP) 1/2.76 (1Dn3UP) 1/2.76 (1Dn3UP) 1/2.76 (1Dn1UP)		GSM	1/8.3		
Duty CycleEDGE (Multislot class:33 Max 4 Uplink Slots)1/2.76 (1Dn3UP) 1/4.1 (1Dn2UP) 1/8.3 (1Dn1UP)		(Multislot class:33 Max 4 Uplink	1/2.76 (1Dn3ÚP) 1/4.1 (1Dn2UP)		
WCDMA 1	Duty Cycle	(Multislot class:33 Max 4 Uplink	1/2.76 (1Dn3UP) 1/4.1 (1Dn2UP)		
		WCDMA	1		
LTE 1		LTE	1		
WLAN 802.11 a/b/g/n(20M/40M) 1		WLAN 802.11 a/b/g/n(20M/40M)	1		
Bluetooth 1		Bluetooth	1		

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	GSM850	824.2		848.8
	GSM1900	1850.2		1909.8
	WCDMA Band II	1852.4		1907.6
	WCDMA Band IV	1712.4		1752.6
	WCDMA Band V	826.4		846.6
	LTE FDD Band IV	1710		1755
	LTE FDD Band VII	2500		2570
	LTE FDD Band XVII	704	—	716
TX Frequency	WLAN 802.11 b/g/n(20M)	2412		2462
Range (MHz)	WLAN802.11 a/n(20M) 5.2G	5180		5240
(	WLAN802.11 a/n(20M) 5.3G	5260		5320
	WLAN802.11 a/n(20M) 5.5G	5500		5700
	WLAN802.11 a/n(20M) 5.8G	5745		5825
	WLAN802.11 n(40M) 5.2G	5190		5230
	WLAN802.11 n(40M) 5.3G	5270		5310
	WLAN802.11 n(40M) 5.5G	5510		5670
	WLAN802.11 n(40M) 5.8G	5755		5795
	Bluetooth	2402		2480

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	GSM850	128	 251
	GSM1900	512	 810
	WCDMA Band II	9262	 9538
	WCDMA Band IV	1312	 1513
	WCDMA Band V	4132	 4233
	LTE FDD Band IV	19957	 20393
	LTE FDD Band VII	20775	 21425
	LTE FDD Band XVII	23755	 23825
Channel	WLAN 802.11 b/g/n(20M)	1	 11
Number (ARFCN)	WLAN802.11 a/n(20M) 5.2G	36	 48
(	WLAN802.11 a/n(20M) 5.3G	52	 64
	WLAN802.11 a/n(20M)5.6G	100	 140
	WLAN802.11 a/n(20M)5.8G	149	 165
	WLAN802.11 n(40M) 5.2G	38	 46
	WLAN802.11 n(40M) 5.3G	54	 62
	WLAN802.11 n(40M) 5.6G	102	 134
	WLAN802.11 n(40M) 5.8G	151	 159
	Bluetooth	0	 78

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台灣檢驗科技股份有限公司



Max. SAR (1 g) (Unit: W/Kg)					
Mode	Band	Measured	Reported	Position / Channel	
	GSM 850	0.46	0.471	☐Left ⊠Right ⊠Cheek ☐Tilt 251 Channel (DTM)	
	GSM 1900	0.171	0.179	□Left ⊠Right ⊠Cheek □Tilt <u>661</u> Channel <u>(DTM)</u>	
	WCDMA Band II	0.202	0.218	□Left ⊠Right ⊠Cheek □Tilt <u>9538</u> Channel	
	WCDMA Band IV	0.167	0.178	☐Left ⊠Right ⊠Cheek ☐Tilt <u>1312</u> Channel	
	WCDMA Band V	0.429	0.453	□Left ⊠Right ⊠Cheek □Tilt <u>4233</u> Channel	
Head	LTE FDD Band IV	0.172	0.175	□Left ⊠Right ⊠Cheek □Tilt <u>20175</u> Channel	
	LTE FDD Band VII	0.132	0.139	☐Left ⊠Right ⊠Cheek ☐Tilt <u>20850</u> Channel	
	LTE FDD Band XVII	0.128	0.129	⊠Left ☐Right ⊠Cheek ☐Tilt <u>23800</u> Channel	
	WLAN802.11 b	0.341	0.358	Left Right Cheek Tilt <u>1</u> Channel - with memory card	
	WLAN802.11a 5.2G	0.149	0.154	Left Right Cheek Tilt <u>44</u> Channel	
	WLAN802.11a 5.3G	0.175	0.178	⊠Left □Right ⊠Cheek □Tilt <u>56</u> Channel	

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Max. SAR (1 g) (Unit: W/Kg)					
Mode	Band	Measured	Reported	Position / Channel	
	WLAN802.11a 5.6G	0.095	0.095	Left Right Cheek Tilt <u>132</u> Channel	
Head	WLAN802.11a 5.8G	0.058	0.060	⊠Left □Right ⊠Cheek □Tilt <u>161</u> Channel	
	GSM 850	0.419	0.459	☐Front ⊠Back <u>128</u> Channel - with headset	
	GSM 1900	1.12	1.146	Front Back <u>512</u> Channel <u>(DTM)</u> - with headset	
	WCDMA Band II	1.13	1.191	Front Back <u>9262</u> Channel - with headset	
Body worn	WCDMA Band IV	1.14	1.175	Front Back <u>1513</u> Channel - with headset	
(speech mode)	WCDMA Band V	0.408	0.427	Front Back <u>4132</u> Channel - with headset	
	LTE FDD Band IV	1.26	1.280	Front Back 20175 Channel	
	LTE FDD Band VII	0.771	0.830	Front Back 20850 Channel	
	LTE FDD Band XVII	0.244	0.245	Front Back 23800 Channel	
	WLAN802.11a 5.2G	0.068	0.070	Front ⊠Back <u>44</u> Channel	
	WLAN802.11a 5.3G	0.112	0.115	☐Front ⊠Back <u>60</u> Channel	

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Max. SAR (1 g) (Unit: W/Kg)						
Mode	Band	Measured	Reported	Position / Channel		
Body worn (speech	WLAN802.11a 5.6G	0.909	0.913	Front Back <u>132</u> Channel <u>- with memory card</u> (repeat with worse case)		
mode)	WLAN802.11a 5.8G	0.204	0.213	Front Back		

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Max. SAR (1 g) (Unit: W/Kg)						
Mode	Band	Measured	Reported	Position / Channel		
	GPRS 850 (1Dn4UP)	0.552	0.605	Front Back Bottom Right Left <u>251</u> Channel		
	GPRS 1900 (1Dn4UP)	1.01	1.010	Front Back Bottom Right Left <u>512</u> Channel		
	WCDMA Band II	0.88	0.930	Front Back Bottom Right Left <u>9262</u> Channel -repeat with worse case		
llatanat	WCDMA Band IV	1.08	1.085	Front Back Bottom Right Left <u>1513</u> Channel		
Hotspot mode	WCDMA Band V	0.508	0.549	Front Back Bottom Right Left <u>4183</u> Channel		
	LTE FDD Band IV	1.29	1.348	Front Back Bottom Right Left <u>20300</u> Channel		
	LTE FDD Band VII	0.904	1.065	Front Back Bottom Right Left <u>20850</u> Channel		
	LTE FDD Band XVII	0.233	0.274	Front Back Bottom Right Left 23780 Channel		
	WLAN802.11b	0.161	0.169	Front Back		

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Max. SAR (10 g) (Unit: W/Kg)										
Mode	Band	Measured	Reported	Position / Channel						
	GPRS 1900	1.04	1.040	Front Back Bottom Right Left <u>661</u> Channel						
	WCDMA Band II	0.985	1.046	Front Back Bottom Right Left <u>9400</u> Channel						
Hand	WCDMA Band IV	1.25	1.291	Front Back Bottom Right Left 1412 Channel						
	LTE FDD Band IV	1.5	1.563	Front Back Bottom Right Left <u>20300</u> Channel						
	LTE FDD Band VII	2.01	2.345	Front Back Bottom Right Left <u>21350</u> Channel						

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	Max. reported SAR WWAN and WLAN DTS 2.4GHz, SAR evaluation									
Frequency	De	osition	reported SAR / W/kg		ΣSAR	Calculated	SPLSR			
band	FU	5111011	WWAN	WLAN	<1.6W/kg	distance (mm)	(≦0.04)			
GSM 850	Head	LE cheek	0.423	0.358	0.781	-	-			
GPRS 850 (1Dn4UP)	Hotspot	Back	0.508	0.169	0.677	-	-			
GSM 1900	Head	LE cheek	0.089	0.358	0.447	-	-			
GPRS 1900 (1Dn4UP)	Hotspot	Front	0.612	0.045	0.657	-	-			
WCDMA	Head	LE cheek	0.083	0.358	0.441	-	-			
Band II	Hotspot	Front	0.603	0.045	0.648	-	-			
WCDMA	Head	LE cheek	0.122	0.358	0.480	-	-			
Band IV	Hotspot	Front	0.909	0.045	0.954	-	-			
WCDMA	Head	LE cheek	0.407	0.358	0.765	-	-			
Band V	Hotspot	Back	0.544	0.169	0.713	-	-			
LTE FDD	Head	LE cheek	0.139	0.358	0.497	-	-			
Band IV	Hotspot	Front	1.087	0.045	1.132	-	-			
LTE FDD	Head	LE cheek	0.108	0.358	0.466	-	-			
Band VII	Hotspot	Back	1.065	0.169	1.234	-	-			
LTE FDD	Head	LE cheek	0.129	0.358	0.487	-	-			
Band XVII	Hotspot	Back	0.189	0.169	0.358	-	-			

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Max. reported SAR WWAN and WLAN DTS 5.8 GHz, SSAR evaluation								
Frequency			reported S	AR / W/kg	ΣSAR	Calculated	SPLSR	
band	Pos	ition	WWAN	WLAN	<1.6W/kg	distance (mm)	(≦0.04)	
GSM 850	Head	REcheek	0.471	0.021	0.492	-	-	
G2101 000	Body-	Back	0.459	0.213	0.672	-	-	
GSM 1900	Head	REcheek	0.179	0.021	0.2	-	-	
0.5101 1900	Body-	Front	1.146	0.011	1.157	-	-	
WCDMA	Head	REcheek	0.218	0.021	0.239	-	-	
Band II	Body-	Front	1.191	0.011	1.202	-	-	
WCDMA	Head	REcheek	0.178	0.021	0.199	-	-	
Band IV	Body-	Front	1.175	0.011	1.186	-	-	
WCDMA	Head	REcheek	0.453	0.021	0.474	-	-	
Band V	Body-	Back	0.424	0.213	0.637	-	-	
LTE FDD	Head	LE cheek	0.139	0.06	0.199	-	-	
Band IV	Body-	Front	1.28	0.011	1.291	-	-	
LTE FDD	Head	LE cheek	0.108	0.06	0.168	-	-	
Band VII	Body-	Back	0.83	0.213	1.043	-	-	
LTE FDD	Head	LE cheek	0.129	0.06	0.189	-	-	
Band XVII	Body-	Back	0.236	0.213	0.449	-	-	

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	Max. reported SAR WWAN and WLAN DTS 5 GHz, $\Sigma$ SAR evaluation									
Frequency			reported S	SAR / W/kg	ΣSAR	Calculated	SPLSR			
band	Pos	ition	WWAN	WLAN	<1.6W/kg	distance (mm)	(≦0.04)			
GSM 850	Head	LE cheek	0.423	0.178	0.601	-	-			
03101 030	Body-	Back	0.459	0.913	1.372	-	-			
GSM 1900	Head	LE cheek	0.089	0.178	0.267	-	-			
03101 1900	Body-	Back	0.804	0.913	1.717	133.5	0.017			
WCDMA	Head	RE cheek	0.218	0.05	0.268	-	-			
Band II	Body-	Back	0.829	0.913	1.742	133.5	0.017			
WCDMA	Head	RE cheek	0.178	0.05	0.228	-	-			
Band IV	Body-	Back	0.776	0.913	1.689	135.8	0.016			
WCDMA	Head	LE cheek	0.407	0.178	0.585	-	-			
Band V	Body-	Back	0.424	0.913	1.337	-	-			
LTE FDD	Head	LE cheek	0.139	0.178	0.317	-	-			
Band IV	Body-	Back	0.861	0.913	1.774	138.2	0.017			
LTE FDD	Head	LE cheek	0.108	0.178	0.286	-	-			
Band VII	Body-	Back	0.83	0.913	1.743	125.7	0.018			
LTE FDD	Head	LE cheek	0.129	0.178	0.307	-	-			
Band XVII	Body-	Back	0.236	0.913	1.149	-	-			
Note										

Note:

We calculate the peak location separation ratio of simultaneous transmitting antenna pair, the SPLSR value is less than 0.04. According to KDB447498 D01v05 simultaneous transmission SAR evaluation is not required.

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Max. reported SAR WWAN and Bluetooth, $\Sigma$ SAR evaluation								
Frequency				SAR / W/kg	ΣSAR	Calculated	SPLSR	
band	Posi	tion	WWAN	Bluetooth	<1.6W/kg	distance (mm)	(≦0.04)	
GSM 850	Body-	Back	0.459	0.087	0.546	-	-	
GPRS 850 (1Dn4UP)	Hotspot	Front	0.605	0.130	0.735	-	-	
GSM 1900	Body-	Front	1.146	0.087	1.233	-	-	
GPRS 1900	Hotspot	Front	0.612	0.130	0.742	-	-	
WCDMA	Body-	Front	1.191	0.087	1.278	-	-	
Band II	Hotspot	Front	0.603	0.130	0.733	-	-	
WCDMA	Body-	Front	1.175	0.087	1.262	-	-	
Band IV	Hotspot	Front	0.909	0.130	1.039	-	-	
WCDMA	Body-	Front	0.427	0.087	0.514	-	-	
Band V	Hotspot	Back	0.544	0.130	0.674	-	-	
LTE FDD	Body-	Front	1.28	0.087	1.367	-	-	
Band IV	Hotspot	Front	1.087	0.130	1.217	-	-	
LTE FDD	Body-	Back	0.83	0.087	0.917	-	-	
Band VII	Hotspot	Back	1.065	0.130	1.195	-	-	
LTE FDD	Body-	Front	0.245	0.087	0.332	-	-	
Band XVII	Hotspot	Front	0.207	0.130	0.337	-	-	

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#### Report No. : ES/2014/10005 Page : 17 of 319

Max. reported SAR WWAN and WLAN DTS 2.4GHz, $\Sigma$ SAR(10g) evaluatior								
Frequency	Pos	ition	reported S	SAR / W/kg	ΣSAR(10g)			
band	F 03		WWAN	WLAN	<4W/kg			
GPRS 1900 (1Dn4UP)	Hand	Front	1.04	1.051	2.091			
WCDMA Band II	Hand	Front	1.046	1.051	2.097			
WCDMA Band IV	Hand	Front	1.291	1.051	2.342			
LTE FDD Band IV	Hand	Front	1.563	1.051	2.614			
LTE FDD Band VII	Hand	Front	2.345	1.051	3.396			

Max. repo	Max. reported SAR WWAN and Bluetooth, ΣSAR(10g) evaluation							
Frequency	Position		reported S	SAR / W/kg	ΣSAR(10g)			
band	F03	ILION	WWAN	Bluetooth	<4W/kg			
GPRS 1900 (1Dn4UP)	Hand	Front	1.04	0.104	1.144			
WCDMA Band II	Hand	Front	1.046	0.104	1.15			
WCDMA Band IV	Hand	Front	1.291	0.104	1.395			
LTE FDD Band IV	Hand	Front	1.563	0.104	1.667			
LTE FDD Band VII	Hand	Front	2.345	0.104	2.449			

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### #. Conducted power table:

There is power reduction for GPRS/EGPRS 1900, WCDMA Band II/ Band IV and LTE FDD band IV / Band VII / Band XVII mode (hotspot on).

There is no power reduction for GPRS/EGPRS 850, WCDMA Band V and WLAN mode.

GSM/GPR	S/EDGE/D	ТМ со	nducted	powert	table:

EUT mode	Frequency		-	Burst average power	Source-based time average power		
	(MHz)	СН	Power + Max. Tolerance (dBm)	Avg.(dBm)	Avg.(dBm)		
GSM 850	824.2	128	33.5	33.10	24.07		
(GMSK)	836.6	190	33.5	33.10	24.07		
(GIVISK)	848.8	251	33.5	33.00	23.97		
	The div	ision f	actor compared to	the number of TX tin	ne slot		
	Divisio	n fact	or	1 TX time slot			
	DIVISIO	maci		-9.03			

Burst average power								
Max. Rated Avg. Power + Max. Tolerance (dBm)			33.5	30	28.5	28		
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP		
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)		
GPRS 850	824.2	128	33.10	29.60	28.10	27.80		
(GMSK)	836.6	190	33.10	29.50	28.10	27.70		
(GIVISK)	848.8	251	33.10	29.60	28.30	27.60		
		S	ource-based tim	e average powe	er			
GPRS 850	824.2	128	24.07	23.58	23.84	24.79		
(GMSK)	836.6	190	24.07	23.48	23.84	24.69		
(GIVISK)	848.8	251	24.07	23.58	24.04	24.59		
	The div	rision fa	actor compared	to the number o	of TX time slot			
	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		

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Burst average power								
Max. Rated Avg. Power + Max. Tolerance (dBm)			27	26	26	25		
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP		
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)		
EDGE 850	824.2	128	26.70	25.80	25.60	24.80		
(MCS 5)	836.6	190	26.70	25.80	25.60	24.70		
	848.8	251	26.70	25.80	25.60	24.80		
		S	ource-based tim	e average powe	er			
EDGE 850	824.2	128	17.67	19.78	21.34	21.79		
(MCS 5)	836.6	190	17.67	19.78	21.34	21.69		
	848.8	251	17.67	19.78	21.34	21.79		
	The div	vision fa	actor 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		

	Burst average power								
	Max. Rated Avg. Power + Max. Tolerance (dBm)			30	28.5	28			
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP			
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)			
EDGE 850	824.2	128	33.00	29.50	28.00	27.70			
(MCS 4)	836.6	190	33.00	29.80	28.00	27.70			
(10103 4)	848.8	251	33.00	29.70	28.30	27.60			
			Source-based tir	ne average pow	er				
EDGE 850	824.2	128	23.97	23.48	23.74	24.69			
(MCS 4)	836.6	190	23.97	23.78	23.74	24.69			
(10103 4)	848.8	251	23.97	23.68	24.04	24.59			
	The di	vision	factor compared	to the number					
	sion factor		1 TX time slot	2 TX time slot	3 TX time slot	4 TX time slot			
Divi			-9.03	-6.02	-4.26	-3.01			

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	Burst average power								
	ted Avg. Powe olerance (dBr		27	26	26	25			
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP			
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)			
EDGE 850	824.2	128	26.80	25.80	25.60	24.70			
(MCS 9)	836.6	190	26.80	25.80	25.60	24.70			
	848.8	251	26.80	25.60	25.60	24.80			
		S	ource-based tim	e average powe	er				
EDGE 850	824.2	128	17.77	19.78	21.34	21.69			
(MCS 9)	836.6	190	17.77	19.78	21.34	21.69			
	848.8	251	17.77	19.58	21.34	21.79			
	The div	ision fa	actor compared	to the number o	of TX time slot				
بې س	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			

	Burst average power									
	ted Avg. Powe olerance (dBm		29.5	28						
			1Dn2UP	1Dn3UP						
EUT mode	e Frequency CH		Avg. (dBm)	Avg. (dBm)						
GSM+GPRS	824.2	128	29.40	27.90						
850	836.6	190	29.20	27.90						
(DTM)	848.8	251	29.20	27.90						
	Source-ba	sed tim	e average power							
GSM+GPRS	824.2	128	23.38	23.64						
850	836.6	190	23.18	23.64						
(DTM)	(DTM) 848.8 251		23.18	23.64						
The divi	The division factor compared to the number of TX time slot									
Di	vision factor		2 TX time slot -6.02	3 TX time slot -4.26						

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	Burst average power									
	ted Avg. Powe olerance (dBr		25.5	25.5						
			1Dn2UP	1Dn3UP						
EUT mode	de Frequency CH		Avg. (dBm)	Avg. (dBm)						
GSM+EDGE	824.2	128	25.30	25.20						
850	836.6	190	25.20	25.20						
(DTM)	848.8	251	25.30	25.20						
	Source-bas	sed tim	e average powe	er						
GSM+EDGE	824.2	128	19.28	20.94						
850	836.6	190	19.18	20.94						
(DTM)	(DTM) 848.8 251		19.28	20.94						
The divisi	on factor com	pared	to the number o	of TX time slot						
Div	ision factor		2 TX time slot	3 TX time slot						
			-6.02	-4.26						

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	Frequency		Max. Rated Avg.	Burst average power	Source-based time average power	
	(MHz)	СН	Power + Max. Tolerance (dBm)	Avg.(dBm)	Avg.(dBm)	
GSM 1900	1850.2	512	31	30.80	21.77	
(GMSK)	1880	661	31	30.60	21.57	
(GIVISK)	1909.8	810	31	30.50	21.47	
	The div	ision fa	ctor compared to	the number of TX time	e slot	
	Division	factor		1 TX time slot		
		I IAULUI		-9.03		

	Burst average power									
	ted Avg. Powe olerance (dBr		31	29	28	27.5				
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP				
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg.	Avg.	Avg.				
GPRS	1850.2	512	30.80	(dBm) 29.00	(dBm) 27.80	(dBm) 27.50				
1900	1880	661	30.60	28.80	27.70	27.40				
(GMSK)	1909.8	810	30.50	28.90	27.90	27.40				
		S	ource-based tim	e average powe	er					
GPRS	1850.2	512	21.77	22.98	23.54	24.49				
1900	1880	661	21.57	22.78	23.44	24.39				
(GMSK)	1909.8	810	21.47	22.88	23.64	24.39				
	The div	ision fa	actor 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				

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Burst average power								
Max. Rated Avg. Power + Max. Tolerance (dBm)			26	26	26	25		
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP		
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)		
EDGE	1850.2	512	26.00	25.90	26.00	24.90		
1900	1880	661	25.90	25.90	25.90	24.90		
(MCS 5)	1909.8	810	25.90	25.80	25.90	24.90		
		S	ource-based tim	e average powe	er			
EDGE	1850.2	512	16.97	19.88	21.74	21.89		
1900	1880	661	16.87	19.88	21.64	21.89		
(MCS 5)	1909.8	810	16.87	19.78	21.64	21.89		
	The div	ision fa	actor 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		

	Burst average power								
	Max. Rated Avg. Power + Max. Tolerance (dBm)			29	28	27.5			
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP			
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)			
EDGE	1850.2	512	30.70	29.00	27.80	27.40			
1900	1880	661	30.70	28.80	27.80	27.40			
(MCS 4)	1909.8	810	30.50	28.80	27.90	27.40			
		S	ource-based tim	e average powe	er				
EDGE	1850.2	512	21.67	22.98	23.54	24.39			
1900	1880	661	21.67	22.78	23.54	24.39			
(MCS 4)	1909.8	810	21.47	22.78	23.64	24.39			
	The division factor compared to the number of TX time slot								
Div	ision 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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Burst average power								
Max. Rated Avg. Power + Max. Tolerance (dBm)			26	26	26	25		
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP		
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)		
EDGE	1850.2	512	25.90	25.70	25.80	24.90		
1900	1880	661	25.90	25.70	25.90	24.80		
(MCS 9)	1909.8	810	26.00	25.60	25.90	24.70		
		S	ource-based tim	e average powe	er			
EDGE	1850.2	512	16.87	19.68	21.54	21.89		
1900	1880	661	16.87	19.68	21.64	21.79		
(MCS 9)	1909.8	810	16.97	19.58	21.64	21.69		
	The div	ision fa	actor compared	to the number o	of TX time slot			
	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		

	Burst average power									
	ted Avg. Powe olerance (dBr		29	28						
			1Dn2UP	1Dn3UP						
EUT mode	Frequency (MHz) CH		Avg. (dBm)	Avg. (dBm)						
GSM+GPRS	1850.2	512	28.90	27.90						
1900	1880	661	29.00	27.80						
(DTM)	1909.8	810	28.90	27.90						
	Source-bas	sed tim	e average powe	er						
GSM+GPRS	1850.2	512	22.88	23.64						
1900	1880	661	22.98	23.54						
(DTM)	(DTM) 1909.8 810		22.88	23.64						
The divisi	The division factor compared to the number of TX time slot									
Div	ision factor		2 TX time slot -6.02	3 TX time slot -4.26						

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	Burst average power										
	ted Avg. Powe olerance (dBr		26	26							
			1Dn2UP	1Dn3UP							
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)							
GSM+EDGE	1850.2	512	25.90	26.00							
1900	1880	661	25.90	26.00							
(DTM)	1909.8	810	25.80	26.00							
	Source-bas	sed tim	e average powe	er							
GSM+EDGE	1850.2	512	19.88	21.74							
1900	1880	661	19.88	21.74							
(DTM)	(DTM) 1909.8 810		19.78	21.74							
The divisi	The division factor compared to the number of TX time slot										
	ision factor		2 TX time slot	3 TX time slot							
			-6.02	-4.26							

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	Burst average power									
Max. Rated Avg. Power + Max. Tolerance (dBm)			26	23	21.5	21				
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP				
EUT mode	de Frequency CH		Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)				
GPRS	1850.2	512	25.90	22.90	21.50	21.00				
1900	1880	661	25.90	22.80	21.40	21.00				
(GMSK)	1909.8	810	26.00	22.90	21.50	21.00				
		S	ource-based tim	e average powe	er					
GPRS	1850.2	512	16.87	16.88	17.24	17.99				
1900	1880	661	16.87	16.78	17.14	17.99				
(GMSK)	1909.8	810	16.97	16.88	17.24	17.99				
	The div	vision fa	actor compared	to the number o	of TX time slot					
	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				

#### GPRS / EGPRS / DTM 1900 Hotspot on (Reduced power):

	Burst average power									
Max. Rated Avg. Power + Max. Tolerance (dBm)			23	20	20	20				
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP				
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)				
EDGE	1850.2	512	22.90	20.00	19.90	20.00				
1900	1880	661	22.80	20.00	20.00	20.00				
(MCS 5)	1909.8	810	22.90	20.00	20.00	20.00				
		S	ource-based tim	e average powe	er					
EDGE	1850.2	512	13.87	13.98	15.64	16.99				
1900	1880	661	13.77	13.98	15.74	16.99				
(MCS 5)	1909.8	810	13.87	13.98	15.74	16.99				
	The div	vision fa	actor 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				

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			Burst aver	age power						
	ted Avg. Powe olerance (dBr		26	23	21.5	21				
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP				
EUT modeFrequency (MHz)CHAvg.Avg.Avg.Avg.(dBm)(dBm)(dBm)(dBm)(dBm)										
EDGE	1850.2	512	25.90	22.90	21.40	20.90				
1900	1880	661	25.90	22.80	21.40	21.00				
(MCS 4)	1909.8	810	25.70	22.70	21.50	21.00				
		S	ource-based tim	e average powe	er					
EDGE	1850.2	512	16.87	16.88	17.14	17.89				
1900	1880	661	16.87	16.78	17.14	17.99				
(MCS 4)	1909.8	810	16.67	16.68	17.24	17.99				
	The div	ision fa	actor compared	to the number o	of TX time slot					
	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				

			Burst avera	age power		
	ted Avg. Powe olerance (dBr		23	20	20	20
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)
EDGE	1850.2	512	22.90	20.00	19.90	20.00
1900	1880	661	22.80	20.00	20.00	20.00
(MCS 9)	1909.8	810	22.90	20.00	19.90	19.90
		S	ource-based tim	e average powe	er	
EDGE	1850.2	512	13.87	13.98	15.64	16.99
1900	1880	661	13.77	13.98	15.74	16.99
(MCS 9)	1909.8	810	13.87	13.98	15.64	16.89
	The div	ision fa	actor compared	to the number o	of TX time slot	
	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

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	Burs	st aver	age power									
	ted Avg. Powe olerance (dBr		23	21.5								
			1Dn2UP	1Dn3UP								
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)								
GSM+GPRS	1850.2	512	22.80	21.50								
1900	1880	661	22.80	21.50								
(DTM)	1909.8	810	22.80	21.50								
	Source-bas	sed tim	e average powe	er								
GSM+GPRS	1850.2	512	16.78	17.24								
1900	1880	661	16.78	17.24								
(DTM)	1909.8	810	16.78	17.24								
The divisi	The division factor compared to the number of TX time slot											
Div	ision factor		2 TX time slot	3 TX time slot								
			-6.02	-4.26								

	Burs	st aver	age power	
	ted Avg. Powe olerance (dBr		20	20
			1Dn2UP	1Dn3UP
EUT mode	Frequency (MHz)	СН	Avg. (dBm)	Avg. (dBm)
GSM+EDGE	1850.2	512	19.80	19.80
1900	1880	661	19.80	19.80
(DTM)	1909.8	810	19.80	19.80
	Source-bas	sed tim	e average powe	۶r
GSM+EDGE	1850.2	512	13.78	15.54
1900	1880	661	13.78	15.54
(DTM)	1909.8	810	13.78	15.54
The divisi	of TX time slot			
Div	ision factor		2 TX time slot	3 TX time slot
			-6.02	-4.26

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# WCDMA Band II / Band IV / Band V - HSDPA / HSUPA/ DC-HSDPA conducted power table:

Dand	011	Max. Rated Avg.	Rel99	HS	DPA moo	de AV(dE	3m)	HSUPA mode AV(dBm)					DC-HSDPA mode AV(dBm)			
Band	СН	Power + Max. Tolerance	AV (dBm)	SUB-1	SUB-2	SUB-3	SUB-4	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5	SUB-1	SUB-2	SUB-3	SUB-4
WCDMA	9262	24	23.77	23.94	23.65	23.46	23.53	23.69	21.74	22.75	21.87	23.58	23.62	23.65	23.17	23.15
Band II	9400	24	23.74	23.63	23.60	23.18	23.19	23.72	21.79	22.74	21.84	23.58	23.60	23.62	23.08	23.07
Rel 8	9538	24	23.67	23.53	23.52	23	23.12	23.61	21.65	22.69	21.69	23.52	23.51	23.49	22.84	22.96
WCDMA	1312	22.3	22.02	21.73	21.90	21.25	21.32	21.94	19.99	21	20.12	21.83	21.75	21.89	21.26	21.32
Band IV	1412	22.3	21.95	22.05	21.81	21.6	21.61	21.93	20	20.95	20.05	21.79	22.07	21.81	21.61	21.61
Rel 8	1513	22.3	22.17	22.01	22.02	21.48	21.6	22.11	20.15	21.19	20.19	22.02	22.02	22.03	21.50	21.62
WCDMA	4132	24.5	24.30	24.09	24.23	23.63	23.68	24.26	22.32	23.3	22.37	24.12	24.13	24.19	23.62	23.57
Band V	4183	24.5	24.16	24.02	24.05	23.54	23.58	24.09	22.17	23.15	22.23	23.92	24.09	23.90	23.41	23.52
Rel 8	4233	24.5	24.26	24.38	24.13	23.89	23.95	24.18	22.22	23.26	22.3	24.07	24.25	23.99	23.76	23.65

#### HSDPA

SUB-TEST	$\beta_{c}$	$\beta_d$	β <sub>d</sub> (SF)	$\beta_c/\beta_d$	β <sub>Hs</sub> ( <i>Note1, Note 2</i> )	CM (dB) <i>(Note 3)</i>	MPR (dB) <i>(Note 3)</i>
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	64	15/4	30/15	1.5	0.5

#### HSUPA

SUB-TEST	βc	βd	β <sub>d</sub> (SF)	β <sub>c</sub> /β <sub>d</sub>	β <sub>нs</sub> (Note1)	$\beta_{ec}$	β <sub>ed</sub> (Note 5) (Note 6)	β <sub>ed</sub> (SF)	β <sub>ed</sub> (Codes)	CM <i>(dB)</i> <i>(Note</i> <i>2)</i>	MPR <i>(dB)</i> <i>(Note</i> <i>2)</i>	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	9/15	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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# WCDMA Band II / Band IV - HSDPA / HSUPA / DC-HSDPA\_Hotspot on (Reduced power) :

Dond	Band CH AVG.		Rel99 AV	HSDPA mode AV(dBm)				HSUPA mode AV(dBm)					DC-HSDPA mode AV(dBm)			
Dailu	СП	Power + Max. Tolerance	(dBm)	SUB-1	SUB-2	SUB-3	SUB-4	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5	SUB-1	SUB-2	SUB-3	SUB-4
WCDMA	9262	18	17.76	17.93	17.64	17.45	17.52	17.68	15.73	16.74	15.86	17.57	17.61	17.64	17.16	17.14
Band II	9400	18	17.74	17.63	17.60	17.18	17.19	17.72	15.79	16.74	15.84	17.58	17.60	17.62	17.08	17.07
Rel 8	9538	18	17.71	17.57	17.56	17.04	17.16	17.65	15.69	16.73	15.73	17.56	17.55	17.53	16.88	17.00
WCDMA	1312	18	17.92	17.63	17.80	17.15	17.22	17.84	15.89	16.9	16.02	17.73	17.65	17.79	17.16	17.22
Band IV	1412	18	17.86	17.96	17.72	17.51	17.52	17.84	15.91	16.86	15.96	17.7	17.98	17.72	17.52	17.52
Rel 8	1513	18	17.98	17.82	17.83	17.29	17.41	17.92	15.96	17	16	17.83	17.83	17.84	17.31	17.43

#### HSDPA

SUB-TEST	$\beta_{c}$	$\beta_{d}$	β <sub>d</sub> (SF)	$\beta_c/\beta_d$	β <sub>Hs</sub> ( <i>Note1, Note 2</i> )	CM (dB) <i>(Note 3)</i>	MPR (dB) <i>(Note 3)</i>
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	64	15/4	30/15	1.5	0.5

#### HSUPA

SUB-TEST	β <sub>c</sub>	β <sub>d</sub>	β <sub>d</sub> (SF)	β <sub>c</sub> /β <sub>d</sub>	β <sub>HS</sub> (Note1)	$\beta_{ec}$	β <sub>ed</sub> (Note 5) (Note 6)	β <sub>ed</sub> (SF)	β <sub>ed</sub> (Codes)	CM ( <i>dB</i> ) (Note 2)	MPR ( <i>dB</i> ) (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	9/15	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 IV (Full power)												
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	22.29	22.5	0				
			0	1732.5	20175	22.43	22.5	0				
				1745	20300	22.43	22.5	0				
				1720	20050	22.25	22.5	0				
		1 RB	50	1732.5	20175	22.27	22.5	0				
				1745	20300	22.31	22.5	0				
				1720	20050	22.20	22.5	0				
			99	1732.5	20175	22.30	22.5	0				
				1745	20300	22.33	22.5	0				
				1720	20050	21.38	22.0	0-1				
	QPSK		0	1732.5	20175	21.47	22	0-1				
				1745	20300	21.45	22	0-1				
				1720	20050	21.33	22.0	0-1				
		50 RB	25	1732.5	20175	21.31	22.0	0-1				
			1745	20300	21.34	22.0	0-1					
			50	1720	20050	21.35	22.0	0-1				
				1732.5	20175	21.34	22.0	0-1				
	-			1745	20300	21.37	22.0	0-1				
				1720	20050	21.35	21.5	0-1				
		100RB		1732.5	20175	21.33	21.5	0-1				
20				1745	20300	21.38	21.5	0-1				
				1720	20050	21.26	21.5	0-1				
			0	1732.5	20175	21.40	21.5	0-1				
				1745	20300	21.38	21.5	0-1				
			50	1720	20050	21.23	21.5	0-1				
		1 RB	50	1732.5	20175	21.24	21.5	0-1				
				1745	20300	21.24	21.5	0-1				
			00	1720	20050	21.17	21.5	0-1				
			99	1732.5	20175	21.23	21.5	0-1				
				1745	20300	21.19	21.5	0-1				
	16 0 0 1		0	1720	20050	20.41	21	0-2				
	16-QAM		0	1732.5	20175	20.50	21	0-2				
				1745	20300	20.48	21	0-2				
		50 RB	25	1720	20050	20.33	21	0-2				
		20	1732.5	20175	20.34	21	0-2					
				1745	20300 20050	20.40 20.37	21	0-2 0-2				
			50	1720 1732.5		20.37	21 21	0-2				
			00	1732.5	20175 20300	20.34	21	0-2				
				1745	20300	20.40	20.5	0-2				
		100	RB	1720	20030	20.30	20.5	0-2				
		.00		1732.5	20175	20.43	20.5	0-2				

#### LTE FDD Band IV / Band VII / Band XVII power table:

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FDD Band IV (Full power)												
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	22.13	22.5	0				
			0	1732.5	20175	22.37	22.5	0				
				1747.5	20325	22.35	22.5	0				
				1717.5	20025	22.08	22.5	0				
		1 RB	36	1732.5	20175	22.17	22.5	0				
				1747.5	20325	22.38	22.5	0				
				1717.5	20025	22.16	22.5	0				
			74	1732.5	20175	22.20	22.5	0				
				1747.5	20325	22.29	22.5	0				
				1717.5	20025	21.14	22	0-1				
	QPSK		0	1732.5	20175	21.32	22	0-1				
				1747.5	20325	21.33	22	0-1				
				1717.5	20025	21.20	22	0-1				
		36 RB	18	1732.5	20175	21.27	22	0-1				
				1747.5	20325	21.30	22	0-1				
			37	1717.5	20025	21.30	22	0-1				
		37	1732.5	20175	21.19	22	0-1					
				1747.5	20325	21.36	22	0-1				
				1717.5	20025	21.22	21.5	0-1				
		75	RB	1732.5	20175	21.27	21.5	0-1				
15				1747.5	20325	21.26	21.5	0-1				
			0	1717.5	20025	21.07	21.5	0-1				
			0	1732.5	20175	21.22	21.5	0-1				
				1747.5	20325	21.50	21.5	0-1				
			00	1717.5	20025	20.97	21.5	0-1				
		1 RB	36	1732.5	20175	20.98	21.5	0-1				
				1747.5	20325	21.34	21.5	0-1				
			74	1717.5	20025	21.08	21.5	0-1				
			74	1732.5	20175	21.30	21.5	0-1				
				1747.5	20325	21.33	21.5	0-1				
	16 OAM		0	1717.5	20025	20.33	21	0-2				
	16-QAM		0	1732.5	20175	20.28	21	0-2				
				1747.5	20325	20.29	21	0-2				
		36 RB	18	1717.5	20025	20.23	21	0-2				
	36	JUKD	10	1732.5	20175	20.26	21	0-2				
				1747.5	20325	20.36	21	0-2				
			37	1717.5	20025	20.02	21	0-2				
			51	1732.5	20175	20.13	21	0-2				
				1747.5	20325	20.31	21	0-2				
		75	RB	1717.5	20025	20.26	20.5	0-2				
		75		1732.5	20175	20.26	20.5	0-2				
				1747.5	20325	20.33	20.5	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 IV (Full power)									
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)	
			0	1715	20000	22.11	22.5	0	
				1732.5	20175	22.17	22.5	0	
				1750	20350	22.24	22.5	0	
				1715	20000	21.99	22.5	0	
		1 RB	25	1732.5	20175	22.04	22.5	0	
				1750	20350	22.17	22.5	0	
				1715	20000	22.09	22.5	0	
			49	1732.5	20175	22.12	22.5	0	
				1750	20350	22.21	22.5	0	
	0.001			1715	20000	21.07	22.0	0-1	
	QPSK		0	1732.5	20175	21.31	22	0-1	
				1750	20350	21.34	22	0-1	
		25 RB	12	1715	20000	21.06	22.0	0-1	
				1732.5	20175	21.17	22.0	0-1	
			25	1750	20350	21.28	22.0	0-1	
				1715	20000	21.15	22.0	0-1	
				1732.5	20175	21.16	22.0	0-1	
				1750	20350	21.20	22.0	0-1	
		50RB		1715	20000	21.08	21.5	0-1	
		50	RB	1732.5	20175	21.25	21.5	0-1	
10				1750	20350	21.37	21.5	0-1	
	16-QAM	1 RB	0	1715	20000	21.07	21.5	0-1	
				1732.5	20175	21.08	21.5	0-1 0-1	
				1750 1715	20350 20000	21.07	21.5 21.5	0-1	
			25	1715	20000	21.10 21.21	21.5	0-1	
				1752.5	20175	21.21	21.5	0-1	
			49	1730	20000	21.15	21.5	0-1	
				1732.5	20000	21.13	21.5	0-1	
				1750	20175	21.20	21.5	0-1	
		25 RB	0	1715	20000	20.27	21.5	0-1	
				1732.5	20000	20.27	21	0-2	
				1750	20350	20.43	21	0-2	
			12	1730	20000	20.86	21	0-2	
				1732.5	20000	20.28	21	0-2	
				1750	20350	20.44	21	0-2	
			25	1715	20000	20.23	21	0-2	
				1732.5	20175	20.26	21	0-2	
				1750	20350	20.49	21	0-2	
		50RB		1715	20000	20.13	20.5	0-2	
				1732.5	20175	20.31	20.5	0-2	
				1750	20350	20.40	20.5	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 IV (Full power)								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance	MPR Allowed per 3GPP(dB)
							(dBm)	
				1712.5	19975	22.32	22.5	0
			0	1732.5	20175	22.50	22.5	0
				1752.5	20375	22.13	22.5	0
			10	1712.5	19975	22.23	22.5	0
		1 RB	12	1732.5	20175	22.39	22.5	0
				1752.5	20375	22.26	22.5	0
			0.4	1712.5	19975	22.44	22.5	0
			24	1732.5	20175	22.22	22.5	0
				1752.5	20375	22.24	22.5	0
	QPSK		0	1712.5	19975	21.36	22.0	0-1
	QPSK		0	1732.5	20175	21.35	22	0-1
		12 RB		1752.5	20375	21.21	22	0-1
			6	1712.5	19975	21.26	22.0	0-1
				1732.5	20175	21.22	22.0	0-1
			13	1752.5	20375	21.26	22.0	0-1
				1712.5	19975	21.35	22.0	0-1
				1732.5	20175	21.21	22.0	0-1
				1752.5	20375	21.14	22.0	0-1
		25RB		1712.5	19975	21.03	21.5	0-1
		25		1732.5 1752.5	20175 20375	<u>21.17</u> 21.23	21.5 21.5	0-1 0-1
5				1752.5	19975	20.96	21.5	0-1
	16-QAM	1 RB	0	1712.5	20175	20.90	21.5	0-1
				1752.5	20175	21.42	21.5	0-1
			12	1732.5	19975	21.42	21.5	0-1
				1732.5	20175	20.94	21.5	0-1
				1752.5	20175	20.94	21.5	0-1
			24	1732.5	19975	21.00	21.5	0-1
				1732.5	20175	21.41	21.5	0-1
				1752.5	20375	21.40	21.5	0-1
		12 RB	0	1712.5	19975	20.37	21.0	0-2
				1732.5	20175	20.31	21	0-2
				1752.5	20375	20.20	21	0-2
			6	1712.5	19975	20.45	21	0-2
				1732.5	20175	20.29	21	0-2
				1752.5	20375	20.25	21	0-2
			13	1712.5	19975	20.44	21	0-2
				1732.5	20175	20.38	21	0-2
				1752.5	20375	20.42	21	0-2
				1712.5	19975	20.45	20.5	0-2
		25RB		1732.5	20175	20.24	20.5	0-2
				1752.5	20375	20.42	20.5	0-2

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			FDD Ba	nd IV (Ful	l power)			
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance	MPR Allowed per 3GPP(dB)
				1711 5	10065	22.24	(dBm) 22.5	0
			0	1711.5	19965	22.24		0
			0	1732.5 1753.5	20175 20385	22.37 22.20	22.5 22.5	0
				1733.5	19965	22.20	22.5	0
		1 RB	7	1711.5	20175	22.24	22.5	0
		THE		1753.5	20175	22.40	22.5	0
				1733.5	19965	22.21	22.5	0
			14	1732.5	20175	22.20	22.5	0
				1753.5	20385	22.30	22.5	0
				1733.5	19965	21.30	22.0	0-1
	QPSK		0	1732.5	20175	21.00	22.0	0-1
		8 RB	-	1753.5	20385	21.16	22	0-1
			4	1700.0	19965	21.01	22.0	0-1
				1732.5	20175	21.18	22.0	0-1
				1753.5	20385	21.10	22.0	0-1
			7	1711.5	19965	21.28	22.0	0-1
				1732.5	20175	21.20	22.0	0-1
				1753.5	20385	21.01	22.0	0-1
		15RB		1711.5	19965	21.29	21.5	0-1
				1732.5	20175	21.15	21.5	0-1
2				1753.5	20385	21.16	21.5	0-1
3	16-QAM	1 RB	0	1711.5	19965	21.23	21.5	0-1
				1732.5	20175	21.25	21.5	0-1
				1753.5	20385	21.29	21.5	0-1
			7	1711.5	19965	21.25	21.5	0-1
				1732.5	20175	21.26	21.5	0-1
				1753.5	20385	21.19	21.5	0-1
			14	1711.5	19965	21.20	21.5	0-1
				1732.5	20175	21.20	21.5	0-1
				1753.5	20385	21.14	21.5	0-1
		8 RB	0	1711.5	19965	20.37	21	0-2
				1732.5	20175	20.31	21	0-2
				1753.5	20385	20.46	21	0-2
			4	1711.5	19965	20.37	21	0-2
				1732.5	20175	20.25	21	0-2
				1753.5	20385	20.42	21	0-2
			7	1711.5	19965	20.27	21	0-2
				1732.5	20175	20.27	21	0-2
				1753.5	20385	20.47	21	0-2
		15RB		1711.5	19965	20.21	20.5	0-2
				1732.5	20175	20.27	20.5	0-2
				1753.5	20385	20.38	20.5	0-2

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FDD Band IV (Full power)								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
			0	1710.7 1732.5	19957 20175	22.02 22.17	22.5 22.5	0
				1754.3	20393	22.21	22.5	0
				1710.7	19957	22.16	22.5	0
		1 RB	2	1732.5	20175	22.27	22.5	0
				1754.3	20393	22.35	22.5	0
			5	1710.7	19957	22.05	22.5	0
			5	1732.5	20175	22.20	22.5	0
				1754.3 1710.7	<u>20393</u> 19957	22.25 21.88	22.5 22.0	0 0-1
	QPSK		0	1710.7	20175	21.86	22.0	0-1
			0	1754.3	20175	21.90	22	0-1
		3 RB		1734.3	19957	21.85	22.0	0-1
			2	1732.5	20175	21.96	22.0	0-1
			_	1754.3	20393	21.98	22.0	0-1
				1710.7	19957	21.86	22.0	0-1
			3	1732.5	20175	21.95	22.0	0-1
				1754.3	20393	21.96	22.0	0-1
		6RB		1710.7	19957	21.10	21.5	0-1
				1732.5	20175	21.30	21.5	0-1
1.4				1754.3	20393	21.38	21.5	0-1
1.4	16-QAM	1 RB	0	1710.7	19957	20.81	21.5	0-1
				1732.5	20175	20.71	21.5	0-1
				1754.3	20393	21.12	21.5	0-1
			2	1710.7	19957	20.67	21.5	0-1
				1732.5	20175	20.74	21.5	0-1
				1754.3	20393	21.24	21.5	0-1
				1710.7	19957	20.88	21.5	0-1
				1732.5	20175	21.03	21.5	0-1
				1754.3	20393	21.21	21.5	0-1
		3 RB	0	1710.7	19957	20.76	21	0-2
				1732.5	20175	20.92	21	0-2
				1754.3	20393	20.96	21	0-2
			2	1710.7	19957	20.78	21	0-2
				1732.5	20175	20.93	21	0-2
			3	1754.3	20393	20.97	21	0-2
				1710.7	19957	20.8	21	0-2
				1732.5	20175	20.92	21	0-2
				1754.3	20393	20.99	21	0-2
		6RB		1710.7	19957	20.00	20.5	0-2
				1732.5 1754.3	20175 20393	20.11 20.20	20.5 20.5	0-2

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FDD Band IV Hotspot on (Reduced power)											
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	18.88	19	0			
			0	1732.5	20175	18.92	19	0			
				1745	20300	18.85	19	0			
				1720	20050	18.84	19	0			
		1 RB	50	1732.5	20175	18.83	19	0			
				1745	20300	18.75	19	0			
				1720	20050	18.85	19	0			
			99	1732.5	20175	18.9	19	0			
				1745	20300	18.77	19	0			
				1720	20050	18.93	19	0-1			
	QPSK		0	1732.5	20175	18.87	19	0-1			
				1745	20300	18.82	19	0-1			
				1720	20050	18.88	19				
		50 RB	25	1732.5	20175	18.87	19				
			-	1745	20300	18.76	19				
				1720	20050	18.83	19				
			50	1732.5	20175	18.89	19				
				1745	20300	18.66	19				
				1720	20050	18.89	19				
		100	)RB	1732.5	20175	18.78	19	1			
20				1745	20300	18.81	19				
				1720	20050	18.42	19				
			0	1732.5	20175	18.56	19				
				1745	20300	18.61	19				
			50	1720	20050	18.41	19				
		1 RB	50	1732.5	20175	18.27	19				
				1745	20300	18.38	19				
			00	1720	20050	18.33	19				
			99	1732.5	20175	18.31	19				
				1745	20300	18.31	19				
	16-QAM		0	1720	20050	18.55	19				
			0	1732.5	20175	18.62	19				
				1745	20300	18.66	19				
			25	1720	20050	18.5	19	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0-1			
		50 RB	25	1732.5	20175	18.5	19				
				1745	20300	18.49	19				
			50	1720	20050	18.55	19	0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-1			
				1732.5	20175	18.48	19				
			l	1745	20300	18.54	19				
		100	)RB	1720	20050	18.53	19	0           0			
		100		1732.5	20175	18.55	19				
				1745	20300	18.53	19	0-2			

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FDD Band IV Hotspot on (Reduced power)											
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	18.41	19	0			
			0	1732.5	20175	18.65	19	0			
				1747.5	20325	18.72	19	0			
				1717.5	20025	18.34	19	0			
		1 RB	36	1732.5	20175	18.61	19	0			
				1747.5	20325	18.58	19	0			
				1717.5	20025	18.45	19	0			
			74	1732.5	20175	18.49	19	0			
				1747.5	20325	18.38	19	0			
				1717.5	20025	18.26	19	0-1			
	QPSK		0	1732.5	20175	18.47	19	0-1			
				1747.5	20325	18.38	19	0-1			
				1717.5	20025	18.34	19	0-1			
		36 RB	18	1732.5	20175	18.48	19	0-1			
				1747.5	20325	18.53	19	0-1			
				1717.5	20025	18.35	19	0-1			
			37	1732.5	20175	18.45	19	0-1			
				1747.5	20325	18.39	19	0-1			
				1717.5	20025	18.46	19				
		75	RB	1732.5	20175	18.36	19				
15				1747.5	20325	18.59	19				
			0	1717.5	20025	18.52	19				
			0	1732.5	20175	18.74	19				
				1747.5	20325	18.74	19				
				1717.5	20025	18.22	19				
		1 RB	36	1732.5	20175	18.47	19				
				1747.5	20325	18.77	19				
			74	1717.5	20025	18.49	19				
			74	1732.5	20175	18.49	19				
				1747.5	20325	18.5	19				
	16 0 4 44		0	1717.5	20025	18.54	19				
	16-QAM		0	1732.5	20175	18.46	19				
				1747.5	20325	18.51	19				
		26 00	10	1717.5	20025	18.6	19				
		36 RB	18	1732.5	20175	18.47	19				
				1747.5	20325	18.7	19				
			27	1717.5	20025	18.56	19	0 0 0 0 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-1			
			37	1732.5	20175	18.31	19				
				1747.5	20325	18.56	19				
		75RB		1717.5	20025	18.49	19				
		75	ΓD	1732.5	20175	18.35	19				
				1747.5	20325	18.52	19	0-2			

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FDD Band IV Hotspot on (Reduced power)											
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	18.31	19	0			
			0	1732.5	20175	18.67	19	0			
				1750	20350	18.58	19	0			
				1715	20000	18.52	19	0			
		1 RB	25	1732.5	20175	18.58	19	0			
				1750	20350	18.6	19	0			
				1715	20000	18.45	19	0			
			49	1732.5	20175	18.45	19	0			
				1750	20350	18.48	19	0			
				1715	20000	18.43	19	0-1			
	QPSK		0	1732.5	20175	18.48	19	0-1			
				1750	20350	18.54	19	0-1			
				1715	20000	18.22	19	0-1			
		25 RB	12	1732.5	20175	18.43	19	0-1			
				1750	20350	18.69	19	0-1			
				1715	20000	18.31	19	0-1			
			25	1732.5	20175	18.48	19	0-1			
				1750	20350	18.7	19	0-1			
				1715	20000	18.34	19	0-1			
		50	RB	1732.5	20175	18.5	19	0-1			
10				1750	20350	18.65	19	0-1			
				1715	20000	18.49	19	0-1			
			0	1732.5	20175	18.66	19	0-1			
				1750	20350	18.73	19	0-1			
			25	1715	20000	18.52	19	0-1			
		1 RB	25	1732.5	20175	18.57	19	0-1			
				1750	20350	18.61	19	0-1			
			40	1715	20000	18.54	19	0-1			
			49	1732.5	20175	18.67	19	0-1			
				1750	20350	18.7	19	0-1			
	16-QAM		0	1715	20000	18.45	19	0-2			
			U	1732.5	20175	18.52	19	0-2			
				1750	20350	18.72	19	0-2			
		25 RB	12	1715	20000	18.46	19	0-2			
		20110	12	<u>1732.5</u> 1750	20175 20350	18.57	19	0-2			
				1750	20350	18.63 18.6	<u>19</u> 19	0-2 0-2			
			25	1715	20000	18.52	19	0-2			
		25									
				1750 1715	20350 20000	18.63	19 19	0-2 0-2			
		50	RB	1715	20000	18.56 18.52	19	0-2			
	50RB			1750	20175	18.67	19	0-2			
				1730	20300	10.07	19	0-2			

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		FDD Ba	and IV Ho	otspot on	(Reduced	l power)		
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
			0	1712.5 1732.5	19975 20175	18.39 18.71	19 19	0
				1752.5	20375	18.59	19	0
				1712.5	19975	18.35	19	0
		1 RB	12	1732.5	20175	18.6	19	0
				1752.5	20375	18.5	19	0
				1712.5	19975	18.35	19	0
			24	1732.5	20175	18.56	19	0
				1752.5	20375	18.62	19	0
				1712.5	19975	18.49	19	0-1
	QPSK		0	1732.5	20175	18.58	19	0-1
				1752.5	20375	18.62	19	0-1
				1712.5	19975	18.46	19	0-1
		12 RB	6	1732.5	20175	18.42	19	0-1
				1752.5	20375	18.7	19	0-1
				1712.5	19975	18.47	19	0-1
			13	1732.5	20175	18.49	19	0-1
				1752.5	20375	18.66	19	0-1
			-	1712.5	19975	18.35	19	0-1
		25	RB	1732.5	20175	18.49	19	0-1
5				1752.5	20375	18.67	19	0-1
Ŭ				1712.5	19975	18.1	19	0-1
			0	1732.5	20175	18.17	19	0-1
				1752.5	20375	18.44	19	0-1
				1712.5	19975	18.16	19	0-1
		1 RB	12	1732.5	20175	18.08	19	0-1
				1752.5	20375	18.39	19	0-1
				1712.5	19975	18.28	19	0-1
			24	1732.5	20175	18.06	19	0-1
				1752.5	20375	18.34	19	0-1
				1712.5	19975	18.62	19	0-2
	16-QAM		0	1732.5	20175	18.61	19	0-2
				1752.5	20375	18.75	19	0-2
				1712.5	19975	18.64	19	0-2
		12 RB	6	1732.5	20175	18.58	19	0-2
				1752.5	20375	18.62	19	0-2
				1712.5	19975	18.62	19	0-2 0-2 0-2 0-2 0-2
			13	1732.5	20175	18.55	19	0-2
				1752.5	20375	18.72	19	0-2
				1712.5	19975	18.6	19	0-2
		25	RB	1732.5	20175	18.48	19	0-2
				1752.5	20375	18.76	19	0-2

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FDD Band IV Hotspot on (Reduced power)											
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	18.5	19	0			
			0	1732.5	20175	18.78	19	0			
				1753.5	20385	18.64	19	0			
				1711.5	19965	18.43	19	0			
		1 RB	7	1732.5	20175	18.61	19	0			
				1753.5	20385	18.58	19	0			
				1711.5	19965	18.44	19	0			
			14	1732.5	20175	18.61	19	0			
				1753.5	20385	18.7	19	0			
				1711.5	19965	18.43	19	0-1			
	QPSK		0	1732.5	20175	18.65	19	0-1			
			-	1753.5	20385	18.73	19	0-1			
				1711.5	19965	18.56	19	0-1			
		8 RB	4	1732.5	20175	18.57	19	0-1			
				1753.5	20385	18.66	19	0-1			
			_	1711.5	19965	18.57	19	0-1			
			7	1732.5	20175	18.57	19	0-1			
				1753.5	20385	18.7	19	0-1			
		4.5		1711.5	19965	18.57	19	0-1			
		15	RB	1732.5	20175	18.56	19	0-1			
3				1753.5	20385	18.75	19	0-1			
			0	1711.5	19965	18.15	19	0-1			
			U	1732.5	20175	18.26	19	0-1			
				1753.5	20385	18.48	19	0-1			
		1 RB	7	1711.5	<u>19965</u> 20175	18.26	<u>19</u> 19	0-1 0-1			
		TIND	'	1732.5		18.24		0-1			
				1753.5 1711.5	20385 19965	18.44 18.16	19 19	0-1			
			14	1711.5	20175	18.16	19	0-1			
				1753.5	20175	18.36	19	0-1			
				1733.5	19965	18.57	19	0-1			
	16-QAM		0	1732.5	20175	18.72	19	0-2			
				1753.5	20175	18.78	19	0-2			
				1700.0	19965	18.64	19	0-2			
		8 RB	4	1732.5	20175	18.54	19	0-2			
				1753.5	20385	18.73	19	0-2			
				1711.5	19965	18.68	19	0-2			
			7	1732.5	20175	18.78	19	0-2			
				1753.5	20385	18.73	19	0-2			
			•	1711.5	19965	18.66	19	0-2			
		15	RB	1732.5	20175	18.7	19	0-2			
	15			1753.5	20385	18.79	19	0-2			

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FDD Band IV Hotspot on (Reduced power)											
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	18.35	19	0			
			0	1732.5	20175	18.37	19	0			
				1754.3	20393	18.56	19	0			
				1710.7	19957	18.31	19	0			
		1 RB	2	1732.5	20175	18.4	19	0			
				1754.3	20393	18.7	19	0			
				1710.7	19957	18.19	19	0			
			5	1732.5	20175	18.49	19	0			
				1754.3	20393	18.57	19	0			
				1710.7	19957	18.24	19	0-1			
	QPSK		0	1732.5	20175	18.5	19	0-1			
				1754.3	20393	18.4	19	0-1			
				1710.7	19957	18.34	19	0-1			
		3 RB	2	1732.5	20175	18.39	19				
				1754.3	20393	18.61	19				
				1710.7	19957	18.34	19	0-1			
			3	1732.5	20175	18.39	19				
				1754.3	20393	18.65	19	0-1			
				1710.7	19957	18.31	19				
		6F	RB	1732.5	20175	18.37	19				
1.4				1754.3	20393	18.62	19				
				1710.7	19957	18.46	19				
			0	1732.5	20175	18.43	19				
				1754.3	20393	18.73	19				
				1710.7	19957	18.39	19				
		1 RB	2	1732.5	20175	18.4	19				
				1754.3	20393	18.84	19	0-1			
			_	1710.7	19957	18.24	19				
			5	1732.5	20175	18.43	19				
				1754.3	20393	18.7	19				
	40.0414		<u>^</u>	1710.7	19957	18.29	19				
	16-QAM		0	1732.5	20175	18.21	19				
				1754.3	20393	18.49	19				
		2 00	<u>_</u>	1710.7	19957	18.23	19	Allowed per 3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
		3 RB	2	1732.5	20175	18.2	19				
				1754.3	20393	18.47	19				
			2	1710.7	19957	18.3	19	0 0 0 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-			
			3	1732.5	20175	18.27	19				
				1754.3	20393	18.55	19				
		~	סר	1710.7	19957	18.2	19				
			RB	1732.5	20175	18.43	19				
				1754.3	20393	18.7	19	0-2			

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FDD Band VII (Full power)											
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	22.66	23	0			
			0	2535	21100	22.5	23				
				2560	21350	22.57	23	0			
				2510	20850	22.67	23	0			
		1 RB	50	2535	21100	22.48	23	0			
				2560	21350	22.66	23	0			
				2510	20850	22.68	23	0			
			99	2535	21100	22.6	23	0			
				2560	21350	22.96	23	0			
				2510	20850	21.78	22.5	0-1			
	QPSK		0	2535	21100	21.64	22.5	0-1			
				2560	21350	21.76	22.5	0-1			
				2510	20850	21.78	22.5	0-1			
		50 RB	25	2535	21100	21.63	22.5	0-1			
				2560	21350	21.89	22.5	0-1			
				2510	20850	21.82	22.5	0-1			
			50	2535	21100	21.62	22.5	0-1			
				2560	21350	21.97	22.5	0-1			
				2510	20850	21.78	22	0-1			
		100	RB	2535	21100	21.67	22	0-1			
20				2560	21350	21.87	22	0-1			
20				2510	20850	21.76	22	0-1			
			0	2535	21100	21.69	22	0-1			
				2560	21350	21.75	22	0-1			
				2510	20850	21.84	22	0-1			
		1 RB	50	2535	21100	21.62	22	0-1			
				2560	21350	21.86	22	0-1			
				2510	20850	21.78	22	0-1			
			99	2535	21100	21.82	22	0-1			
				2560	21350	21.98	22	0-1			
				2510	20850	21.17	21.5	0-2			
	16-QAM		0	2535	21100	21.08	21.5	0-2			
				2560	21350	21.19	21.5	0-2			
				2510	20850	20.23	21.5	0-2			
		50 RB	25	2535	21100	21.09	21.5	0-2			
				2560	21350	21.24	21.5	0-2			
				2510	20850	21.22	21.5	3GPP(dB) 0 0 0 0 0 0 0 0 0 0 0 0 0			
			50	2535	21100	21.18	21.5	0-2			
				2560	21350	21.25	21.5	0-2			
				2510	20850	21.23	21.5	0-2			
		100	RB	2535	21100	21.14	21.5	0-2			
				2560	21350	21.27	21.5	0-2			

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FDD Band VII (Full power)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
			0	2507.5 2535	20825 21100	22.53 22.41	23 23	0			
				2562.5	21375	22.58	23				
				2507.5	20825	22.64	23				
		1 RB	36	2535	21100	22.39	23				
				2562.5	21375	22.73	23				
				2507.5	20825	22.7	23	0			
			74	2535	21100	22.45	23	0			
				2562.5	21375	22.95	23	0			
				2507.5	20825	21.55	22.5	0-1			
	QPSK		0	2535	21100	21.51	22.5				
				2562.5	21375	21.77	22.5	0-1			
				2507.5	20825	21.61	22.5	0-1			
		36 RB	18	2535	21100	21.53	22.5	0-1			
				2562.5	21375	21.85	22.5	0-1			
				2507.5	20825	21.66	22.5	0-1			
			37	2535	21100	21.5	22.5	0-1			
				2562.5	21375	21.89	22.5	0-1			
				2507.5	20825	21.62	22	0-1			
		75	RB	2535	21100	21.48	22	0-1			
15				2562.5	21375	21.83	22	0-1			
15				2507.5	20825	21.77	22	0-1			
			0	2535	21100	21.63	22	0-1			
				2562.5	21375	21.8	22	0-1			
				2507.5	20825	21.79	22	0-1			
		1 RB	36	2535	21100	21.52	22	0-1			
				2562.5	21375	21.95	22	0-1			
				2507.5	20825	21.88	22	0-1			
			74	2535	21100	21.69	22	0-1			
				2562.5	21375	21.93	22	0-1			
				2507.5	20825	20.81	21.5	0-2			
	16-QAM		0	2535	21100	20.63	21.5	0-2			
				2562.5	21375	20.95	21.5	0-2			
				2507.5	20825	20.93	21.5	0-2			
		36 RB	18	2535	21100	20.75	21.5	0-2			
				2562.5	21375	21.02	21.5	0-2			
				2507.5	20825	20.97	21.5	0-2			
			37	2535	21100	20.66	21.5	0-2			
				2562.5	21375	21.12	21.5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
				2507.5	20825	20.94	21.5	0-2			
		75	RB	2535	21100	20.68	21.5	0-2			
				2562.5	21375	21.09	21.5	0-2			

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FDD Band VII (Full power)											
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)			
			0	2505	20800	22.67	23	0			
			0	2535	21100	22.5	23	0			
				2565	21400	22.71	23	0			
		1 RB	25	2505	20800	22.72	23	0			
		IND	23	2535	21100	22.54	23	0			
				2565	21400	22.83	23 23	0			
			49	2505 2535	20800	22.83	23				
			43		21100	22.58		0			
				2565 2505	21400 20800	22.92 21.75	23 22.5	0 0-1			
	QPSK		0	2505	20800	21.75	22.5	0-1			
	QI OIX		U	2565	21400	21.39	22.5	0-1			
				2505	20800	21.8	22.5	0-1			
		25 RB	12	2535	21100	21.58	22.5	0-1			
		2010	12	2565	21400	21.30	22.5	0-1			
				2505	20800	21.86	22.5	0-1			
			25	2505	20800	21.60	22.5	0-1			
			20	2565	21400	21.93	22.5	0-1			
				2505	20800	21.69	22.5	0-1			
		50	RB	2535	21100	21.59	22	0-1			
		00		2565	21400	21.82	22	0-1			
10				2505	20800	21.73	22	0-1			
			0	2535	21100	21.62	22	0-1			
			-	2565	21400	21.91	22	0-1			
				2505	20800	21.74	22	0-1			
		1 RB	25	2535	21100	21.55	22	0-1			
				2565	21400	21.83	22	0-1			
				2505	20800	21.83	22	0-1			
			49	2535	21100	21.68	22	0-1			
				2565	21400	21.98	22	0-1			
				2505	20800	20.81	21.5	0-2			
	16-QAM		0	2535	21100	20.75	21.5	0-2			
				2565	21400	21.03	21.5	0-2			
				2505	20800	20.93	21.5	0-2			
		25 RB	12	2535	21100	20.73	21.5	0-2			
				2565	21400	21.14	21.5	0-2			
				2505	20800	20.95	21.5	0-2			
			25	2535	21100	20.68	21.5	0-2			
				2565	21400	21.18	21.5	0-2			
				2505	20800	20.9	21.5	0-2			
		50	RB	2535	21100	20.63	21.5	0-2			
				2565	21400	21.13	21.5	0-2			

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FDD Band VII (Full power)											
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	22.72	23	0			
			0	2535	21100	22.5	23	0			
				2567.5	21425	22.84	23	0			
				2502.5	20775	22.5	23	0			
		1 RB	12	2535	21100	22.52	23	0			
				2567.5	21425	22.86	23	0			
				2502.5	20775	22.58	23	0			
			24	2535	21100	22.48	23	0			
				2567.5	21425	22.94	23	0			
				2502.5	20775	21.68	22.5	0-1			
	QPSK		0	2535	21100	21.63	22.5	0-1			
				2567.5	21425	22.01	22.5	0-1			
			_	2502.5	20775	21.65	22.5				
		12 RB	6	2535	21100	21.62	22.5				
				2567.5	21425	21.95	22.5				
			10	2502.5	20775	21.67	22.5				
			13	2535	21100	21.54	22.5				
				2567.5	21425	21.94	22.5				
				2502.5	20775	21.68	22				
		25	RB	2535	21100	21.56	22				
5				2567.5	21425	21.85	22				
			0	2502.5	20775	21.65	22				
			0	2535	21100	21.51	22				
				2567.5	21425	21.92	22				
			10	2502.5	20775	21.66	22				
		1 RB	12	2535	21100	21.55	22				
				2567.5	21425	21.98	22				
			24	2502.5	20775	21.69	22				
			24	2535	21100	21.5	22				
				2567.5	21425	21.99	22				
	16-QAM		0	2502.5	20775	20.86	21.5				
			U	2535	21100	20.69	21.5				
				2567.5	21425	21.15	21.5				
		12 RB	6	2502.5	20775	20.78	21.5				
			0	2535	21100	20.7	21.5				
				2567.5	21425	21.16	21.5				
			13	2502.5 2535	<u>20775</u> 21100	20.84 20.69	21.5 21.5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
			10	2567.5	21425	20.09	21.5				
			L	2507.5	20775	20.72	21.5				
		25	RB	2502.5	21100	20.72	21.5				
		20		2567.5	21425	20.08	21.5				

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		FDD Ba	nd VII Ho	otspot on	(Reduced	l power)		
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	19.38	20	0
			0	2535	21100	19.27	20	0
				2560	21350	19.3	20	0
				2510	20850	19.51	20	0
		1 RB	50	2535	21100	19.13	20	0
				2560	21350	19.43	20	0
				2510	20850	19.45	20	0
			99	2535	21100	19.34	20	0
				2560	21350	19.83	20	0
				2510	20850	19.28	20	0-1
	QPSK		0	2535	21100	19.07	20	0-1
				2560	21350	19.21	20	0-1
				2510	20850	19.36	20	0-1
		50 RB	25	2535	21100	19.01	20	0-1
				2560	21350	19.33	20	0-1
				2510	20850	19.39	20	0-1
			50	2535	21100	19.04	20	0-1
				2560	21350	19.49	20	0-1
				2510	20850	19.29	20	0-1
		100	)RB	2535	21100	19.06	20	0-1
20				2560	21350	19.33	20	0-1
				2510	20850	19.7	20	
			0	2535	21100	19.55	20	
				2560	21350	19.58	20	
				2510	20850	19.74	20	
		1 RB	50	2535	21100	19.51	20	
				2560	21350	19.68	20	
				2510	20850	19.66	20	
			99	2535	21100	19.64	20	
				2560	21350	19.71	20	
	40.0414		0	2510	20850	19.75	20	
	16-QAM		0	2535	21100	19.53	20	
				2560	21350	19.64	20	
			25	2510	20850	19.82	20	
		50 RB	25	2535	21100	19.48	20	
				2560	21350	19.83	20	
			50	2510	20850	19.78	20	
			50	2535	21100	19.54	20	
				2560	21350	19.9	20	0 0 0 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-
		100		2510	20850	19.79	20	
		100	)RB	2535	21100	19.48	20	
				2560	21350	19.81	20	0-2

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		FDD Ba	nd VII Ho	otspot on	(Reduced	l power)		
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	19.62	20	0
			0	2535	21100	19.37	20	0
				2562.5	21375	19.27	20	0
				2507.5	20825	19.65	20	0
		1 RB	36	2535	21100	19.26	20	0
				2562.5	21375	19.37	20	0
				2507.5	20825	19.75	20	0
			74	2535	21100	19.31	20	0
				2562.5	21375	19.56	20	0
				2507.5	20825	19.61	20	0-1
	QPSK		0	2535	21100	19.26	20	0-1
				2562.5	21375	19.36	20	0-1
				2507.5	20825	19.6	20	0-1
		36 RB	18	2535	21100	19.22	20	0-1
				2562.5	21375	19.41	20	0-1
				2507.5	20825	19.77	20	0-1
			37	2535	21100	19.21	20	0-1
				2562.5	21375	19.56	20	0-1
				2507.5	20825	19.66	20	
		75	RB	2535	21100	19.36	20	
15				2562.5	21375	19.45	20	1
			_	2507.5	20825	19.77	20	
			0	2535	21100	19.43	20	
				2562.5	21375	19.66	20	
				2507.5	20825	19.74	20	
		1 RB	36	2535	21100	19.47	20	
				2562.5	21375	19.79	20	
			- 4	2507.5	20825	19.81	20	
			74	2535	21100	19.53	20	
				2562.5	21375	19.93	20	
	16 0 4 44		0	2507.5	20825	19.77	20	
	16-QAM		0	2535	21100	19.47	20	
				2562.5	21375	19.73	20	
			40	2507.5	20825	19.79	20	
		36 RB	18	2535	21100	19.52	20	
				2562.5	21375	19.91	20	
			27	2507.5	20825	19.82	20	0 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-1 0-1
			37	2535	21100	19.46	20	
				2562.5	21375	19.88	20	0 0 0 0 0 0 0-1 0-1 0-1 0-1 0-1 0-1 0-1
		75	DR	2507.5	20825	19.82	20	
		15	RB	2535	21100	19.53	20	
				2562.5	21375	19.81	20	0-2

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		FDD Ba	nd VII Ho	otspot on	(Reduced	l power)		
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
			0	2505 2535	20800 21100	19.25 19.19	20 20	0
				2565	21400	19.43	20	0
		1 RB	25	2505 2535	20800 21100	19.46 19.17	20 20	0
				2565	21400	19.54	20	0
			49	2505	20800	19.54	20	0
			45	2535 2565	21100 21400	19.24 19.66	20 20	0
	QPSK	25 RB	0	2505	20800	19.3	20	0-1
			0	2535 2565	21100 21400	19.23 19.36	20 20	0-1 0-1
				2505	20800	19.42	20	0-1
			12	2535 2565	21100 21400	19.18 19.47	20 20	0-1 0-1
				2505	20800	19.53	20	0-1
			25	2535	21100	19.1	20	0-1
				2565 2505	21400 20800	19.61 19.37	20 20	0-1 0-1
		50RB		2535	21100	19.17	20	0-1
10				2565 2505	21400 20800	<u>19.47</u> 19.7	20 20	0-1 0-1
			0	2535	21100	19.42	20	0-1
				2565	21400	19.75	20	0-1
		1 RB	25	2505 2535	20800 21100	<u>19.69</u> 19.46	20 20	0-1 0-1
				2565	21400	19.77	20	0-1
			49	2505 2535	20800 21100	<u>19.78</u> 19.5	20 20	0-1 0-1
			10	2565	21400	19.97	20	0-1
	16 OAM		0	2505	20800	19.73	20	0-2
	16-QAM		0	2535 2565	21100 21400	<u>19.42</u> 19.91	20 20	0-2 0-2
				2505	20800	19.72	20	0-2
		25 RB	12	2535 2565	21100 21400	19.48 19.92	20 20	0-2 0-2
				2505	20800	19.83	20	0-2
			25	2535	21100	19.45	20	0-2
				2565 2505	21400 20800	19.95 19.73	20 20	0-2 0-2
		50	RB	2535	21100	19.49	20	0-2
				2565	21400	19.81	20	0-2

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FDD Band VII Hotspot on (Reduced power)												
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)				
			0	2502.5 2535	20775 21100	19.59 19.25	20 20	0				
			_	2567.5	21425	19.55	20	0				
				2502.5	20775	19.56	20	0				
		1 RB	12	2535	21100	19.22	20	0				
				2567.5	21425	19.53	20	0				
				2502.5	20775	19.57	20	0				
			24	2535	21100	19.19	20	0				
				2567.5	21425	19.62	20	0				
				2502.5	20775	19.53	20	0-1				
	QPSK		0	2535	21100	19.22	20	0-1				
				2567.5	21425	19.62	20	0-1				
		(0.55		2502.5	20775	19.47	20	0-1				
		12 RB	6	2535	21100	19.17	20	0-1				
				2567.5	21425	19.62	20	0-1				
				2502.5	20775	19.53	20	0-1				
			13	2535	21100	19.16	20	0-1				
				2567.5	21425	19.69	20	0-1				
			-	2502.5	20775	19.5	20	0-1				
		25RB		2535	21100	19.32	20	0-1				
5				2567.5	21425	19.53	20	0-1				
5				2502.5	20775	19.22	20	0-1				
			0	2535	21100	19.07	20	0-1				
				2567.5	21425	19.48	20	0-1				
				2502.5	20775	19.26	20	0-1				
		1 RB	12	2535	21100	19.1	20	0-1				
				2567.5	21425	19.49	20	0-1				
				2502.5	20775	19.3	20	0-1				
			24	2535	21100	19.03	20	0-1				
				2567.5	21425	19.51	20	0-1				
				2502.5	20775	19.43	20	0-2				
	16-QAM		0	2535	21100	19.28	20	0-2				
				2567.5	21425	19.51	20	0-2				
				2502.5	20775	19.4	20	0-2				
		12 RB	6	2535	21100	19.23	20	0-2				
				2567.5	21425	19.52	20	0-2				
				2502.5	20775	19.41	20	0-2				
			13	2535	21100	19.23	20	0-2				
				2567.5	21425	19.51	20	0-2				
			2502.5	20775	19.38	20	0-2					
		25	RB	2535	21100	19.26	20	0-2				
				2567.5	21425	19.58	20	0-2				

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FDD Band XVII (Full power)												
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	24.66	25	0				
			0	710	23790	24.68	25	0				
				711	23800	24.72	25	0				
				709	23780	24.82	25	0				
		1 RB	25	710	23790	24.89	25	0				
				711	23800	24.91	25	0				
				709	23780	24.95	25	0				
			49	710	23790	24.97	25	0				
				711	23800	24.98	25	0				
				709	23780	24.06	24.5	0-1				
	QPSK		0	710	23790	24.07	24.5	0-1				
			-	711	23800	24.09	24.5	0-1				
		25 RB		709	23780	24.12	24.5	0-1				
		25 RB	12	710	23790	24.07	24.5	0-1				
				711	23800	24.08	24.5	0-1				
				709	23780	24.08	24.5	0-1				
			25	710	23790	24.13	24.5	0-1				
				711	23800	24.08	24.5	0-1				
		50RB		709	23780	24.12	24.5	0-1				
		50	RB	710	23790	24.09	24.5	0-1				
10				711	23800	24.06	24.5	0-1				
			0	709	23780	23.96	24	0-1				
			0	710	23790	23.65	24	0-1				
				711	23800	23.85	24	0-1				
		1 RB	25	709	23780	23.82	24 24	0-1				
			25	710 711	23790 23800	23.74 23.77	24 24	0-1 0-1				
				709	23780	23.89	24	0-1				
			49	709	23780	23.78	24	0-1				
				710	23800	23.78	24	0-1				
				709	23780	23.08	23.5	0-1				
	16-QAM		0	710	23790	23.12	23.5	0-2				
			-	710	23800	23.12	23.5	0-2				
				709	23780	23.06	23.5	0-2				
		25 RB	12	710	23790	23.04	23.5	0-2				
				710	23800	23.11	23.5	0-2				
				709	23780	23.11	23.5	0-2				
			25	710	23790	23.09	23.5	0-2				
				711	23800	23.16	23.5	0-2				
			-	709	23780	23.07	23.5	0-2				
		50	RB	710	23790	23.03	23.5	0-2				
		50RB	711	23800	23.09	23.5	0-2					

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### Report No. : ES/2014/10005 Page : 52 of 319

FDD Band XVII (Full power)												
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	24.51	25	0				
			0	710	23790	24.5	25	0				
				713.5	23825	24.38	25	0				
				706.5	23755	24.31	25	0				
		1 RB	12	710	23790	24.39	25	0				
				713.5	23825	24.38	25	0				
				706.5	23755	24.36	25	0				
			24	710	23790	24.46	25	0				
				713.5	23825	24.6	25	0				
				706.5	23755	23.71	24.5	0-1				
	QPSK		0	710	23790	23.67	24.5	0-1				
				713.5	23825	23.58	24.5	0-1				
				706.5	23755	23.61	24.5	0-1				
		12 RB	6	710	23790	23.58	24.5	0-1				
				713.5	23825	23.64	24.5	0-1				
			10	706.5	23755	23.67	24.5	0-1				
			13	710	23790	23.61	24.5	0-1				
				713.5	23825	23.7	24.5	0-1				
		25		706.5	23755	23.63	24.5	0-1				
		25	RB	710	23790	23.62	24.5	0-1				
5				713.5	23825	23.69	24.5	0-1				
			0	706.5	23755	23.79	24	0-1				
			0	710	23790	23.56	24	0-1				
				713.5	23825	23.57	24 24	0-1 0-1				
		1 RB	12	706.5 710	23755 23790	23.76 23.57	24	0-1				
		TRB	12	713.5	23790		24	0-1				
				713.5	23625	23.49 23.77	24	0-1				
			24	700.5	23755	23.76	24	0-1				
			- '	713.5	23790	23.70	24	0-1				
				706.5	23755	22.88	23.5	0-1				
	16-QAM		0	710	23790	22.65	23.5	0-2				
			-	713.5	23825	22.6	23.5	0-2				
				706.5	23755	22.82	23.5	0-2				
		12 RB	6	710	23790	22.75	23.5	0-2				
				713.5	23825	22.79	23.5	0-2				
				706.5	23755	22.82	23.5	0-2				
			13	710	23790	22.69	23.5	0-2				
				713.5	23825	22.62	23.5	0-2				
				706.5	23755	22.73	23.5	0-2				
		25	RB	710	23790	22.69	23.5	0-2				
		2380	713.5	23825	22.57	23.5	0-2					

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## Report No. : ES/2014/10005 Page : 53 of 319

FDD Band XVII Hotspot on (Reduced power)												
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	24.15	25	0				
			0	710	23790	24.18	25	0				
				711	23800	24.21	25	0				
				709	23780	24.28	25	0				
		1 RB	25	710	23790	24.21	25	0				
				711	23800	24.25	25	0				
				709	23780	24.29	25	0				
			49	710	23790	24.32	25	0				
				711	23800	24.31	25	0				
				709	23780	23.72	24.5	0-1				
	QPSK		0	710	23790	23.82	24.5	0-1				
				711	23800	23.86	24.5	0-1				
		25 DD		709	23780	23.81	24.5	0-1				
		25 RB	12	710	23790	23.78	24.5	0-1				
				711	23800	23.89	24.5	0-1				
			05	709	23780	23.77	24.5	0-1				
			25	710	23790	23.87	24.5	0-1				
				711	23800	23.91	24.5	0-1				
				709	23780	23.86	24.5	0-1				
		50	RB	710	23790	23.78	24.5	0-1				
10				711	23800	23.89	24.5	0-1				
			0	709	23780	23.61	24	0-1				
			0	710	23790	23.33	24	0-1				
				711	23800	23.55	24	0-1				
			05	709	23780	23.65	24	0-1				
		1 RB	25	710	23790	23.54	24	0-1				
				711	23800	23.43	24	0-1				
			40	709	23780	23.71	24	0-1				
			49	710	23790	23.63	24	0-1				
				711	23800	23.48	24	0-1				
	16-QAM		0	709	23780	22.6	23.5	0-2				
			U	710	23790	22.59	23.5	0-2				
				711	23800	22.54	23.5	0-2				
		25 RB	12	709	23780	22.68	23.5	0-2				
			١Z	710	23790	22.56 22.5	23.5 23.5	0-2				
				711	23800			0-2				
			25	709	23780	22.74	23.5	0-2				
			20	710	23790	22.56	23.5	0-2				
				711	23800	22.5	23.5	0-2				
		50	RB	709	23780	22.68	23.5	0-2				
		50		710	23790	22.63	23.5	0-2				
				711	23800	22.53	23.5	0-2				

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	FDD Band XVII Hotspot on (Reduced power)												
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)					
			0	706.5 710	23755 23790	24.07 24.04	25 25	0					
				713.5	23825	24.02	25	0					
				706.5	23755	24.14	25	0					
		1 RB	12	710	23790	24.02	25	0					
				713.5	23825	23.99	25	0					
				706.5	23755	24.2	25	0					
			24	710	23790	24.06	25	0					
				713.5	23825	24.07	25	0					
				706.5	23755	23.38	24.5	0-1					
	QPSK		0	710	23790	23.52	24.5	0-1					
				713.5	23825	23.47	24.5	0-1					
				706.5	23755	23.49	24.5	0-1					
		12 RB	6	710	23790	23.43	24.5	0-1					
				713.5	23825	23.51	24.5	0-1					
				706.5	23755	23.5	24.5	0-1					
			13	710	23790	23.51	24.5	0-1					
				713.5	23825	23.65	24.5	0-1					
				706.5	23755	23.52	24.5	0-1					
		25	25RB		23790	23.49	24.5	0-1					
5				713.5	23825	23.45	24.5	0-1					
5				706.5	23755	23.48	24	0-1					
			0	710	23790	23.45	24	0-1					
				713.5	23825	23.34	24	0-1					
				706.5	23755	23.54	24	0-1					
		1 RB	12	710	23790	23.31	24	0-1					
				713.5	23825	23.32	24	0-1					
				706.5	23755	23.48	24	0-1					
			24	710	23790	23.33	24	0-1					
				713.5	23825	23.35	24	0-1					
				706.5	23755	22.61	23.5	0-2					
	16-QAM		0	710	23790	22.52	23.5	0-2					
				713.5	23825	22.51	23.5	0-2					
				706.5	23755	22.63	23.5	0-2					
		12 RB	6	710	23790	22.52	23.5	0-2					
				713.5	23825	22.51	23.5	0-2					
				706.5	23755	22.65	23.5	0-2					
			13	710	23790	22.51	23.5	0-2					
				713.5	23825	22.52	23.5	0-2					
				706.5	23755	22.62	23.5	0-2					
		25RB	710	23790	22.52	23.5	0-2						
				713.5	23825	22.51	23.5	0-2					

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#### #. WLAN802.11 a/b/g/n (20M/40M) conducted power table:

	802.11b Max. Rated Avg.			Average Power	Output (dBm)						
СН	Frequency	Power + Max.		Data Rate (Mbps)							
СП	(MHz)	Tolerance (dBm)	1	2	5.5	11					
1	2412	18.00	17.79	17.74	17.68	17.67					
6	2437	18.00	17.77	17.71	17.65	17.55					
11	2462	18.00	17.98	17.93	17.79	17.72					

	802.11g Max. Rated Avg.				Average	e Powe	r Outpu	ıt(dBm)					
СЦ	Frequency	Power + Max.		Data Rate (Mbps)									
СН	(MHz)			9	12	18	24	36	48	54			
1	2412	12.00	11.96	11.91	11.84	11.79	11.74	11.68	11.61	11.54			
6	2437	15.00	14.99	14.96	14.94	14.88	14.76	14.71	14.68	14.64			
11	2462	13.00	12.99	12.91	12.83	12.74	12.66	12.59	12.42	12.37			

802	802.11n (20M) Max. Rated Avg.				Average	e Powe	r Outpu	it(dBm)						
СН	Frequency	Power + Max.		Data Rate (Mbps)										
СП	(MHz)	Tolerance (dBm)	mcs0	mcs1	mcs2	mcs3	mcs4	mcs5	mcs6	mcs7				
1	2412	12.00	11.91	11.80	11.72	11.66	11.59	11.51	11.44	11.38				
6	2437	13.00	12.87	12.78	12.67	12.64	12.54	12.42	12.35	12.25				
11	2462	11.00	10.78	10.69	10.61	10.56	10.49	10.42	10.37	10.33				

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	02.11a	Max. Rated			Aver	age Po	wer (d	IBm)		
5.2G/5.3	3G/5.5G/5.8G	Avg. Power +				5	``			
СН	Frequency	Max. Tolerance			Da	ta Rat	e (Mbp	s)	I	
	(MHz)	(dBm)	6	9	12	18	24	36	48	54
36	5180	14.00	13.89	13.80	13.74	13.62	13.52	13.45	13.42	13.40
40	5200	14.00	13.86	13.83	13.77	13.72	13.69	13.55	13.48	13.43
44	5220	14.00	13.85	13.74	13.60	13.58	13.44	13.42	13.32	13.25
48	5240	14.00	13.79	13.74	13.67	13.61	13.57	13.44	13.36	13.30
52	5260	14.00	13.88	13.82	13.72	13.58	13.52	13.43	13.33	13.31
56	5280	14.00	13.93	13.81	13.67	13.65	13.62	13.50	13.40	13.33
60	5300	14.00	13.89	13.88	13.84	13.72	13.62	13.55	13.47	13.35
64	5320	14.00	13.84	13.78	13.69	13.66	13.61	13.57	13.48	13.34
100	5500	14.00	13.73	13.72	13.68	13.55	13.51	13.45	13.35	13.26
104	5520	14.00	13.71	13.59	13.50	13.39	13.35	13.33	13.27	13.23
108	5540	14.00	13.79	13.76	13.74	13.68	13.66	13.53	13.40	13.34
112	5560	14.00	13.82	13.68	13.59	13.47	13.35	13.24	13.12	13.02
116	5580	14.00	13.79	13.76	13.69	13.61	13.57	13.48	13.41	13.28
132	5660	14.00	13.98	13.96	13.85	13.78	13.68	13.63	13.49	13.40
136	5680	14.00	13.96	13.87	13.77	13.75	13.66	13.61	13.52	13.46
140	5700	11.00	10.97	10.94	10.88	10.83	10.76	10.71	10.66	10.61
149	5745	14.00	13.81	13.72	13.60	13.50	13.43	13.39	13.28	13.20
153	5765	14.00	13.82	13.73	13.59	13.46	13.38	13.35	13.28	13.19
157	5785	14.00	13.87	13.76	13.71	13.64	13.51	13.41	13.35	13.24
161	5805	14.00	13.86	13.82	13.68	13.65	13.56	13.47	13.44	13.38
165	5825	14.00	13.83	13.70	13.65	13.59	13.53	13.48	13.34	13.23

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	11n(20M) 3G/5.5G/5.8G	Max. Rated Avg. Power +			Aver	age Po	wer (d	Bm)		
	Frequency	Max. Tolerance			Da	ita Rate	e (Mbp	s)		
СН	(MHz)	(dBm)	mcs0	mcs1	mcs2	mcs3	mcs4	mcs5	mcs6	mcs7
36	5180	11.50	11.47	11.40	11.29	11.19	11.11	11.09	11.07	11.00
40	5200	11.50	11.48	11.43	11.31	11.20	11.08	10.99	10.90	10.86
44	5220	11.50	11.49	11.43	11.39	11.28	11.21	11.19	11.17	11.09
48	5240	11.50	11.43	11.35	11.22	11.11	11.06	10.96	10.85	10.71
52	5260	11.50	11.46	11.34	11.22	11.10	11.02	10.97	10.93	10.83
56	5280	11.50	11.47	11.41	11.30	11.26	11.14	11.00	10.87	10.75
60	5300	11.50	11.49	11.45	11.36	11.24	11.12	11.09	10.95	10.82
64	5320	11.50	11.45	11.39	11.28	11.23	11.20	11.11	11.09	11.00
100	5500	11.50	11.33	11.22	11.13	11.03	11.00	10.94	10.91	10.84
104	5520	11.50	11.31	11.29	11.25	11.20	11.11	11.08	10.98	10.87
108	5540	11.50	11.40	11.34	11.30	11.23	11.13	11.04	10.92	10.88
112	5560	11.50	11.47	11.45	11.41	11.28	11.24	11.16	11.08	10.96
116	5580	11.50	11.44	11.39	11.36	11.26	11.21	11.18	11.11	11.03
132	5660	11.50	11.38	11.30	11.27	11.22	11.11	11.05	10.96	10.83
136	5680	11.50	11.41	11.32	11.23	11.13	11.05	10.97	10.87	10.75
140	5700	8.50	8.46	8.41	8.36	8.31	8.22	8.14	8.08	8.01
149	5745	11.50	11.47	11.40	11.34	11.23	11.17	11.09	11.04	10.99
153	5765	11.50	11.49	11.46	11.32	11.26	11.18	11.13	10.99	10.97
157	5785	11.50	11.49	11.41	11.34	11.26	11.17	11.15	11.11	10.99
161	5805	11.50	11.47	11.37	11.23	11.11	10.99	10.89	10.82	10.74
165	5825	11.50	11.48	11.37	11.27	11.15	11.08	11.01	10.88	10.85

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802.	11n(40M)	Max. Rated			Avor	ago Do	whor (d	IPm)				
5.2G/5.3	3G/5.5G/5.8G	Avg. Power +			Avei	age Po	iwer (u	ып)				
СН	Frequency	Max. Tolerance										
СП	(MHz)	(dBm)	mcs0	mcs1	mcs2	mcs3	mcs4	mcs5	mcs6	mcs7		
38	5190	10.50	10.45	10.31	10.22	10.10	10.00	9.98	9.95	9.87		
46	5230	10.50	10.46	10.40	10.31	10.24	10.16	10.13	10.07	10.05		
54	5270	10.50	10.49	10.42	10.36	10.32	10.18	10.10	10.04	9.97		
62	5310	10.50	10.47	10.37	10.24	10.10	10.03	9.91	9.82	9.69		
102	5510	10.50	10.29	10.18	10.11	10.08	9.96	9.86	9.74	9.62		
110	5550	10.50	10.46	10.44	10.32	10.24	10.19	10.14	10.03	9.98		
118	5590	10.50	10.49	10.38	10.28	10.26	10.18	10.04	9.98	9.91		
134	5670	10.50	10.34	10.23	10.20	10.18	10.16	10.05	9.97	9.83		
151	5755	10.50	10.48	10.44	10.40	10.34	10.28	10.19	10.09	10.06		
159	5795	10.50	10.46	10.44	10.31	10.29	10.18	10.16	10.07	10.01		

#### #. Bluetooth conducted power table:

Frequency	Avg. (dBm)			
(MHz)	BDR	4DPSK	8DPSK	
2402	5.31	4.11	4.02	
2441	7.96	6.27	6.26	
2480	6.01	4.28	4.51	

Frequency	Avg. (dBm)	
(MHz)	BT4.0	
2402	-2.48	
2442	-0.37	
2480	-2.02	

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## 1.4 Test Environment

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

# 1.5 Operation Description

# General:

- 1. The EUT is controlled by using a Radio Communication Tester (R&S CMU200 & Anritsu 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.
- 3. During the SAR testing, the DASY 5 system checks power drift by comparing the e-field strength of one specific location measured at the beginning with that measured at the end of the SAR testing.
- 4. Testing head SAR at lowest, middle and highest channel for all bands with Left Tilt /Left Cheek/Right Tilt/Right Cheek conditions.
- Testing body-worn speech mode SAR (with headset)by separating the EUT and the phantom **15mm** distance when performing GSM850, GSM1900,WCDMA Band II/IV/V. (Both front side & back side)

Testing body-worn SAR by separating the EUT and the phantom **15mm** distance when performing LTE FDD band IV/VII/XVII and WiFi 5G. (Both front side & back side)

- 6. Testing hotspot mode SAR by separating the EUT and the phantom **10mm** distance.
  - #. The SAR testing for portable devices with wireless router capability is refered as test guidance of KDB 941225 D06v01 (SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities).
  - #. The following procedures are applicable when the overall device length and width are ≥9 cm x 5 cm respectively. A test separation of 10 mm is required. SAR must be measured for all sides and surfaces with a transmitting antenna located within

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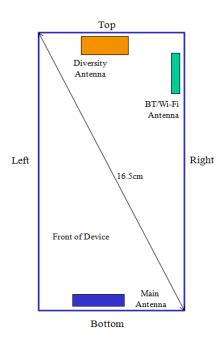


25 mm from that surface or edge, for the data modes, wireless technologies and frequency bands supporting hotspot mode.

# For WiFi 2.4G (15mm separation): the testing device support mobile hotspot function, the separation distance is 10mm (No need to perform SAR testing with Body worn accessory (15mm separation distance) due to the hotspot mode(10mm separation distance) is more conservative than Body worn accessory mode.).

Test configurations:

- (1) Front side
- (2) Back side
- (3) Top side.(WWAN antenna to edge distance >25mm\_No SAR measurement is necessary for this configuration)
- (4) Bottom side. (WLAN antenna to edge distance >25mm\_ No SAR measurement is necessary for this configuration)
- (5) Right side. (WWAN antenna to edge distance >25mm\_ No SAR measurement is necessary for this configuration)
- (6) Left side. (WLAN antenna to edge distance >25mm\_ No SAR measurement is necessary for this configuration)



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7. According to **KDB447498 D01v05** – The 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq$  50 mm are determined by: [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] .  $[\sqrt{f(GHz)}] \leq 3.0$  for 1-g SAR, SAR evaluation is not required. (Max power of Bluetooth = 7.96dBm)

When SAR evaluation is not required to be measured, per FCC KDB447498 D01v05, the following equation must be used to estimate the 1g SAR for simultaneous transmission assessment involving that transmitter.

Estimated SAR =  $\left[\sqrt{f(GHz)/7.5}\right] \cdot \left[(max. power of channel, mW)/(min. test separation)\right]$ distance, mm)]

Estimated 10g SAR =  $\left[\sqrt{f(GHz)/18.75}\right] \cdot \left[(max. power of channel, mW)/(min. test)\right]$ separation distance, mm)]

Mode	Frequency (MHz)	Maximum Power (dBm)	Separation Distance (Body) (mm)	Estimated SAR 1g (Body) (W/kg)
Bluetooth	2441	7.96	15	0.087
Bluetooth	2441	7.96	10	0.130

Mode	Frequency (MHz)	Maximum Power (dBm)	Separation Distance (Body) (mm)	Estimated SAR 10g (Hand) (W/kg)
WiFi b	2462	17.98	5	1.051
Bluetooth	2441	7.96	5	0.104

- 8. According to KDB248227 D01v01-SAR is not required for 802.11 g/HT20/HT40 channels when the maximum average output power is higher than that measured on the corresponding 802.11b channels but increase less than 1/4 dB.
- 9. According to FCC KDB248227 and October 10, 2012 TCB Workshop, SAR is not required for 802.11 n(20M)/n(40M) channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a channels.

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10. Using **KDB941225 D01v02** to exclude SAR test requirements for HSPA modes due to the maximum average output power of HSPA active is higher than that measured without HSPA using 12.2kbps RMC but increase less than 1/4 dB.

# 11.LTE modes test according to FCC KDB 941225 D05v02.

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 ≤ 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.

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

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maximum output power for the configuration in the higher order modulation is >  $\frac{1}{2}$  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  $> \frac{1}{2}$  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.
- 12. Per KDB 648474 D04v01, the device is considered a "phablet' since its overall diagonal distance is greater than 160mm. Therefore hand SAR tests are required when 1g hotspot SAR scaled up to the maximum output power tolerances is >1.2W/kg. Hand SAR test distance is 0mm.

Response to Inquiry to FCC (Tracking Number 601846):

As stated in FCC KDB Publication 648474, "When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold." Hence, if employing power reduction, you should scale to the maximum output power including tolerance for comparison. If the 1-g reported SAR > 1.2 W/kg; then 10-g extremity SAR is required. If the device has power reduction in hotspot mode and 10-g extremity SAR is required, the power reduction should be used during those SAR tests. After completing the tests, scaling for reported SAR and simultaneous transmission considerations may be necessary

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## Additional configuration (Head):

13. For highest SAR configuration in this band repeated with external Memory card inside.

## Additional configuration (Body):

- 14. For highest SAR configuration in this band repeated with external Memory card inside.
- 15. For highest SAR configuration in this band repeated with Headset (MH410C).

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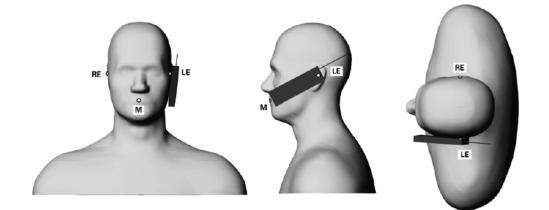
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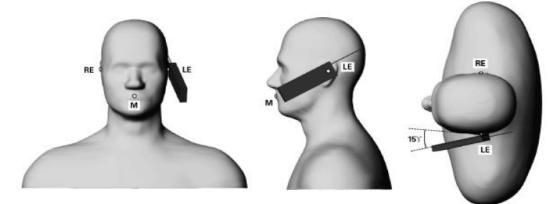


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## **1.6 Positioning Procedure**



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.



Phone 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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## **1.7 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

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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 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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## **1.8 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:

## **1.8.1 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.

$$SAR = \frac{\sigma}{\rho} \left| E \right|^2 = C \frac{\delta T}{\delta t}$$

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:

• 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.

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- 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.
- The calibration depends on the assessment of the specific density, the heat capacity and the conductivity of the medium. While the specific density and heat capacity can be measured accurately with standardized procedures (~ 2% for c; much better for ρ), there is no standard for the measurement of the conductivity. Depending on the method and liquid, the error can well exceed ±5%.
- 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  $\pm 10\%$  (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  $\pm 7-9\%$  (RSS) when not, which is in good agreement with the estimates given in [2].

## 1.8.2 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:

• The setup must enable accurate determination of the incident power.

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- The accuracy of the calculated field strength will depend on the assessment of the dielectric parameters of the liquid.
- 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.

## References

- [1] N. Kuster, Q. Balzano, and J.C. Lin, Eds., Mobile Communications Safety, Chapman & Hall, London, 1997.
- [2] K. Meier, M. Burkhardt, T. Schmid, and N. Kuster, \Broadband calibration of E-field probes in lossy media", IEEE Transactions on Microwave Theory and Techniques, vol. 44, no. 10, pp. 1954{1962, Oct. 1996.
- [3] K. Jokela, P. Hyysalo, and L. Puranen, \Calibration of specific absorption rate (SAR) probes in waveguide at 900 MHz", IEEE Transactions on Instrumentation and Measurements, vol. 47, no. 2, pp. 432{438, Apr. 1998.

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## 1.9 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.

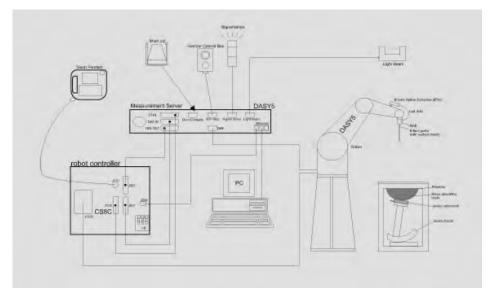


Fig. a A block diagram of the SAR measurement system

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

- 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).
- 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.
- 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.

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- 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.
- 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.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7
- DASY 5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

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## 1.10 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
	/1900/2450/2600/5200/5300/5600/5800 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 $\mu$ W/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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#### SAM PHANTOM V4.0C

Construction:	The shell corresponds to the specifi	cations of the Specific								
	Anthropomorphic Mannequin (SAM) phantom defined in IEEE									
	1528-200X, CENELEC 50361 and IE	28-200X, CENELEC 50361 and IEC 62209.								
	It enables the dosimetric evaluation of left and right hand phone									
	usage as well as body mounted usage at the flat phantom region									
	cover prevents evaporation of the li	iquid. Reference markings on the								
	phantom allow the complete setup of	of all predefined phantom positions								
	and measurement grids by manuall	y teaching three points with the								
	robot.									
Shell Thickness:	2 ± 0.2 mm									
Filling Volume:	Approx. 25 liters	and the								
Dimensions:	Height: 210 mm;	T III								
	Length: 1000 mm;									
	Width: 500 mm									

## **DEVICE HOLDER**

Construction	In combination with the Twin SAM Phantom	
	V4.0/V4.0C or Twin SAM, the Mounting	- Change
	<b>. . . .</b>	
	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,	A STATE
	CENELEC, FCC or other specifications. The	
	device holder can be locked at different	
	phantom locations (left head, right head, flat	Device Holder
	phantom).	

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### 1.11 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 KDB865664 D01) from the target SAR values.

These tests were done at 750/835/1750/1900/2450/2600/5200/5300/5600/5800 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 ambient temperature of the laboratory was 21.7°C, the relative humidity was 62% and 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.

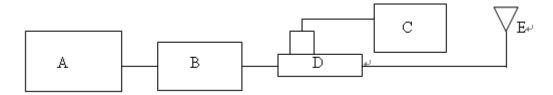


Fig. b The block diagram of system verification

- A. Signal Generator
- B. Amplifier
- C. Power Sensor
- D. Dual Directional Coupling
- E. Reference Dipole Antenna



Photograph of the Dipole Antenna

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Validation Kit	S/N	Frequency (MHz)		Target SAR (1g) (Pin=250mW)	Measured SAR (1g)(mW/g)	Deviation (%)	Measured Date		
D750V2	1015	750	Head	2.14	2.01	6.07%	Feb. 05,2014		
D750V2	1015	750	Body	2.23	2.1	5.83%	Feb. 15,2014		
D835V2	4d156	835	Head	2.48	2.5	-0.81%	Jan. 30,2014		
D033VZ	40150	000	Body	2.46	2.45	0.41%	Jan. 31,2014		
	1095	1750	Head	9.01	8.78	2.55%	Feb. 01,2014		
	1095	1750	Body	9.5	9.82	-3.37%	red. 01,2014		
D1750V2			Head	9.04	8.46	6.42%	Feb. 16,2014		
D1750V2	1000	1750		9.46	9.16	3.17%	Feb. 17,2014		
	1008	1008	1008	1750	Body	9.46	9.14	3.38%	Feb. 18,2014
				9.46	8.9	5.92%	Feb. 19,2014		
D1900V2	5d173	1900	Head	9.82	9.83	-0.10%	Feb. 04,2014		
D1900v2	50175	1900	Body	10.1	9.98	1.19%	Feb. 05,2014		
D2450V2	912	2450	Head	13.5	13.3	1.48%	Feb. 12,2014		
D2450V2	912	2450	Body	13.2	13.5	-2.27%	red. 12,2014		
			Head	14.7	14.5	1.36%	Feb. 20,2014		
D2600V2	1005	2600	Dody	14.3	14.3	0.00%	Feb. 21,2014		
			Body	14.3	14.4	-0.70%	Feb. 22,2014		
		5200	Head	8.27	8.11	1.93%			
		5200	Body	7.64	7.53	1.44%			
		5300	Head	8.51	8.72	-2.47%			
	1104	5300	Body	7.77	7.72	0.64%	Fab 12 2014		
D5GHzV2	1104	E400	Head	8.62	8.49	1.51%	Feb. 13,2014		
		5600	Body	8.25	8.23	0.24%			
		5000		8.09	7.95	1.73%			
		5800	Body	7.6	7.56	0.53%			

Table 1. System validation (follow manufacture target value)

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## 1.12 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 conjuncation 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)

Measured Frequency (MHz)	Tissue Type	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, Er	Measured Conductivity, σ (S/m)	% dev <b>ɛ</b> r	% dev σ	Measurement Date
709		42.155	0.890	43.981	0.858	-4.33%	3.60%	
710	Head	42.149	0.890	43.788	0.861	-3.89%	3.26%	Feb. 5,2014
711	пеаи	42.144	0.890	43.722	0.867	-3.74%	2.58%	rep. 5,2014
750		41.942	0.893	43.374	0.873	-3.41%	2.24%	
709		55.691	0.960	54.683	0.924	1.81%	3.75%	
710	Body	55.687	0.960	54.604	0.925	1.94%	3.65%	Feb. 15,2014
711	БОЦУ	55.683	0.960	54.538	0.927	2.06%	3.44%	rep. 15,2014
750		55.531	0.963	54.444	0.957	1.96%	0.62%	
824.2		41.556	0.899	42.082	0.874	-1.27%	2.80%	
826.4		41.545	0.899	42.057	0.876	-1.23%	2.56%	
835	Head	41.500	0.900	41.947	0.885	-1.08%	1.67%	Jan. 30,2014
836.6	пеаи	41.500	0.902	40.919	0.887	1.40%	1.66%	Jan. 30,2014
846.6		41.500	0.912	41.798	0.897	-0.72%	1.64%	
848.8		41.500	0.915	41.773	0.899	-0.66%	1.75%	
824.2		55.242	0.969	53.674	0.995	2.84%	-2.67%	
826.4		55.234	0.969	53.656	0.997	2.86%	-2.89%	
835	Pody	55.2	0.97	53.585	1.006	2.93%	-3.71%	lap 21 2014
836.6	Body	55.195	0.972	53.568	1.009	2.95%	-3.81%	Jan. 31,2014
846.6		55.164	0.984	53.49	1.019	3.03%	-3.56%	
848.8		55.158	0.987	53.473	1.021	3.05%	-3.44%	

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Measured Frequency (MHz)	Tissue Type	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, Er	Measured Conductivity, σ (S/m)	% dev ɛr	% dev σ	Measurement Date
1712.4		40.138	1.349	41.248	1.339	-2.77%	0.74%	
1732.4	Head	40.107	1.361	41.158	1.357	-2.62%	0.29%	
1750	пеаи	40.079	1.371	41.094	1.374	-2.53%	-0.22%	
1752.6		40.075	1.373	41.081	1.377	-2.51%	-0.29%	Feb. 1,2014
1712.4		53.531	1.465	54.244	1.395	-1.33%	4.78%	rep. 1,2014
1732.4	Body	53.478	1.477	54.197	1.418	-1.34%	3.99%	
1750	БОЦУ	53.432	1.488	54.16	1.436	-1.36%	3.49%	
1752.6		53.425	1.49	54.143	1.439	-1.34%	3.42%	
1720		40.126	1.354	38.886	1.363	3.09%	-0.66%	
1732.5	Head	40.107	1.361	38.76	1.372	3.36%	-0.81%	Feb. 16,2014
1745	пеаи	40.187	1.368	38.711	1.38	3.67%	-0.88%	reb. 10,2014
1750		40.079	1.371	38.645	1.391	3.58%	-1.46%	
1720		53.511	1.469	55.58	1.424	-3.87%	3.06%	
1732.5		53.478	1.477	55.435	1.454	-3.66%	1.56%	Feb. 17,2014
1745		53.445	1.485	55.411	1.459	-3.68%	1.75%	reb. 17,2014
1750		53.432	1.488	55.384	1.467	-3.65%	1.41%	
1720		53.511	1.469	55.522	1.426	-3.76%	2.93%	
1732.5	Body	53.478	1.477	55.403	1.455	-3.60%	1.49%	Feb. 18,2014
1745	БОЦУ	53.445	1.485	55.275	1.463	-3.42%	1.48%	rep. 10,2014
1750		53.432	1.488	55.219	1.466	-3.34%	1.48%	
1720		53.511	1.469	55.583	1.423	-3.87%	3.13%	
1732.5		53.478	1.477	55.441	1.452	-3.67%	1.69%	Feb. 19,2014
1745		53.445	1.485	55.416	1.461	-3.69%	1.62%	red. 19,2014
1750		53.432	1.488	55.302	1.463	-3.50%	1.68%	

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Measured Frequency (MHz)	Tissue Type	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, Er	Measured Conductivity, σ (S/m)	% dev εr	% dev σ	Measurement Date
1850.2		40.000	1.400	39.137	1.332	2.16%	4.86%	
1852.4		40.000	1.400	39.127	1.334	2.18%	4.71%	
1880	Head	40.000	1.400	39.019	1.36	2.45%	2.86%	Feb. 4,2014
1900	nedu	40.000	1.400	38.931	1.38	2.67%	1.43%	100. 4,2014
1907.6		40.000	1.400	38.898	1.388	2.75%	0.86%	
1909.8		40.000	1.400	38.891	1.389	2.77%	0.79%	
1850.2		53.300	1.520	54.23	1.476	-1.74%	2.89%	
1852.4		53.300	1.520	54.222	1.479	-1.73%	2.70%	
1880	Body	53.300	1.520	54.138	1.509	-1.57%	0.72%	Feb. 5,2014
1900	DOUY	53.300	1.520	54.067	1.532	-1.44%	-0.79%	160. 5,2014
1907.6		53.300	1.520	54.041	1.541	-1.39%	-1.38%	
1909.8		53.300	1.520	54.036	1.544	-1.38%	-1.58%	
2412		39.268	1.766	39.73	1.802	-1.18%	-2.04%	
2437	Head	39.223	1.788	39.63	1.832	-1.04%	-2.46%	Feb. 12,2014
2450	пеаи	39.200	1.800	39.586	1.849	-0.98%	-2.72%	FED. 12,2014
2462		39.185	1.813	39.541	1.863	-0.91%	-2.76%	
2412		52.751	1.914	51.136	1.935	3.06%	-1.10%	
2437	Dealu	52.717	1.938	51.076	1.972	3.11%	-1.75%	Fab 12 2014
2450	Body	52.700	1.950	51.052	1.99	3.13%	-2.05%	Feb. 12,2014
2462		52.685	1.967	51.01	2.005	3.18%	-1.93%	
2510		39.124	1.865	40.164	1.886	-2.66%	-1.13%	
2535		39.092	1.893	40.059	1.906	-2.47%	-0.69%	
2560	Head	39.060	1.920	39.999	1.948	-2.40%	-1.46%	Feb. 20,2014
2600		39.009	1.964	39.635	2.003	-1.60%	-1.99%	
2510		52.624	2.035	51.072	2.12	2.95%	-4.18%	
2535		52.592	2.071	50.928	2.148	3.16%	-3.72%	
2560	Body	52.560	2.106	50.8	2.163	3.35%	-2.71%	Feb. 21,2014
2600		52.509	2.163	50.622	2.224	3.59%	-2.82%	
2510		52.624	2.035	51.022	2.101	3.04%	-3.24%	
2535		52.592	2.033	50.898	2.101	3.22%	-3.52%	
	Body							Feb. 22,2014
2560		52.560	2.106	50.787	2.161	3.37%	-2.61%	
2600		52.509	2.163	50.662	2.234	3.52%	-3.28%	

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Measured Frequency (MHz)	Tissue Type	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, Er	Measured Conductivity, σ (S/m)	% dev εr	% dev σ	Measurement Date
5180		36.009	4.635	36.151	4.582	-0.40%	1.13%	
5200		35.986	4.655	36.097	4.612	-0.31%	0.92%	
5220	Head	35.963	4.676	36.083	4.647	-0.33%	0.61%	Feb. 13,2014
5280		35.894	4.737	35.914	4.698	-0.05%	0.82%	
5300		35.871	4.758	35.85	4.726	0.06%	0.66%	
5180		49.041	5.276	48.476	5.144	1.15%	2.50%	
5200		49.014	5.299	48.422	5.167	1.21%	2.50%	
5220	Body	48.987	5.323	48.357	5.202	1.29%	2.27%	Feb. 13,2014
5280		48.906	5.393	48.207	5.291	1.43%	1.89%	
5300		48.879	5.416	48.156	5.314	1.48%	1.88%	
5540		35.597	5.004	35.316	5.012	0.79%	-0.16%	
5560	Head	35.574	5.024	35.284	5.031	0.82%	-0.14%	
5600	пеаи	35.529	5.065	35.164	5.075	1.03%	-0.20%	
5660		35.460	5.127	35.063	5.147	1.12%	-0.39%	
5540		48.553	5.696	47.532	5.67	2.10%	0.46%	
5560	Body	48.526	5.720	47.477	5.699	2.16%	0.37%	
5600	БОЦУ	48.471	5.766	47.391	5.754	2.23%	0.21%	
5660		48.390	5.837	47.232	5.845	2.39%	-0.14%	Feb. 13,2014
5765		35.340	5.234	34.788	5.27	1.56%	-0.69%	Feb. 13,2014
5785	Head	35.317	5.255	34.751	5.298	1.60%	-0.83%	
5800	пеаи	35.3	5.27	34.725	5.309	1.63%	-0.74%	
5805		35.294	5.275	34.702	5.315	1.68%	-0.76%	
5765		48.248	5.959	46.968	6	2.65%	-0.69%	
5785	Dodu	48.220	5.982	46.926	6.031	2.68%	-0.81%	
5800	Body	48.2	6	46.896	6.046	2.71%	-0.77%	
5805		48.193	6.006	46.878	6.054	2.73%	-0.80%	

Table 2. Dielectric Parameters of Tissue Simulant Fluid

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Fraguanay				Ingre	edient			Total
Frequency (MHz)	Mode	DGMBE	Water	Salt	Preventol D-7	Cellulose	Sugar	Total amount
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)
1750	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)
1000	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)
2450	Head	550ml	450ml	_				1.0L(Kg)
2450	Body	301.7ml	698.3ml	_				1.0L(Kg)
2400	Head	550ml	450ml					1.0L(Kg)
2600	Body	301.7ml	698.3ml					1.0L(Kg)

The composition of the brain tissue simulating liquid:

#### Simulating Liquids for 5 GHz, Manufactured by SPEAG:

Ingredients	Water	Esters, Emulsifiers, Inhibitors	Sodium and Salt
(% by weight)	60-80	20-40	0-1.5

Table 3. Recipes for tissue simulating liquid

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## 1.13 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 C95.1–1992, Copyright 1992 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 a 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.

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(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).

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 m W/g	8.00 m W/g
Spatial Average SAR (Whole Body)	0.08 m W/g	0.40 m W/g
Spatial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 m W/g	20.00 m W/g

#### 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.
- 2. 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 MHz

Mode	Position	Distanc e (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged 10 (W/ Measured	g kg)	Plot page
	RE Cheek	-	128	824.2	33.5	33.1	9.65%	0.323	0.354	-
	RE Cheek	-	190	836.6	33.5	33.1	9.65%	0.411	0.451	-
GSM	RE Cheek	-	251	848.8	33.5	33	12.20%	0.405	0.454	-
(Head)	RE Tilt	-	190	836.6	33.5	33.1	9.65%	0.282	0.309	-
	LE Cheek	-	190	836.6	33.5	33.1	9.65%	0.386	0.423	-
	LE Tilt	-	190	836.6	33.5	33.1	9.65%	0.254	0.279	-
	RE Cheek	-	128	824.2	28	27.9	2.33%	0.3	0.307	-
	RE Cheek	-	190	836.6	28	27.9	2.33%	0.391	0.400	-
	RE Cheek	-	251	848.8	28	27.9	2.33%	0.46	0.471	118
GSM+GPRS DTM_3up (Head)	RE Cheek — With Memory Card	-	251	848.8	28	27.9	2.33%	0.419	0.429	-
	RE Tilt	-	190	836.6	28	27.9	2.33%	0.244	0.250	-
	LE Cheek	-	190	836.6	28	27.9	2.33%	0.349	0.357	-
	LE Tilt	-	190	836.6	28	27.9	2.33%	0.226	0.231	-
	Front side	15mm	190	836.6	33.5	33.1	9.65%	0.264	0.289	-
GSM (Body-Worn	Back side	15mm	128	824.2	33.5	33.1	9.65%	0.419	0.459	120
speech mode)	Back side	15mm	190	836.6	33.5	33.1	9.65%	0.403	0.442	-
speech mode)	Back side	15mm	251	848.8	33.5	33	12.20%	0.408	0.458	-
GSM+GPRS	Front side	15mm	190	836.6	28	27.9	2.33%	0.373	0.382	-
DTM_3up	Back side	15mm	128	824.2	28	27.9	2.33%	0.37	0.379	-
(Body-Worn	Back side	15mm	190	836.6	28	27.9	2.33%	0.408	0.418	-
speech mode)	Back side	15mm	251	848.8	28	27.9	2.33%	0.447	0.457	-
	Front side	10mm	128	824.2	28	27.8	4.71%	0.457	0.479	-
0000	Front side	10mm	190	836.6	28	27.7	7.15%	0.523	0.560	-
GPRS (Hotspot)	Front side	10mm	251	848.8	28	27.6	9.65%	0.552	0.605	121
(1Dn4UP)	Back side	10mm	190	836.6	28	27.7	7.15%	0.474	0.508	-
(1211101)	Bottom side	10mm	190	836.6	28	27.7	7.15%	0.161	0.173	-
	Left side	10mm	190	836.6	28	27.7	7.15%	0.502	0.538	-

Using KDB941225 D03v01 and KDB941225 D04v01 to exclude SAR test requirements for EDGE modes due to the source-based time-averaged output power for EDGE mode is lower than that in the GPRS mode.

# According to KDB447498 D01v05 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.

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#### **GSM 1900 MHz**

Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance	Measured Avg. Power (dBm)	Scaling	Averaged 1 (W) Measured	g	Plot page
	RE Cheek	-	512	1850.2	31	30.8	4.71%	0.098	0.103	-
	RE Cheek	-	661	1880	31	30.6	9.65%	0.106	0.116	-
GSM	RE Cheek	-	810	1909.8	31	30.5	12.20%	0.126	0.141	-
(Head)	RE Tilt	-	661	1880	31	30.6	9.65%	0.026	0.029	-
	LE Cheek	-	661	1880	31	30.6	9.65%	0.081	0.089	-
	LE Tilt	-	661	1880	31	30.6	9.65%	0.028	0.031	-
	RE Cheek	-	512	1850.2	28	27.9	2.33%	0.164	0.168	-
0014 0000	RE Cheek	-	661	1880	28	27.8	4.71%	0.171	0.179	122
GSM+GPRS DTM_3up	RE Cheek	-	810	1909.8	28	27.9	2.33%	0.158	0.162	-
(Head)	RE Tilt	-	661	1880	28	27.8	4.71%	0.034	0.036	-
(	LE Cheek	-	661	1880	28	27.8	4.71%	0.081	0.085	-
	LE Tilt	-	661	1880	28	27.8	4.71%	0.04	0.042	-
0.014	Front side	15mm	512	1850.2	31	30.8	4.71%	0.596	0.624	-
GSM (Body-worn	Front side	15mm	661	1880	31	30.6	9.65%	0.574	0.629	-
speech mode)	Front side	15mm	810	1909.8	31	30.5	12.20%	0.665	0.746	-
	Back side	15mm	661	1880	31	30.6	9.65%	0.453	0.497	-
	Front side	15mm	512	1850.2	28	27.9	2.33%	1.12	1.146	123
	Front side	15mm	661	1880	28	27.8	4.71%	1.06	1.110	-
GSM+GPRS	Front side	15mm	810	1909.8	28	27.9	2.33%	0.92	0.941	-
DTM_3up (Body-worn	Front side*	15 mm	512	1850.2	28	27.9	2.33%	1.1	1.126	-
speech mode)	Back side	15mm	512	1850.2	28	27.9	2.33%	0.775	0.793	-
	Back side	15mm	661	1880	28	27.8	4.71%	0.768	0.804	-
	Back side	15mm	810	1909.8	28	27.9	2.33%	0.706	0.722	-
	Front side	10mm	661	1880	21	21	0.00%	0.612	0.612	-
	Back side	10mm	661	1880	21	21	0.00%	0.412	0.412	-
GPRS	Bottom side	10mm	512	1850.2	21	21	0.00%	1.01	1.010	124
(Hotspot)	Bottom side	10mm	661	1880	21	21	0.00%	0.918	0.918	-
(1Dn4UP)	Bottom side	10mm	810	1909.8	21	21	0.00%	0.77	0.770	-
	Bottom side*	10mm	512	1850.2	21	21	0.00%	1.01	1.010	125
	Left side	10mm	661	1880	21	21	0.00%	0.017	0.017	-

\* - repeated at the highest SAR measurement according to the FCC KDB 865664 D01v01

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Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance	Avg. Power	Scaling	1(	SAR over )g ′kg)	Plot page
		~ /			(dBm)	(dBm)		Measured	Reported	1 3
	Front side	0mm	661	1880	21	21	0.00%	1.04	1.040	126
GPRS	Back side	0mm	661	1880	21	21	0.00%	0.473	0.473	-
(Hand)	Bottom side	0mm	512	1850.2	21	21	0.00%	0.631	0.631	-
(1Dn4UP)	Bottom side	0mm	661	1880	21	21	0.00%	0.638	0.638	-
	Bottom side	0mm	810	1909.8	21	21	0.00%	0.679	0.679	-

# Using KDB941225 D03v01 and KDB941225 D04v01 to exclude SAR test requirements for EDGE modes due to the source-based time-averaged output power for EDGE mode is lower than that in the GPRS mode.

# According to KDB447498 D01v05 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq$  100 MHz, testing for the other channels is not required.

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#### WCDMA Band II

Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max.	Measured Avg. Power	Scaling	•	AR over 1g /kg)	Plot
		(((((((((((((((((((((((((((((((((((((((			Tolerance (dBm)	(dBm)		Measured	Reported	page
	RE Cheek	-	9262	1852.4	24	23.77	5.44%	0.17	0.179	-
	RE Cheek	-	9400	1880	24	23.74	6.17%	0.187	0.199	-
R99	RE Cheek	-	9538	1907.6	24	23.67	7.89%	0.202	0.218	127
(Head)	RE Tilt	-	9400	1880	24	23.74	6.17%	0.03	0.032	-
	LE Cheek	-	9400	1880	24	23.74	6.17%	0.078	0.083	-
	LE Tilt	-	9400	1880	24	23.74	6.17%	0.044	0.047	-
	Front side	15mm	9262	1852.4	24	23.77	5.44%	1.13	1.191	128
	Front side	15mm	9400	1880	24	23.74	6.17%	1.07	1.136	-
Body-worn	Front side	15mm	9538	1907.6	24	23.67	7.89%	1.01	1.090	-
(speech	Front side*	15mm	9262	1852.4	24	23.77	5.44%	1.11	1.170	-
mode)	Back side	15mm	9262	1852.4	24	23.77	5.44%	0.786	0.829	-
	Back side	15mm	9400	1880	24	23.74	6.17%	0.775	0.823	-
	Back side	15mm	9538	1907.6	24	23.67	7.89%	0.706	0.762	-
	Front side	10mm	9400	1880	18	17.74	6.17%	0.568	0.603	-
	Back side	10mm	9400	1880	18	17.74	6.17%	0.341	0.362	-
	Bottom side	10mm	9262	1852.4	18	17.76	5.68%	0.865	0.914	-
Hotspot	Bottom side	10mm	9400	1880	18	17.74	6.17%	0.782	0.830	-
	Bottom side	10mm	9538	1907.6	18	17.71	6.91%	0.738	0.789	-
	Bottom side*	10mm	9262	1852.4	18	17.76	5.68%	0.88	0.930	129
	Left side	10mm	9400	1880	18	17.74	6.17%	0.02	0.021	-

\* - repeated at the highest SAR measurement according to the KDB 865664 D01v01

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Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance	Avg. Power	Scaling	•	SAR over )g ′kg)	Plot page
		~ /			(dBm)	(dBm)		Measured	Reported	1. 2.
	Front side	0mm	9400	1880	18	17.74	6.17%	0.985	1.046	130
DOO	Back side	0mm	9400	1880	18	17.74	6.17%	0.406	0.431	-
R99 (Hand)	Bottom side	0mm	9262	1852.4	18	17.76	5.68%	0.585	0.618	-
(nand)	Bottom side	0mm	9400	1880	18	17.74	6.17%	0.664	0.705	-
	Bottom side	0mm	9538	1907.6	18	17.71	6.91%	0.796	0.851	-

# Using KDB941225 D01v02 to exclude SAR test requirements for HSPA modes due to the maximum average output power of HSPA active is higher than that measured without HSPA using 12.2kbps RMC but increase less than 1/4 dB.

# According to KDB447498 D01v05 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.

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#### WCDMA Band IV

Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max.	Measured Avg. Power	Scaling	Averaged S (W/	•	Plot
		(1111)		(101112)	Tolerance (dBm)	(dBm)		Measured	Reported	page
	RE Cheek	-	1312	1712.4	22.3	22.02	6.66%	0.167	0.178	131
	RE Cheek	-	1412	1732.4	22.3	21.95	8.39%	0.154	0.167	-
R99	RE Cheek	-	1513	1752.6	22.3	22.17	3.04%	0.147	0.151	-
(Head)	RE Tilt	-	1412	1732.4	22.3	21.95	8.39%	0.058	0.063	-
	LE Cheek	-	1412	1732.4	22.3	21.95	8.39%	0.113	0.122	-
	LE Tilt	-	1412	1732.4	22.3	21.95	8.39%	0.028	0.030	-
	Front side	15mm	1312	1712.4	22.3	22.02	6.66%	0.995	1.061	-
Deducuero	Front side	15mm	1412	1732.4	22.3	21.95	8.39%	1.07	1.160	-
Body-worn (speech mode)	Front side	15mm	1513	1752.6	22.3	22.17	3.04%	1.14	1.175	132
(speccir mode)	Front side*	15mm	1513	1752.6	22.3	22.17	3.04%	1.14	1.175	133
	Back side	15mm	1412	1732.4	22.3	21.95	8.39%	0.716	0.776	-
	Front side	10mm	1312	1712.4	18	17.92	1.86%	0.75	0.764	-
	Front side	10mm	1412	1732.4	18	17.86	3.28%	0.817	0.844	-
	Front side	10mm	1513	1752.6	18	17.98	0.46%	0.905	0.909	-
	Back side	10mm	1412	1732.4	18	17.86	3.28%	0.536	0.554	-
Hotspot	Bottom side	10mm	1312	1712.4	18	17.92	1.86%	0.796	0.811	-
	Bottom side	10mm	1412	1732.4	18	17.86	3.28%	0.92	0.950	-
	Bottom side	10mm	1513	1752.6	18	17.98	0.46%	1.08	1.085	134
	Bottom side*	10mm	1513	1752.6	18	17.98	0.46%	1.08	1.085	135
	Left side	10mm	1412	1732.4	18	17.86	3.28%	0.072	0.074	-

\* - repeated at the highest SAR measurement according to the KDB 865664 D01v01

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Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance	Avg. Power	Scaling	1(	SAR over )g ′kg)	Plot page
		~ /			(dBm)	(dBm)		Measured	Reported	1 3
	Front side	0mm	1312	1712.4	18	17.92	1.86%	1.24	1.263	-
	Front side	0mm	1412	1732.4	18	17.86	3.28%	1.25	1.291	136
DOO	Front side	0mm	1513	1752.6	18	17.98	0.46%	1.28	1.286	-
R99 (Hand)	Back side	0mm	1412	1732.4	18	17.86	3.28%	0.557	0.575	-
(Hand)	Bottom side	0mm	1312	1712.4	18	17.92	1.86%	0.454	0.462	-
	Bottom side	0mm	1412	1732.4	18	17.86	3.28%	0.456	0.471	-
	Bottom side	0mm	1513	1752.6	18	17.98	0.46%	0.494	0.496	-

- # Using KDB941225 D01v02 to exclude SAR test requirements for HSPA modes due to the maximum average output power of HSPA active is higher than that measured without HSPA using 12.2kbps RMC but increase less than 1/4 dB.
- # According to KDB447498 D01v05 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.

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#### WCDMA Band V

Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max.	Measured Avg. Power	Scaling	Averaged S (W/	0	Plot
		(1111)			Tolerance (dBm)	(dBm)		Measured	Reported	page
	RE Cheek	-	4132	826.4	24.5	24.30	4.71%	0.399	0.418	-
	RE Cheek	-	4183	836.6	24.5	24.16	8.14%	0.406	0.439	-
R99	RE Cheek	-	4233	846.6	24.5	24.26	5.68%	0.429	0.453	137
(Head)	RE Tilt	-	4183	836.6	24.5	24.16	8.14%	0.292	0.316	-
	LE Cheek	-	4183	836.6	24.5	24.16	8.14%	0.376	0.407	-
	LE Tilt	-	4183	836.6	24.5	24.16	8.14%	0.273	0.295	-
	Front side	15mm	4132	826.4	24.5	24.30	4.71%	0.408	0.427	138
Body-worn	Front side	15mm	4183	836.6	24.5	24.16	8.14%	0.394	0.426	-
(speech mode)	Front side	15mm	4233	846.6	24.5	24.26	5.68%	0.367	0.388	-
	Back side	15mm	4183	836.6	24.5	24.16	8.14%	0.392	0.424	-
	Front side	10mm	4183	836.6	24.5	24.16	8.14%	0.484	0.523	-
	Back side	10mm	4183	836.6	24.5	24.16	8.14%	0.503	0.544	-
Hotspot	Bottom side	10mm	4183	836.6	24.5	24.16	8.14%	0.091	0.098	-
notspot	Left side	10mm	4132	826.4	24.5	24.30	4.71%	0.513	0.537	-
	Left side	10mm	4183	836.6	24.5	24.16	8.14%	0.508	0.549	139
	Left side	10mm	4233	846.6	24.5	24.26	5.68%	0.489	0.517	-

\* - repeated at the highest SAR measurement according to the FCC KDB 865664 D01v01

- # Using KDB941225 D01v02 to exclude SAR test requirements for HSPA modes due to the maximum average output power of HSPA active is higher than that measured without HSPA using 12.2kbps RMC but increase less than 1/4 dB.
- # According to KDB447498 D01v05 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq$  100 MHz, testing for the other channels is not required.

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#### LTE FDD Band IV

									Max. Rated	Measured			SAR over N/kg)	
Mode	Bandwidth (MHz)	Modulatior	RB Size	RB start	Position	Distance (mm)	СН	Freq. (MHz)	Avg. Power + Max. Tolerance (dBm)	Avg. Power (dBm)	Scaling	Measured	Reported	Plot page
					RE Cheek	-	20050	1720	22.5	22.29	4.95%	0.152	0.160	-
					RE Cheek	-	20175	1732.5	22.5	22.43	1.62%	0.172	0.175	140
					RE Cheek	-	20300	1745	22.5	22.43	1.62%	0.169	0.172	-
					RE Tilt	-	20175	1732.5	22.5	22.43	1.62%	0.041	0.042	-
			1 RB	0	RE Tilt	-	20300	1745	22.5	22.43	1.62%	0.053	0.054	-
					LE Cheek	-	20175	1732.5	22.5	22.43	1.62%	0.137	0.139	-
					LE Cheek	-	20300	1745	22.5	22.43	1.62%	0.122	0.124	-
LTE Band 4					LE Tilt	-	20175	1732.5	22.5	22.43	1.62%	0.028	0.028	-
(Head)	20MHz	QPSK			LE Tilt	-	20300	1745	22.5	22.43	1.62%	0.03	0.030	-
(nead)				RE Cheek	-	20175	1732.5	22	21.47	12.98%	0.135	0.153	-	
		50 RB	0	RE Tilt	-	20175	1732.5	22	21.47	12.98%	0.035	0.040	-	
			00110	Ŭ	LE Cheek	-	20175	1732.5	22	21.47	12.98%	0.105	0.119	-
					LE Tilt	-	20175	1732.5	22	21.47	12.98%	0.022	0.025	-
					RE Cheek	-	20300	1745	21.5	21.38	2.80%	0.124	0.127	-
			100	RB	RE Tilt	-	20300	1745	21.5	21.38	2.80%	0.04	0.041	-
				115	LE Cheek	-	20300	1745	21.5	21.38	2.80%	0.088	0.090	-
					LE Tilt	-	20300	1745	21.5	21.38	2.80%	0.021	0.022	-
					Front side	15mm	20050	1720	22.5	22.29	4.95%	1.03	1.081	-
					Front side	15mm	20175	1732.5	22.5	22.43	1.62%	1.26	1.280	141
					Front side	15mm	20300	1745	22.5	22.43	1.62%	1.22	1.240	-
					Front side -with memory card	15mm	20175	1732.5	22.5	22.43	1.62%	1.17	1.189	-
			1 RB	0	Front side -with headset	15mm	20175	1732.5	22.5	22.43	1.62%	1.09	1.108	-
LTE Band 4					Front side*	15mm	20175	1732.5	22.5	22.43	1.62%	1.25	1.270	-
(Body-	20MHz	QPSK			Back side	15mm	20050	1720	22.5	22.29	4.95%	0.732	0.768	-
Worn)					Back side	15mm	20175	1732.5	22.5	22.43	1.62%	0.831	0.845	-
					Back side	15mm	20300	1745	22.5	22.43	1.62%	0.847	0.861	-
					Front side	15mm	20050	1720	22	21.38	15.35%	0.851	0.982	-
			50 RB	0	Front side	15mm	20175	1732.5	22	21.47	12.98%	0.967	1.093	-
			30 KD	0	Front side	15mm	20300	1745	22	21.45	13.50%	0.903	1.025	-
					Back side	15mm	20175	1732.5	22	21.47	12.98%	0.652	0.737	-
					Front side	15mm	20050	1720	21.5	21.35	3.51%	0.836	0.865	-
			100	RB	Front side	15mm	20175	1732.5	21.5	21.33	3.99%	0.92	0.957	-
			100	κD	Front side	15mm	20300	1745	21.5	21.38	2.80%	0.91	0.935	-
				Back side	15mm	20300	1745	21.5	21.38	2.80%	0.638	0.656	<u> </u>	

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									Max. Rated	Measured			SAR over V/kg)	
Mode	Bandwidth (MHz)	Modulatior	RB Size	RB start	Position	Distance (mm)	СН	Freq. (MHz)	Avg. Power + Max. Tolerance (dBm)	Avg. Power (dBm)	Scaling	Measured	Reported	Plot page
					Front side	10mm	20050	1720	19	18.88	2.80%	0.868	0.892	-
					Front side	10mm	20175	1732.5	19	18.92	1.86%	0.964	0.982	-
					Front side	10mm	20300	1745	19	18.85	3.51%	1.01	1.045	-
			1 00	99	Back side	10mm	20175	1732.5	19	18.92	1.86%	0.609	0.620	-
			1 RB	99	Bottom side	10mm	20050	1720	19	18.88	2.80%	1.01	1.038	-
					Bottom side	10mm	20175	1732.5	19	18.92	1.86%	1.14	1.161	-
					Bottom side	10mm	20300	1745	19	18.85	3.51%	1.2	1.242	-
					Left side	10mm	20175	1732.5	19	18.92	1.86%	0.097	0.099	-
				Front side	10mm	20050	1720	19	18.93	1.62%	0.914	0.929	-	
				Front side	10mm	20300	1745	19	18.82	4.23%	1.04	1.084	-	
				0	Back side	10mm	20050	1720	19	18.93	1.62%	0.581	0.590	-
				0	Bottom side	10mm	20050	1720	19	18.93	1.62%	1.08	1.098	-
			50 RB		Bottom side	10mm	20300	1745	19	18.82	4.23%	1.26	1.313	-
					Left side	10mm	20050	1720	19	18.93	1.62%	0.093	0.095	-
LTE Band 4		0.001/		5.0	Front side	10mm	20175	1732.5	19	18.89	2.57%	1.02	1.046	-
(Hotspot)	20MHz	QPSK		50	Bottom side	10mm	20175	1732.5	19	18.89	2.57%	1.15	1.179	-
( · · · ]· · · /					Front side	10mm	20050	1720	19	18.89	2.57%	0.937	0.961	-
				·	Front side	10mm	20175	1732.5	19	18.78	5.20%	0.99	1.041	-
					Front side	10mm	20300	1745	19	18.81	4.47%	1.04	1.087	-
					Back side	10mm	20050	1720	19	18.89	2.57%	0.583	0.598	-
					Bottom side	10mm	20050	1720	19	18.89	2.57%	1.12	1.149	-
					Bottom side	10mm	20175	1732.5	19	18.78	5.20%	1.18	1.241	-
					Bottom side	10mm	20300	1745	19	18.81	4.47%	1.29	1.348	142
			100	RB	Bottom side									
					-with	10mm	20300	1745	19	18.81	4.47%	1.24	1.295	-
				memory card										
				Bottom side	10	00000	47.5	40	10.01	4 4707	4.04	4.017		
					-with	10mm	20300	1745	19	18.81	4.47%	1.26	1.316	-
					headset	10	00000	4745	10	10.01	4.470/	1.00	1 007	
				B	Bottom side*	10mm	20300	1745	19	18.81	4.47%	1.28	1.337	-
					Left side	10mm	20050	1720	19	18.89	2.57%	0.095	0.097	-

\* - repeated at the highest SAR measurement according to the FCC KDB 865664 D01v01

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									Max. Rated	Measured			SAR over W/kg)	
Mode	Bandwidth (MHz)	Modulatior	RB Size	RB start	Position	Distance (mm)	СН	Freq. (MHz)	Avg. Power + Max. Tolerance (dBm)	Avg. Power (dBm)	Scaling	Measured	Reported	Plot page
					Front side	-	20050	1720	19	18.88	2.80%	1.4	1.439	-
					Front side	-	20175	1732.5	19	18.92	1.86%	1.44	1.467	-
					Front side	-	20300	1745	19	18.85	3.51%	1.44	1.491	-
			1 RB	0	Back side	-	20175	1732.5	19	18.92	1.86%	0.772	0.786	-
				Bottom side	-	20050	1720	19	18.88	2.80%	0.647	0.665	-	
					Bottom side	-	20175	1732.5	19	18.92	1.86%	0.705	0.718	-
					Bottom side	-	20300	1745	19	18.85	3.51%	0.75	0.776	-
					Front side	-	20050	1720	19	18.93	1.62%	1.46	1.484	-
					Front side	-	20300	1745	19	18.82	4.23%	1.5	1.563	143
LTE Band 4				0	Back side	-	20050	1720	19	18.93	1.62%	0.747	0.759	-
(Hand)	20MHz	QPSK	50 RB		Bottom side	-	20050	1720	19	18.93	1.62%	0.697	0.708	-
(nana)					Bottom side	-	20300	1745	19	18.82	4.23%	0.732	0.763	-
				50	Front side	-	20175	1732.5	19	18.89	2.57%	1.47	1.508	-
				00	Bottom side	-	20175	1732.5	19	18.89	2.57%	0.657	0.674	-
					Front side	-	20050	1720	19	18.89	2.57%	1.45	1.487	-
					Front side	-	20175	1732.5	19	18.78	5.20%	1.46	1.536	-
					Front side	-	20300	1745	19	18.81	4.47%	1.45	1.515	-
			100	) RB	Back side	-	20050	1720	19	18.89	2.57%	0.748	0.767	-
					Bottom side	-	20050	1720	19	18.89	2.57%	0.686	0.704	-
					Bottom side	-	20175	1732.5	19	18.78	5.20%	0.648	0.682	-
				Bottom side	-	20300	1745	19	18.81	4.47%	0.69	0.721	-	

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#### LTE FDD Band VII

							Max. Rated	Measured		Averaged SA (W/A		
Mode Bandwidth (MHz) Modulati	or RB Size	RB start		Distance (mm)	СН	Freq. (MHz)	Avg. Power + Max. Tolerance (dBm)	Avg. Power (dBm)	Scaling	Measured	Reported	Plot page
			RE Cheek	-	21350	2560	23	22.96	0.93%	0.119	0.120	-
	1 RB	99	RE Tilt	-	21350	2560	23	22.96	0.93%	0.027	0.027	-
	IKD	77	LE Cheek	-	21350	2560	23	22.96	0.93%	0.107	0.108	-
			LE Tilt	-	21350	2560	23	22.96	0.93%	0.05	0.050	-
			RE Cheek	-	21350	2560	22.5	21.97	12.98%	0.096	0.108	-
	50 RB	50	RE Tilt	-	21350	2560	22.5	21.97	12.98%	0.023	0.026	-
LTE Band 7 20MHz QPSK	JU KD	50	LE Cheek	-	21350	2560	22.5	21.97	12.98%	0.089	0.101	-
(Head) 2010112 QPSK			LE Tilt	-	21350	2560	22.5	21.97	12.98%	0.042	0.047	-
			RE Cheek	-	20850	2510	22	21.78	5.20%	0.132	0.139	144
			RE Cheek	-	21100	2535	22	21.67	7.89%	0.114	0.123	-
	10	חם מ	RE Cheek	-	21350	2560	22	21.87	3.04%	0.098	0.101	-
	100	) RB	RE Tilt	-	21350	2560	22	21.87	3.04%	0.025	0.026	-
			LE Cheek	-	21350	2560	22	21.87	3.04%	0.093	0.096	-
			LE Tilt	-	21350	2560	22	21.87	3.04%	0.044	0.045	-
			Front side	15mm	21350	2560	23	22.96	0.93%	0.496	0.501	-
			Back side	15mm	20850	2510	23	22.68	7.65%	0.771	0.830	145
	1 RB	99	Back side	15mm	21100	2535	23	22.6	9.65%	0.611	0.670	-
LTE Band 7			Back side	15mm	21350	2560	23	22.96	0.93%	0.568	0.573	-
(Body- 20MHz QPSK			Back side*	15mm	20850	2510	23	22.68	7.65%	0.747	0.804	-
Worn)	50.00	5.0	Front side	15mm	21350	2560	22.5	21.97	12.98%	0.42	0.475	-
	50 RB	50	Back side	15mm	21350	2560	22.5	21.97	12.98%	0.481	0.543	-
			Front side	15mm	21350	2560	22	21.87	3.04%	0.436	0.449	-
	100	) RB	Back side	15mm	21350	2560	22	21.87	3.04%	0.494	0.509	-
			Front side	10mm	21350	2560	20	19.83	3.99%	0.519	0.540	-
	1 00	99	Back side	10mm	21350	2560	20	19.83	3.99%	0.553	0.575	-
	1 RB	99	Bottom side	10mm	21350	2560	20	19.83	3.99%	0.467	0.486	-
			Left side	10mm	21350	2560	20	19.83	3.99%	0.06	0.062	-
			Front side	10mm	21350	2560	20	19.49	12.46%	0.539	0.606	-
	50 RB	50	Back side	10mm	21350	2560	20	19.49	12.46%	0.574	0.646	-
LTE Band 7	00112		Bottom side	10mm	21350	2560	20	19.49	12.46%	0.494	0.556	-
(Hotspot) 20MHz QPSK			Left side	10mm	21350	2560	20	19.49	12.46%	0.06	0.067	-
			Front side	10mm	21350	2560	20	19.33	16.68%	0.533	0.622	-
			Back side	10mm	20850 21100	2510 2535	20 20	19.29 19.06	<u>17.76%</u> 24.17%	0.904	1.065 0.910	146
	10/	) RB	Back side Back side	10mm 10mm	21350	2535 2560	20	19.06	<u>24.17%</u> 16.68%	0.733	0.910	-
	100		Back side*	10mm	20850	2560	20	19.33	16.68%	0.584	1.047	+
			Bottom side	10mm	20850	2560	20	19.33	16.68%	0.889	0.587	-
1 1 1												

\* - repeated at the highest SAR measurement according to the FCC KDB 865664 D01v01

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									Max. Rated	Measured			SAR over W/kg)	
Mode	Bandwidth (MHz)	Modulatior	RB Size	RB start	Position	Distance (mm)	СН	Freq. (MHz)	Avg. Power + Max. Tolerance (dBm)	Avg. Power (dBm)	Scaling	Measured	Reported	Plot page
			50 RB	50	Front side	10mm	21350	2560	20	19.49	12.46%	2.03	2.283	-
			30 KD	50	Back side	10mm	21350	2560	20	19.49	12.46%	1.14	1.282	-
LTE Band 7	20₩⊔-				Front side	10mm	21350	2560	20	19.33	16.68%	2.01	2.345	147
(Hand)	20MH7 0PS	UPSK	100	RB	Back side	10mm	20850	2510	20	19.29	17.76%	1.52	1.790	-
()		100	ND	Back side	10mm	21100	2535	20	19.06	24.17%	1.28	1.589	-	
				Back side	10mm	21350	2560	20	19.33	16.68%	1.16	1.353	-	

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#### LTE FDD Band XVII

Mode         (MHz)         Modulation         RB Size         RB start         Position         (mm)         CH         (MHz)         Power + Max, Tolerance         Scaling (dBm)         Measured Reported         Reported Reported         power Reported         Scaling (dBm)         Measured Reported         Reported Reported         power Reported         Scaling Reported         Measured Reported         Reported Reported         power Reported         Scaling Reported         Measured Reported         Reported Reported         power Reported         Scaling Reported         Measured Reported         Reported Reported         power Reported         Scaling Reported         Measured Reported         Reported         power Reported         Scaling Reported         Measured Reported         Reported         power Reported         Scaling Reported         Measured Reported         Reported										Max. Rated	Measured		Averaged 1g (V	SAR over V/kg)	
$ \left[ \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Mode		Modulatior	RB Size	RB start	Position		СН		Power + Max. Tolerance	Power	Scaling	Measured	Reported	Plot page
LTE Band 17 (Head)         10MHz         OPSK         1 RB         49         LE Cheek LE Cheek         - 23790         210         25         24.95         1.16%         0.123         0.124         0.124           17 (Head)         10MHz         OPSK         LE Cheek         - 25 RB         23790         710         25         24.97         0.69%         0.125         0.126         0.085<						RE Cheek	-	23800	711		24.98	0.46%	0.114	0.115	-
LTE Band 17 (Head)         10MHz         QPSK         I RB         49         LE Cheek LE Cheek         -         23700         710         25         24.97         0.69%         0.125         0.126         1           17 (Head)         10MHz         QPSK         25 RB         25 RB         25         RE Cheek         -         23800         711         25         24.98         0.46%         0.028         0.085         0.085         0.085         0.085         0.093         0.085         0.093         0.085         0.093         0.005         0.085         0.093         0.005         0.085         0.093         0.012         0.126         0.24.5         24.13         8.89%         0.002         0.068         0.065         0.065         0.065         0.065         0.065         0.062         0.068         0.012         1.12         1.14%         0.002         0.062         0.068         0.022         0.068         0.022         0.064         0.022         0.064         0.023         0.012         1.12         LE Cheek         -         23780         709         24.5         24.12         9.14%         0.0047         0.051         LE Cheek         -         23780         709         24.5         24.12						RE Tilt	-	23800	711	25	24.98	0.46%	0.085	0.085	-
LTE Band 17 (Head)         10MHz         QPSK         LE Cheek LE Cheek         -         23790         710         25         24.97         0.69%         0.125         0.126         1.125           17 (Head)         10MHz         QPSK         25 RB         25         RE Cheek         -         23800         711         25         24.98         0.46%         0.0285         0.085         0.085           17<(Head)			1 00	40	LE Cheek	-	23780	709	25	24.95	1.16%	0.123	0.124	-	
LTE Band 17 (Head)         10MHz         QPSK         LE Tilt         -         23800         711         25         24.98         0.46%         0.085         0.085         0.085         0.085         0.085         0.085         0.085         0.093         1           (Head)         10MHz         QPSK         25 RB         25 RB         25         RE Cheek         -         23790         710         24.5         24.13         8.89%         0.060         0.065         0.093         0.112           LE Cheek         -         23790         710         24.5         24.13         8.89%         0.062         0.068         0.089         0.062         0.068         0.089         0.062         0.068         0.089         0.062         0.089         0.062         0.089         0.062         0.089         0.040         0.051         1.02 <td< td=""><td></td><td>IKB</td><td>49</td><td>LE Cheek</td><td>-</td><td>23790</td><td>710</td><td>25</td><td>24.97</td><td>0.69%</td><td>0.125</td><td>0.126</td><td>-</td></td<>			IKB	49	LE Cheek	-	23790	710	25	24.97	0.69%	0.125	0.126	-	
LTE Band (Head)         10MHz         OPSK         RE Cheek 25 RB         -         23790         710         24.5         24.13         8.89%         0.085         0.093         0.093           (Head)         10MHz         0PSK         25 RB         25         RE Tilt         -         23790         710         24.5         24.13         8.89%         0.066         0.065         0.066           LE Cheek         -         23790         710         24.5         24.13         8.89%         0.062         0.068           LE Tilt         -         23790         710         24.5         24.12         9.14%         0.082         0.089           Stores         RE Tilt         -         23780         709         24.5         24.12         9.14%         0.0031         0.102           LE Cheek         -         23780         709         24.5         24.12         9.14%         0.0031         0.102           LE Tilt         -         23780         709         24.5         24.12         9.14%         0.0031         0.102           Kodo-         1RB         49         Front side         15mm         23780         709         25         24.95         1.1						LE Cheek	-	23800	711	25	24.98	0.46%	0.128	0.129	148
17 (Head)         10MHz         QPSK         25 RB         25         RE Tilt         -         23790         710         24.5         24.13         8.89%         0.005         0.005         0.005         0.005         0.006         0.0065         0.0065         0.0065         0.0065         0.0065         0.006         0.0065         0.006         0.0065         0.006         0.0065         0.0061 </td <td>LTE David</td> <td></td> <td></td> <td></td> <td></td> <td>LE Tilt</td> <td>-</td> <td>23800</td> <td>711</td> <td>25</td> <td>24.98</td> <td>0.46%</td> <td>0.085</td> <td>0.085</td> <td>-</td>	LTE David					LE Tilt	-	23800	711	25	24.98	0.46%	0.085	0.085	-
(Head)       25 RB       25       RE lift       -       23/90       710       24.5       24.13       8.89%       0.06       0.065         LE Cheek       -       23790       710       24.5       24.13       8.89%       0.062       0.068         LE Tilt       -       23790       710       24.5       24.13       8.89%       0.062       0.068         LE Tilt       -       23790       710       24.5       24.12       9.14%       0.082       0.089         Back Side       -       23780       709       24.5       24.12       9.14%       0.093       0.102         LE Cheek       -       23780       709       24.5       24.12       9.14%       0.093       0.102         LE Tilt       -       23780       709       24.5       24.12       9.14%       0.059       0.064         LE Tilt       -       23780       709       25       24.92       9.14%       0.023       0.241         Ke Oriskie       15mm       23790       710       25       24.97       0.69%       0.242       0.244         Ke Oriskie       15mm       23790       710       24.5       24.98		10111-	ODCK			RE Cheek	-	23790	710	24.5	24.13	8.89%	0.085	0.093	-
LTE Band 17 (Body-Worn) LTE Band 17 (Body-Worn) LTE Band 17 (Body-Worn) LTE Band 17 (Bady-Worn) LTE Band 17 (Body-Worn) LTE Band LTE BANC LTE		QPSK		25	RE Tilt	-	23790	710	24.5	24.13	8.89%	0.06	0.065	-	
LTE Band         IOMHz         OPSK         LE RB         LE Tilt         -         23790         710         24.5         24.13         8.89%         0.062         0.068           LTE Band         50 RB         RE Cheek         -         23780         709         24.5         24.12         9.14%         0.082         0.089         0.062         0.068         0.061         0.061         0.061         0.062         0.089         0.021         0.051         0.021         0.051         0.021         0.051         0.021         0.051         0.021         0.051         0.062         0.064         0.059         0.064         0.059         0.064         0.059         0.064         0.059         0.064         0.059         0.064         0.059         0.064         0.059         0.064         0.059         0.064         0.059         0.064         0.059         0.064         0.059         0.064         0.059         0.064         0.059         0.044         0.059         0.044         0.059         0.044         0.059         0.044         0.059         0.044         0.059         0.044         0.059         0.046         0.235         0.236         0.236         0.236         0.236         0.236         0.236 </td <td></td> <td>25 KB</td> <td>25</td> <td>LE Cheek</td> <td>-</td> <td>23790</td> <td>710</td> <td>24.5</td> <td></td> <td></td> <td>0.103</td> <td>0.112</td> <td>-</td>			25 KB	25	LE Cheek	-	23790	710	24.5			0.103	0.112	-	
LTE Band         10MHz         QPSK         RE Cheek         -         23780         709         24.5         24.12         9.14%         0.082         0.089           LTE Band         17         (Body-Worn)         10MHz         QPSK         1 RB         49         Front side         15mm         23780         709         24.5         24.12         9.14%         0.047         0.051           LTE Band         17         (Body-Worn)         1 RB         49         Front side         15mm         23780         709         24.5         24.12         9.14%         0.059         0.064           17         (Body-Worn)         1 RB         49         Front side         15mm         23780         709         25         24.95         1.16%         0.238         0.241         0.244         0.242         0.244         0.245         1           (Body-Worn)         10MHz         QPSK         25 RB         25         Front side         15mm         23700         710         25         24.97         0.69%         0.242         0.244         0.245         1           Back side         15mm         23790         710         24.5         24.13         8.89%         0.187         0.							-		710				0.062	0.068	-
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$							-		709				0.082		-
LTE Band         10MHz         QPSK         LE Cheek         -         23780         709         24.5         24.12         9.14%         0.093         0.102           LTE Band         17         INMHz         QPSK         1 RB         49         Front side         15mm         23780         709         24.5         24.12         9.14%         0.059         0.064           17         INMHz         QPSK         1 RB         49         Front side         15mm         23780         709         25         24.95         1.16%         0.238         0.241           17         INMHz         QPSK         25 RB         25         Front side         15mm         23790         710         25         24.97         0.69%         0.242         0.244         0.245         1           18         49         Front side         15mm         23800         711         25         24.98         0.46%         0.235         0.236         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.203         0.204         0.203         0.201         0.24.5         24.13         8.89%         0.186         0.203         0.203         0.201         0.				50			-								-
LE Tilt         -         23780         709         24.5         24.12         9.14%         0.059         0.064           LTE Band         1 RB         49         Front side         15mm         23780         709         25         24.95         1.16%         0.238         0.241           LTE Band         17         10MHz         Pront side         15mm         23790         710         25         24.97         0.69%         0.242         0.244         0.245         1           Back side         15mm         23800         711         25         24.98         0.46%         0.242         0.244         0.245         1           Back side         15mm         23800         711         25         24.98         0.46%         0.235         0.236           Worn)         25 RB         25 RB         Front side         15mm         23790         710         24.5         24.13         8.89%         0.187         0.204           Worn)         50 RB         Front side         15mm         23780         709         24.5         24.12         9.14%         0.18         0.196           1 RB         49         Front side         15mm         23790				50	KR	LE Cheek	-	23780	709	24.5		9.14%	0.093	0.102	-
LTE Band 17 (Body- Worn)         10MHz         QPSK         1 RB         49         Front side Front side         15mm 15mm         23780 23790         709         25         24.95         1.16%         0.238         0.241           17 (Body- Worn)         10MHz         QPSK         1 RB         49         Front side Front side         15mm         23800         711         25         24.98         0.46%         0.242         0.244         0.245         1           17 (Body- Worn)         25 RB         25 RB         25         Front side         15mm         23800         711         25         24.98         0.46%         0.235         0.236         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.204         0.245         0.24.1							-		709					0.064	-
LTE Band 17 (Body- Worn)         10MHz         QPSK         1 RB         49         Front side 15mm         15mm         23790         710         25         24.97         0.69%         0.242         0.244         0.245         1           17 (Body- Worn)         10MHz         QPSK         1         RB         49         Front side         15mm         23800         711         25         24.98         0.46%         0.242         0.244         0.245         1           (Body- Worn)         25 RB         25 RB         25         Front side         15mm         23800         711         25         24.98         0.46%         0.235         0.236         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.218							15mm		709			1.16%		0.241	-
LTE Band 17 (Body- Worn)         10MHz         QPSK         I RB         49         Front side         15mm         23800         711         25         24.98         0.46%         0.244         0.245         1           (Body- Worn)         10MHz         QPSK         25 RB         25         Front side         15mm         23800         711         25         24.98         0.46%         0.235         0.236         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.204         0.203         0.204         0.204         0.204         0.204         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.203         0.204         0.204         0.245         0.24.51         0.183         0.200			QPSK												-
17 (Body- Worn)         10MHz         QPSK         Back side         15mm         23800         711         25         24.98         0.46%         0.235         0.236           Worn)         25 RB         25 RB         25         Front side         15mm         23790         710         24.5         24.13         8.89%         0.187         0.204           50 RB         Front side         15mm         23790         710         24.5         24.13         8.89%         0.186         0.203           50 RB         Front side         15mm         23780         709         24.5         24.12         9.14%         0.183         0.200           Back side         15mm         23780         709         24.5         24.12         9.14%         0.183         0.200           Back side         15mm         23780         709         24.5         24.12         9.14%         0.183         0.200           Back side         10mm         23790         710         25         24.32         16.95%         0.177         0.207           Back side         10mm         23790         710         25         24.32         16.95%         0.034         0.040           Lef	LTE Band				49				711	25				0.245	149
(Body- Worn)         OMHZ         OPSK         25 RB         25         Front side         15mm         23790         710         24.5         24.13         8.89%         0.187         0.204           Worn)         50 RB         Front side         15mm         23790         710         24.5         24.13         8.89%         0.187         0.204           50 RB         Front side         15mm         23780         709         24.5         24.12         9.14%         0.183         0.200           Back side         15mm         23780         709         24.5         24.12         9.14%         0.183         0.200           Back side         15mm         23780         709         24.5         24.12         9.14%         0.183         0.200           Back side         15mm         23780         709         24.5         24.12         9.14%         0.183         0.200           Back side         10mm         23790         710         25         24.32         16.95%         0.177         0.207           Back side         10mm         23790         710         25         24.32         16.95%         0.034         0.040           Left side         1	17	101411				Back side	15mm	23800	711	25		0.46%	0.235	0.236	-
Worn)         25 RB         25         Back side         15mm         23790         710         24.5         24.13         8.89%         0.186         0.203           50 RB         Front side         15mm         23780         709         24.5         24.12         9.14%         0.183         0.200           Back side         15mm         23780         709         24.5         24.12         9.14%         0.18         0.196           Back side         15mm         23780         709         24.5         24.12         9.14%         0.18         0.196           Image: Solve the side         10mm         23790         710         25         24.32         16.95%         0.177         0.207           Back side         10mm         23790         710         25         24.32         16.95%         0.162         0.189           Bottom side         10mm         23790         710         25         24.32         16.95%         0.034         0.040           Left side         10mm         23790         710         25         24.32         16.95%         0.233         0.274         1           Left side         10mm         23790         710         25 <td></td> <td>TOWHZ</td> <td></td> <td>0.5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td>		TOWHZ			0.5										-
50 RB         Front side         15mm         23780         709         24.5         24.12         9.14%         0.183         0.200           Back side         15mm         23780         709         24.5         24.12         9.14%         0.183         0.200           Back side         15mm         23780         709         24.5         24.12         9.14%         0.18         0.196           Image: Provide side         10mm         23790         710         25         24.32         16.95%         0.177         0.207           Back side         10mm         23790         710         25         24.32         16.95%         0.162         0.189           Bottom side         10mm         23790         710         25         24.32         16.95%         0.040         0.040           Left side         10mm         23790         710         25         24.32         16.95%         0.034         0.040           Left side         10mm         23790         710         25         24.32         16.95%         0.233         0.274         1           Left side         10mm         23790         710         25         24.32         16.95%         0.233<				25 RB	25				710						-
SURB         Back side         15mm         23780         709         24.5         24.12         9.14%         0.18         0.196           1 RB         49         Front side         10mm         23790         710         25         24.32         16.95%         0.177         0.207           Back side         10mm         23790         710         25         24.32         16.95%         0.162         0.189           Back side         10mm         23790         710         25         24.32         16.95%         0.034         0.040           Left side         10mm         23790         710         25         24.32         16.95%         0.034         0.040           Left side         10mm         23790         710         25         24.32         16.95%         0.233         0.274         1           Left side         10mm         23790         710         25         24.32         16.95%         0.233         0.272           Left side         10mm         23790         710         25         24.32         16.95%         0.233         0.272           Left side         10mm         23790         710         25         24.32         16.	,			50											-
Image: LTE Band         1 RB         49         Front side         10mm         23790         710         25         24.32         16.95%         0.177         0.207           Back side         10mm         23790         710         25         24.32         16.95%         0.162         0.189           Bottom side         10mm         23790         710         25         24.32         16.95%         0.034         0.040           Left side         10mm         23790         710         25         24.32         16.95%         0.233         0.274         1           Left side         10mm         23790         710         25         24.32         16.95%         0.233         0.274         1           Left side         10mm         23790         710         25         24.32         16.95%         0.233         0.272           Left side         10mm         23790         710         25         24.32         16.95%         0.233         0.272           Left side         10mm         23790         710         25         24.32         16.95%         0.233         0.272           Left side         10mm         23800         711         24.5				50	КВ				709						-
LTE Band         1 RB         49         Back side         10mm         23790         710         25         24.32         16.95%         0.162         0.189           LTE Band         0         10mm         23790         710         25         24.32         16.95%         0.034         0.040															-
LTE Band 49 Bottom side 10mm 23790 710 25 24.32 16.95% 0.034 0.040 Left side 10mm 23780 709 25 24.29 17.76% 0.233 0.274 1 Left side 10mm 23790 710 25 24.32 16.95% 0.233 0.272 Left side 10mm 23800 711 24.5 24.31 4.47% 0.246 0.257 Left side 10mm 23800 711 24.5 24.31 4.47% 0.2464 0.257 Left side 10mm 23800 711 24.5 24.31 4.47% 0.2464 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 24.5 24.31 4.475% 0.2454 0.257 Left side 10mm 23800 711 24.5 Left side 10mm 24.5 Lef							10mm		710			16.95%		0.189	-
Left side 10mm 23780 709 25 24.29 17.76% 0.233 0.274 1 Left side 10mm 23790 710 25 24.32 16.95% 0.233 0.272 Left side 10mm 23800 711 24.5 24.31 4.47% 0.246 0.257				1 DR	10	Bottom side	10mm	23790	710	25		16.95%	0.034	0.040	-
LTE Band				TIND	47					25					150
															-
17   10MUz   ODSK       Front side   10mm   23800   711   24.5   23.91   14.55%   0.154   0.176	LTE Band														-
	17	10MHz	QPSK												-
(Latenot) 25 DB 25 Back side 10mm 23800 /11 24.5 23.91 14.55% 0.139 0.159				25 RB	25										-
BOLIOM SIDE TOMIN 23800 711 24.5 23.91 14.55% 0.031 0.036	(														-
Left side         10mm         23800         711         24.5         23.91         14.55%         0.203         0.233           Front side         10mm         23800         711         24.5         23.89         15.08%         0.15         0.173					<u> </u>										-
Book side 10mm 22000 711 24.5 22.00 15.000/ 0.125 0.155															-
50 RB         Back side         10mm         23800         711         24.5         23.89         15.08%         0.135         0.155           Bottom side         10mm         23800         711         24.5         23.89         15.08%         0.035         0.035				50	RB										
							1								-

\* - repeated at the highest SAR measurement according to the FCC KDB 865664 D01v01

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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#### WLAN802.11 b

Mode	Position	Distance	СН	Freq.	Max. Rated Avg.	Measured Avg.	Scaling	Averaged S (W/	•	Plot
		(mm)		(MHz)	Power + Max.	Power		Measured	Reported	page
	RE Cheek	-	11	2462	18	17.98	0.46%	0.115	0.116	-
	RE Tilt	-	11	2462	18	17.98	0.46%	0.111	0.112	-
	LE Cheek	-	1	2412	18	17.79	4.95%	0.324	0.340	-
	LE Cheek	-	6	2437	18	17.77	5.44%	0.274	0.289	-
Head	LE Cheek	-	11	2462	18	17.98	0.46%	0.316	0.317	-
	LE Cheek -with Memory card	-	1	2412	18	17.79	4.95%	0.341	0.358	151
	LE Tilt	-	11	2462	18	17.98	0.46%	0.211	0.212	-
	Front side	10mm	11	2462	18	17.98	0.46%	0.045	0.045	-
	Back side	10mm	1	2412	18	17.79	4.95%	0.161	0.169	153
Hatapat	Back side	10mm	6	2437	18	17.77	5.44%	0.152	0.160	-
Hotspot	Back side	10mm	11	2462	18	17.98	0.46%	0.146	0.147	-
	Top side	10mm	11	2462	18	17.98	0.46%	0.088	0.088	-
	Right side	10mm	11	2462	18	17.98	0.46%	0.059	0.059	-

- # Using KDB248227 D01v01-SAR is not required for 802.11 g/HT20 channels when the maximum average output power is higher than that measured on the corresponding 802.11b channels but increase less than 1/4 dB.
- # According to KDB447498 D01v05 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq$  100 MHz, testing for the other channels is not required.

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WLAN802.11 a 5.2G

Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max.	Measured Avg. Power	Scaling	•	AR over 1g /kg)	Plot page
		(1111)		(11112)	Tolerance (dBm)	(dBm)		Measured	Reported	page
	RE Cheek	-	36	5180	14	13.89	2.57%	0.02	0.021	-
	RE Tilt	-	36	5180	14	13.89	2.57%	0.018	0.018	-
Head	LE Cheek	-	36	5180	14	13.89	2.57%	0.072	0.074	-
	LE Cheek	-	44	5220	14	13.85	3.51%	0.149	0.154	154
	LE Tilt	-	36	5180	14	13.89	2.57%	0.035	0.036	-
Della	Front side	15mm	36	5180	14	13.89	2.57%	0.015	0.015	-
Body- worn	Back side	15mm	36	5180	14	13.89	2.57%	0.058	0.059	-
WOIN	Back side	15mm	44	5220	14	13.85	3.51%	0.068	0.070	155

- # As per KDB248227 D01v01, when SAR at default channel where maximum power occurs is less than 0.8W/kg, SAR tests on other default channel is option.
- # As per KDB248227 D01v01, when the maximum average output channel in each frequency band is not include in the "default test channels", the maximum channel should be tested instead of an adjacent "default test channels".

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WLAN802.11 a 5.3G

Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max.	Measured Avg. Power	Scaling	0	AR over 1g /kg)	Plot
		(11111)			Tolerance (dBm)	(dBm)		Measured	Reported	page
	RE Cheek	-	56	5280	14	13.93	1.62%	0.049	0.050	-
	RE Tilt	-	56	5280	14	13.93	1.62%	0.032	0.033	-
Head	LE Cheek	-	56	5280	14	13.93	1.62%	0.175	0.178	156
	LE Cheek	-	60	5300	14	13.89	2.57%	0.114	0.117	-
	LE Tilt	-	56	5280	14	13.93	1.62%	0.072	0.073	-
	Front side	15mm	56	5280	14	13.93	1.62%	0.02	0.020	-
Body-	Back side	15mm	56	5280	14	13.93	1.62%	0.1	0.102	-
worn –	Back side	15mm	60	5300	14	13.89	2.57%	0.112	0.115	157

- # As per KDB248227 D01v01, when SAR at default channel where maximum power occurs is less than 0.8W/kg, SAR tests on other default channel is option.
- # As per KDB248227 D01v01, when the maximum average output channel in each frequency band is not include in the "default test channels", the maximum channel should be tested instead of an adjacent "default test channels".

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#### WLAN802.11 a 5.6G

Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max.	Measured Avg. Power	Scaling	0	AR over 1g /kg)	Plot page
		(())))			Tolerance (dBm)	(dBm)		Measured	Reported	page
	RE Cheek	-	132	5660	14	13.98	0.46%	0.031	0.031	-
	RE Tilt	-	132	5660	14	13.98	0.46%	0.015	0.015	-
Head	LE Cheek	-	108	5540	14	13.79	4.95%	0.058	0.061	-
	LE Cheek	-	112	5560	14	13.82	4.23%	0.065	0.068	-
	LE Cheek	-	132	5660	14	13.98	0.46%	0.095	0.095	158
	LE Tilt	-	132	5660	14	13.98	0.46%	0.039	0.039	-
	Front side	15mm	132	5660	14	13.98	0.46%	0.023	0.023	-
	Back side	15mm	108	5540	14	13.79	4.95%	0.327	0.343	-
	Back side	15mm	112	5560	14	13.82	4.23%	0.436	0.454	-
	Back side	15mm	132	5660	14	13.98	0.46%	0.855	0.859	-
Body-	Back side - with headset	15mm	132	5660	14	13.98	0.46%	0.868	0.872	-
Worn	Back side - with Memory Card	15mm	132	5660	14	13.98	0.46%	0.892	0.896	-
	Back side* - with Memory Card	15mm	132	5660	14	13.98	0.46%	0.909	0.913	159

\* - repeated at the highest SAR measurement according to the FCC KDB 865664 D01v01

- As per KDB248227 D01v01, when SAR at default channel where maximum power # occurs is less than 0.8W/kg, SAR tests on other default channel is option.
- As per KDB248227 D01v01, when the maximum average output channel in each # frequency band is not include in the "default test channels", the maximum channel should be tested instead of an adjacent "default test channels".

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WLAN802.11 a 5.8G

Mode	Position	Distance (mm)	СН	Freq. (MHz)	Max. Rated Avg. Power + Max.	Measured Avg. Power	Scaling	0	AR over 1g /kg)	Plot
		(((((((((((((((((((((((((((((((((((((((			Tolerance (dBm)	(dBm)		Measured	Reported	page
	RE Cheek	-	157	5785	14	13.87	3.04%	0.02	0.021	-
	RE Tilt	-	157	5785	14	13.87	3.04%	0.011	0.011	-
lload	LE Cheek	-	153	5765	14	13.82	4.23%	0.057	0.059	-
Head	LE Cheek	-	157	5785	14	13.87	3.04%	0.052	0.054	-
	LE Cheek	-	161	5805	14	13.86	3.28%	0.058	0.060	161
	LE Tilt	-	157	5785	14	13.87	3.04%	0.025	0.026	-
	Front side	15mm	157	5785	14	13.87	3.04%	0.011	0.011	-
Body-	Back side	15mm	153	5765	14	13.82	4.23%	0.204	0.213	162
worn	Back side	15mm	157	5785	14	13.87	3.04%	0.173	0.178	-
	Back side	15mm	161	5805	14	13.86	3.28%	0.182	0.188	-

# As per KDB248227 D01v01, when SAR at default channel where maximum power occurs is less than 0.8W/kg, SAR tests on other default channel is option.

# As per KDB248227 D01v01, when the maximum average output channel in each frequency band is not include in the "default test channels", the maximum channel should be tested instead of an adjacent "default test channels".

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# 3. Simultaneous Transmission Analysis

Simultaneous Transmit Configurations	Head	Body-Worn	Hot Spot	Hand							
GSM850/1900 Voice + 2.4GHz Wi-Fi	Yes	No	No	No							
UMTS B2/B4/B5 Voice + 2.4GHz Wi-Fi	Yes	No	No	No							
LTE FDD B4 / B7 / B17 + 2.4GHz Wi-Fi	Yes	No	No	No							
GSM850/1900 Voice + 5GHz Wi-Fi Yes Yes No No											
UMTS B2/B4/B5 Voice + 5GHz Wi-Fi Yes Yes No No											
LTE FDD B4 / B7 / B17 + 5GHz Wi-Fi Yes Yes No No											
GPRS850/1900 Data + 2.4GHz Wi-Fi	No	No	Yes	Yes							
UMTS B2/B4/B5 Data + 2.4GHz Wi-Fi	No	No	Yes	Yes							
LTE FDD B4 / B7 / B17 + 2.4GHz Wi-Fi	No	No	Yes	Yes							
GSM850/1900 Voice + 2.4GHz Bluetooth	No	Yes	No	No							
GPRS850/1900 Data + 2.4GHz Bluetooth	No	No	Yes	Yes							
UMTS B2/B4/B5 Voice + 2.4GHz Bluetooth No Yes No No											
UMTS B2/B4/B5 Data + 2.4GHz Bluetooth No No Yes Yes											
LTE FDD B4 / B7 / B17 + 2.4GHz No Yes Yes Yes											
Notes: 1. GSM & WCDMA & LTE share the same antenna path and cannot transmit simultaneously											

Bluetooth, 5GHz WiFi, and 2.4GHz WiFi share the same antenna path and cannot transmit

#### Simultaneous Transmission Scenarios:

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	repo	orted SAR WW	AN and WLA	N DTS 2.4G	Hz, ΣSAR ev	aluation				
Frequency	D	osition	reported S	AR / W/kg	ΣSAR	Calculated	SPLSR			
band	FUSILION		WWAN	WLAN	<1.6W/kg	distance (mm)	(≦0.04)			
		RE cheek	0.471	0.116	0.587	-	-			
GSM 850	Head	RE tilt	0.309	0.112	0.421	-	-			
03101 030	Heau	LE cheek	0.423	0.358	0.781	-	-			
		LE tilt	0.279	0.212	0.491	-	-			
		Front	0.605	0.045	0.650	-	-			
		Back	0.508	0.169	0.677	-	-			
GPRS 850	Hotepot	Тор	-	0.088	-	-	-			
(1Dn4UP)	Hotspot	Bottom	0.173	-	-	-	-			
		Right	-	0.059	-	-	-			
		Left	0.538	-	-	-	-			
	llaad	RE cheek	0.179	0.116	0.295	-	-			
GSM 1900		RE tilt	0.036	0.112	0.148	-	-			
G3W 1900	Head	LE cheek	0.089	0.358	0.447	-	-			
		LE tilt	0.042	0.212	0.254	-	-			
		Front	0.612	0.045	0.657	-	-			
		Back	0.412	0.169	0.581	-	-			
GPRS 1900	Hotepot	Тор	-	0.088	-	-	-			
(1Dn4UP)	Hotspot	Bottom	1.01	-	-	-	-			
		Right	-	0.059	-		-			
		-	-	-	Left	0.017	-	-	-	-

#### **Simultaneous Transmission Combination**

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reported SAR WWAN and WLAN DTS 2.4GHz, ΣSAR evaluation Frequency reported SAR / W/kg ΣSAR Calculated SPLSR											
Frequency			reported S	SAR / W/kg	ΣSAR	Calculated	SPLSR				
band	PC	osition	WWAN	WLAN	<1.6W/kg	distance (mm)	(≦0.04)				
		RE cheek	0.218	0.116	0.334	-	-				
	Head	RE tilt	0.032	0.112	0.144	-	-				
	неао	LE cheek	0.083	0.358	0.441	-	-				
		LE tilt	0.047	0.212	0.259	-	-				
WCDMA		Front	0.603	0.045	0.648	-	-				
Band II		Back	0.362	0.169	0.531	-	-				
	Hotspot	Тор	-	0.088	-	-	-				
	Ποτοροτ	Bottom	0.93	-	-	-	-				
		Right	-	0.059	-	-	-				
		Left	0.021	-	-	-	-				
		RE cheek	0.178	0.116	0.294	-	-				
	Head	RE tilt	0.063	0.112	0.175	-	-				
	пеаи	LE cheek	0.122	0.358	0.480	-	-				
		LE tilt	0.03	0.212	0.242	-	-				
WCDMA		Front	0.909	0.045	0.954	-	-				
Band IV	Hotspot	Back	0.554	0.169	0.723	-	-				
		Тор	-	0.088	-	-	-				
		Bottom	1.085	-	-	-	-				
		Right	-	0.059	-	-	-				
		Left	0.074	-	-	-	-				
		RE cheek	0.453	0.116	0.569	-	-				
	llood	RE tilt	0.316	0.112	0.428	-	-				
	Head	LE cheek	0.407	0.358	0.765	-	-				
		LE tilt	0.295	0.212	0.507	-	-				
WCDMA		Front	0.523	0.045	0.568	-	-				
Band V		Back	0.544	0.169	0.713	-	-				
		Тор	-	0.088	-	-	-				
	Hotspot	Bottom	0.098	-	-	-	-				
		Right	-	0.059	-	-	-				
		Left	0.549	-	-	-	-				

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reported SAR WWAN and WLAN DTS 2.4GHz, ΣSAR evaluation											
Frequency		.,.	reported S	AR / W/kg	ΣSAR	Calculated	SPLSR				
band	PO	osition	WWAN	WLAN	<1.6W/kg	distance (mm)	(≦0.04)				
		RE cheek	0.175	0.116	0.291	-	-				
	lleed	RE tilt	0.054	0.112	0.166	-	-				
	Head	LE cheek	0.139	0.358	0.497	-	-				
		LE tilt	0.03	0.212	0.242	-	-				
LTE FDD		Front	1.087	0.045	1.132	-	-				
Band IV		Back	0.62	0.169	0.789	-	-				
	Hotspot	Тор	-	0.088	-	-	-				
	ποιεροι	Bottom	1.348	-	-	-	-				
		Right	-	0.059	-	-	-				
		Left	0.099	-	-	-	-				
		RE cheek	0.139	0.116	0.255	-	-				
	Head	RE tilt	0.027	0.112	0.139	-	-				
		LE cheek	0.108	0.358	0.466	-	-				
		LE tilt	0.05	0.212	0.262	-	-				
LTE FDD	Hotspot	Front	0.622	0.045	0.667	-	-				
Band VII		Back	1.065	0.169	1.234	-	-				
		Тор	-	0.088	-	-	-				
		Bottom	0.587	-	-	-	-				
		Right	-	0.059	-	-	-				
		Left	0.07	-	-	-	-				
		RE cheek	0.115	0.116	0.231	-	-				
	Head	RE tilt	0.085	0.112	0.197	-	-				
	ncau	LE cheek	0.129	0.358	0.487	-	-				
		LE tilt	0.085	0.212	0.297	-	-				
LTE FDD		Front	0.207	0.045	0.252	-	-				
Band XVII		Back	0.189	0.169	0.358	-	-				
	Hotspot	Тор	-	0.088	-	-	-				
	notspot	Bottom	0.04	-	-	-	-				
	E	Right	-	0.059	-	-	-				
		Left	0.274	-	-	-	-				

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	reported	I SAR WWAI	N and WLAN	NDTS 5.8 G	Hz, ΣSAR ev	valuation	
Frequency	_		reported S	SAR / W/kg	ΣSAR	Calculated	SPLSR
band	Pos	ition	WWAN	WLAN	<1.6W/kg	distance (mm)	(≦0.04)
		RE cheek	0.471	0.021	0.492	-	-
	Head	RE tilt	0.309	0.011	0.32	-	-
GSM 850	Head	LE cheek	0.423	0.06	0.483	-	-
0300 030		LE tilt	0.279	0.026	0.305	-	-
	Body-	Front	0.382	0.011	0.393	-	-
	Worn	Back	0.459	0.213	0.672	-	-
GSM 1900	Head	RE cheek	0.179	0.021	0.2	-	-
		RE tilt	0.036	0.011	0.047	-	-
		LE cheek	0.089	0.06	0.149	-	-
0.5101 1 700		LE tilt	0.042	0.026	0.068	-	-
	Body-	Front	1.146	0.011	1.157	-	-
	Worn	Back	0.804	0.213	1.017	-	-
	Head	RE cheek	0.218	0.021	0.239	-	-
		RE tilt	0.032	0.011	0.043	-	-
WCDMA		LE cheek	0.083	0.06	0.143	-	-
Band II		LE tilt	0.047	0.026	0.073	-	-
	Body-	Front	1.191	0.011	1.202	-	-
	Worn	Back	0.829	0.213	1.042	-	-
		RE cheek	0.178	0.021	0.199	-	-
	llood	RE tilt	0.063	0.011	0.074	-	-
WCDMA	Head	LE cheek	0.122	0.06	0.182	-	-
Band IV		LE tilt	0.03	0.026	0.056	-	-
	Body-	Front	1.175	0.011	1.186	-	-
	Worn	Back	0.776	0.213	0.989	-	-

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	reported SAR WWAN and WLAN DTS 5.8 GHz, ΣSAR evaluation											
Frequency			reported S	AR / W/kg	ΣSAR	Calculated	SPLSR					
band	Pos	ition	WWAN	WLAN	<1.6W/kg	distance (mm)	(≦0.04)					
		RE cheek	0.453	0.021	0.474	-	-					
	Head	RE tilt	0.316	0.011	0.327	-	-					
WCDMA	neau	LE cheek	0.407	0.06	0.467	-	-					
Band V		LE tilt	0.295	0.026	0.321	-	-					
	Body-	Front	0.427	0.011	0.438	-	-					
	Worn	Back	0.424	0.213	0.637	-	-					
		RE cheek	0.175	0.021	0.196	-	-					
	Head	RE tilt	0.054	0.011	0.065	-	-					
LTE FDD	Heau	LE cheek	0.139	0.06	0.199	-	-					
Band IV		LE tilt	0.03	0.026	0.056	-	-					
	Body- Worn	Front	1.28	0.011	1.291	-	-					
		Back	0.861	0.213	1.074	-	-					
		RE cheek	0.139	0.021	0.16	-	-					
	Head	RE tilt	0.027	0.011	0.038	-	-					
LTE FDD	Heau	LE cheek	0.108	0.06	0.168	-	-					
Band VII		LE tilt	0.05	0.026	0.076	-	-					
	Body-	Front	0.501	0.011	0.512	-	-					
	Worn	Back	0.83	0.213	1.043	-	-					
		RE cheek	0.115	0.021	0.136	-	-					
	Head	RE tilt	0.085	0.011	0.096	-	-					
LTE FDD	neau	LE cheek	0.129	0.06	0.189	-	-					
Band XVII		LE tilt	0.085	0.026	0.111	-	-					
	Body-	Front	0.245	0.011	0.256	-	-					
	Worn	Back	0.236	0.213	0.449	-	-					

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	reported SAR WWAN and WLAN DTS 5 GHz, ΣSAR evaluation							
Frequency	_		reported S	AR / W/kg	ΣSAR	Calculated	SPLSR	
band		ition	WWAN	WLAN	<1.6W/kg	distance (mm)	(≦0.04)	
		RE cheek	0.471	0.05	0.521	-	-	
	Head	RE tilt	0.309	0.033	0.342	-	-	
GSM 850	Heau	LE cheek	0.423	0.178	0.601	-	-	
03101 030		LE tilt	0.279	0.073	0.352	-	-	
[	Body-	Front	0.382	0.023	0.405	-	-	
	Worn	Back	0.459	0.913	1.372	-	-	
		RE cheek	0.179	0.05	0.229	-	-	
	Head	RE tilt	0.036	0.033	0.069	-	-	
GSM 1900		LE cheek	0.089	0.178	0.267	-	-	
03101 1900		LE tilt	0.042	0.073	0.115	-	-	
[	Body-	Front	1.146	0.023	1.169	-	-	
	Worn	Back	0.804	0.913	1.717	133.5	0.017	
	Head	RE cheek	0.218	0.05	0.268	-	-	
		RE tilt	0.032	0.033	0.065	-	-	
WCDMA		LE cheek	0.083	0.178	0.261	-	-	
Band II		LE tilt	0.047	0.073	0.12	-	-	
	Body-	Front	1.191	0.023	1.214	-	-	
	Worn	Back	0.829	0.913	1.742	133.5	0.017	
		RE cheek	0.178	0.05	0.228	-	-	
	llood	RE tilt	0.063	0.033	0.096	-	-	
WCDMA	Head	LE cheek	0.122	0.178	0.3	-	-	
Band IV		LE tilt	0.03	0.073	0.103	-	-	
[	Body-	Front	1.175	0.023	1.198	-	-	
	Worn	Back	0.776	0.913	1.689	135.8	0.016	
Note:								

We calculate the peak location separation ratio of simultaneous transmitting antenna pair, the SPLSR value is less than 0.04. According to KDB447498 D01v05 simultaneous transmission SAR evaluation is not required.

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reported SAR WWAN and WLAN DTS 5 GHz, $\Sigma$ SAR evaluation								
Frequency		Position reported SAR / W/kg ΣSAR		ΣSAR	Calculated	SPLSR		
band Pos		ition	WWAN	WLAN	<1.6W/kg	distance (mm)	(≦0.04)	
		RE cheek	0.453	0.05	0.503	-	-	
	Head	RE tilt	0.316	0.033	0.349	-	-	
WCDMA	Tieau	LE cheek	0.407	0.178	0.585	-	-	
Band V		LE tilt	0.295	0.073	0.368	-	-	
	Body-Worn	Front	0.427	0.023	0.45	-	-	
	bouy-worn	Back	0.424	0.913	1.337	-	-	
		RE cheek	0.175	0.05	0.225	-	-	
	Head	RE tilt	0.054	0.033	0.087	-	-	
LTE FDD		LE cheek	0.139	0.178	0.317	-	-	
Band IV		LE tilt	0.03	0.073	0.103	-	-	
	Body-Worn	Front	1.28	0.023	1.303	-	-	
		Back	0.861	0.913	1.774	138.2	0.017	
	llaad	RE cheek	0.139	0.05	0.189	-	-	
		RE tilt	0.027	0.033	0.06	-	-	
LTE FDD	Head	LE cheek	0.108	0.178	0.286	-	-	
Band VII		LE tilt	0.05	0.073	0.123	-	-	
	Dody Worp	Front	0.501	0.023	0.524	-	-	
	Body-Worn	Back	0.83	0.913	1.743	125.7	0.018	
		RE cheek	0.115	0.05	0.165	-	-	
	llood	RE tilt	0.085	0.033	0.118	-	-	
LTE FDD	Head	LE cheek	0.129	0.178	0.307	-	-	
Band XVII		LE tilt	0.085	0.073	0.158	-	-	
	Dody Marr	Front	0.245	0.023	0.268	-	-	
	Body-Worn	Back	0.236	0.913	1.149	-	-	
Note	•				•	•		

Note:

We calculate the peak location separation ratio of simultaneous transmitting antenna pair, the SPLSR value is less than 0.04. According to KDB447498 D01v05 simultaneous transmission SAR evaluation is not required.

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#### Report No. : ES/2014/10005 Page : 111 of 319

reported SAR WWAN and Bluetooth, ΣSAR evaluation								
Frequency			reported S	reported SAR / W/kg		Calculated	SPLSR	
band	Posi	ition	WWAN	Bluetooth	<1.6W/kg	distance (mm)	(≦0.04)	
GSM 850	Body-	Front	0.382	0.087	0.469	-	-	
03101 030	Worn	Back	0.459	0.087	0.546	-	-	
		Front	0.605	0.130	0.735	-	-	
		Back	0.508	0.130	0.638	-	-	
GPRS 850	Hotspot	Тор	-	0.130	-	-	-	
(1Dn4UP)	Ποισμοι	Bottom	0.173	-	-	-	-	
		Right	-	0.130	-	-	-	
		Left	0.538	-	-	-	-	
GSM 1900	Body- Worn	Front	1.146	0.087	1.233	-	-	
03101 1900		Back	0.804	0.087	0.891	-	-	
	Hotspot	Front	0.612	0.130	0.742	-	-	
GPRS		Back	0.412	0.130	0.542	-	-	
1900		Тор	-	0.130	-	-	-	
(1Dn4UP)		Bottom	1.01	-	-	-	-	
		Right	-	0.130	-	-	-	
		Left	0.017	-	-	-	-	
	Body-	Front	1.191	0.087	1.278	-	-	
	Worn	Back	0.829	0.087	0.916	-	-	
		Front	0.603	0.130	0.733	-	-	
WCDMA		Back	0.362	0.130	0.492	-	-	
Band II	Hotspot	Тор	-	0.130	-	-	-	
	ΠΟΙSPUL	Bottom	0.93	-	-	-	-	
		Right	-	0.130	-	-	-	
		Left	0.021	-	-	-	-	

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#### Report No. : ES/2014/10005 Page : 112 of 319

reported SAR WWAN and Bluetooth, ΣSAR evaluation								
Frequency			reported S	SAR / W/kg	ΣSAR	Calculated	SPLSR	
band	Pos	ition	WWAN	Bluetooth	<1.6W/kg	distance (mm)	(≦0.04)	
	Body-	Front	1.175	0.087	1.262	-	-	
	Worn	Back	0.776	0.087	0.863	-	-	
		Front	0.909	0.130	1.039	-	-	
WCDMA		Back	0.554	0.130	0.684	-	-	
Band IV	Hotspot	Тор	-	0.130	-	-	-	
	notspot	Bottom	1.085	-	-	-	-	
		Right	-	0.130	-	-	-	
		Left	0.074	-	-	-	-	
	Body-	Front	0.427	0.087	0.514	-	-	
	Worn	Back	0.424	0.087	0.511	-	-	
	Hotspot	Front	0.523	0.130	0.653	-	-	
WCDMA		Back	0.544	0.130	0.674	-	-	
Band V		Тор	-	0.130	-	-	-	
		Bottom	0.098	-	-	-	-	
		Right	-	0.130	-	-	-	
		Left	0.549	-	-	-	-	
	Body-	Front	1.28	0.087	1.367	-	-	
	Worn	Back	0.861	0.087	0.948	-	-	
		Front	1.087	0.130	1.217	-	-	
LTE FDD		Back	0.62	0.130	0.75	-	-	
Band IV	Llatanat	Тор	-	0.130	-	-	-	
	Hotspot	Bottom	1.348	-	-	-	-	
		Right	-	0.130	-	-	-	
		Left	0.099	-	-	-	-	

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reported SAR WWAN and Bluetooth, ΣSAR evaluation								
Frequency			reported S	SAR / W/kg	ΣSAR	Calculated	SPLSR	
band		ition	WWAN	Bluetooth	<1.6W/kg	distance (mm)	(≦0.04)	
	Body-	Front	0.501	0.087	0.588	-	-	
	Worn	Back	0.83	0.087	0.917	-	-	
		Front	0.622	0.130	0.752	-	-	
LTE FDD		Back	1.065	0.130	1.195	-	-	
Band VII	Hotspot	Тор	-	0.130	-	-	-	
		Bottom	0.587	-	-	-	-	
		Right	-	0.130	-	-	-	
		Left	0.07	-	-	-	-	
	Body- Worn	Front	0.245	0.087	0.332	-	-	
		Back	0.236	0.087	0.323	-	-	
		Front	0.207	0.130	0.337	-	-	
LTE FDD		Back	0.189	0.130	0.319	-	-	
Band XVII	Hotcoot	Тор	-	0.130	-	-	-	
	Hotspot	Bottom	0.04	-	-	-	-	
		Right	-	0.130	-	-	_	
		Left	0.274	-	-	-	-	

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reported SAR WWAN and WLAN DTS 2.4GHz, ΣSAR(10g) evaluation								
Frequency	Pos	ition	reported S	AR / W/kg	ΣSAR(10g)			
band	F03		WWAN	WLAN	<4W/kg			
		Front	1.04	1.051	2.091			
0000		Back	0.473	1.051	1.524			
GPRS 1900	Hand	Тор	-	1.051	-			
(1Dn4UP)	Папи	Bottom	0.679	-	-			
()		Right	-	1.051	-			
		Left	-	-	-			
		Front	1.046	1.051	2.097			
		Back	0.431	1.051	1.482			
WCDMA	Hand	Тор	-	1.051	-			
Band II	Папи	Bottom	0.851	-	-			
		Right	-	1.051	-			
		Left	-	-	-			
	Hand	Front	1.291	1.051	2.342			
		Back	0.575	1.051	1.626			
WCDMA		Тор	-	1.051	-			
Band IV		Bottom	0.496	-	-			
		Right	-	1.051	-			
		Left	-	-	-			
		Front	1.563	1.051	2.614			
		Back	0.786	1.051	1.837			
LTE FDD	Hand	Тор	-	1.051	-			
Band IV	Папи	Bottom	0.776	-	-			
		Right	-	1.051	-			
		Left	-	-	-			
		Front	2.345	1.051	3.396			
		Back	1.79	1.051	2.841			
LTE FDD	Hand	Тор	-	1.051	-			
Band VII	Tanu	Bottom	-	-	-			
		Right	-	1.051	-			
		Left	-	-	-			

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reported SAR WWAN and Bluetooth, ΣSAR(10g) evaluation								
Frequency	Deel		reported S	ΣSAR(10g)				
band	Position		WWAN	Bluetooth	<4W/kg			
		Front	1.04	0.104	1.144			
		Back	0.473	0.104	0.577			
GPRS 1900	Hand	Тор	-	0.104	-			
(1Dn4UP)	TIATIU	Bottom	0.679	-	-			
		Right	-	0.104	-			
		Left	-	-	-			
		Front	1.046	0.104	1.15			
		Back	0.431	0.104	0.535			
WCDMA	Hand	Тор	-	0.104	-			
Band II	TIATIU	Bottom	0.851	-	-			
		Right	-	0.104	-			
		Left	-	-	-			
	Hand	Front	1.291	0.104	1.395			
		Back	0.575	0.104	0.679			
WCDMA		Тор	-	0.104	-			
Band IV		Bottom	0.496	-	-			
		Right	-	0.104	-			
		Left	-	-	-			
		Front	1.563	0.104	1.667			
		Back	0.786	0.104	0.890			
LTE FDD		Тор	-	0.104	_			
Band IV	Hand	Bottom	0.776	-	-			
		Right	-	0.104	-			
		Left	-	-	-			
		Front	2.345	0.104	2.449			
		Back	1.79	0.104	1.894			
LTE FDD	l lo := el	Тор	-	0.104	-			
Band VII	Hand	Bottom	-	-	-			
		Right	-	0.104	-			
		Left	-	-	-			

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# 4. Instruments List

Device	Manufacturer	Tupo	Serial	Date of last	Date of next
Device	Manufacturer	Туре	number	calibration	calibration
			3770	Apr.30,2013	Apr.29,2014
Dosimetric E-Field	Schmid & Partner		3923	Jun.12,2013	Jun.11,2014
Probe	Engineering AG	EX3DV4	3831	Jan.31,2014	Jan.30,2015
			3578	Jun.20,2013	Jun.19,2014
		D750V2	1015	Aug.26,2013	Aug.25,2014
		D835V2	4d156	Jun.06,2013	Jun.05,2014
			1095	Jun.06,2013	Jun.05,2014
750/835/1750/1900/	Schmid & Partner	D1750V2	1008	May 29,2013	May 28,2014
2450/2600/5G System Validation Dipole	Engineering AG	D1900V2	5d173	Jun.10,2013	Jun.09,2014
		D2450V2	912	Jun.07,2013	Jun.06,2014
		D2600V2	1005	Jan.28,2014	Jan.27,2015
		D5GHzV2	1104	May 07,2013	May 06,2014
	Schmid & Partner Engineering AG		856	May 23,2013	May 22,2014
Data acquisition Electronics		DAE4	1260	May 03,2013	May 02,2014
			547	Mar.19,2013	Mar.18,2014
Software	Schmid & Partner	DASY 52	N/A	Calibration	Calibration
Sultware	Engineering AG	V52.8.7	N/A	not required	not required
Phantom	Schmid & Partner	SAM	N/A	Calibration	Calibration
Fnantom	Engineering AG	SAIVI	N/A	not required	not required
Network Analyzer	Agilent	E5071C	MY46108212	Apr.01,2013	Mar.31,2014
Dielectric Probe Kit	Agilent	85070E	MY44300677	Calibration	Calibration
Dielectric Probe Kit	Agilent	00070E	101144300077	not required	not required
Dual-directional	Agilent	772D	MY46151242	Jul.04,2013	Jul.03,2014
coupler	Aylicin	778D	MY48220468	Mar.29,2013	Mar.28,2014
RF Signal Generator	Agilent	N5181A	MY50141235	Dec.14,2013	Dec.13,2016
Power Meter	Agilent	E4417A	MY51410006	Oct.25,2013	Oct.24,2015
Power Sensor	Agilent	E9301H	MY51470001	Dec.16,2013	Dec.15,2014

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Device	Manufacturer	Туре	Serial	Date of last	Date of next
Device	Manufacturer	туре	number	calibration	calibration
Radio Communication Test	R&S	CMU200	113505	May 14,2013	May 13,2014
Radio Communication Test	Anritsu	MT8820C	6201061014	May.21,2013	May.20,2014
TECPEL	Digital thermometer	DTM-303A	TP130074	Mar.20,2014	Mar.19,2015
Spectrum Analyzer	Agilent	E4446A	MY51100003	May 30,2013	May 29,2014
Spectrum Analyzer	Agilent	E4440A	MY45304525	Mar.05,2014	Mar.04,2015
Power Sensor	Anritsu	MA2490A	32910	May 30,2013	May 29,2014
Power Meter	Anritsu	ML2487A	6K00003260	May 30,2013	May 29,2014
Power Meter	Anritsu	ML2495A	1005007	Jan.13,2014	Jan.12,2015
Power Sensor	Anritsu	MA2411B	917032	Jan.13,2014	Jan.12,2015

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# 5. Measurements

Date: 1/30/2014

# GSM 850\_Head\_RE Cheek\_CH 251\_DTM

Communication System: GSM ; Frequency: 848.8 MHz

Medium parameters used: f = 849 MHz;  $\sigma$  = 0.899 S/m;  $\epsilon$ r = 41.773;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section

DASY 5 Configuration:

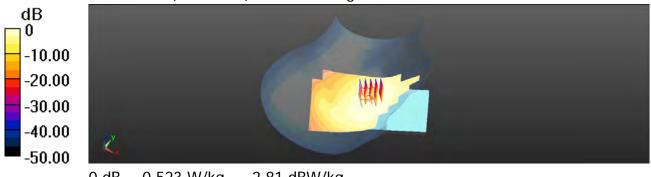
- Probe: EX3DV4 SN3770; ConvF(9.83, 9.83, 9.83); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 0.523 W/kg

## Configuration/RE Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 8.598 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 0.588 W/kg SAR(1 g) = 0.460 W/kg; SAR(10 g) = 0.351 W/kg Maximum value of SAR (measured) = 0.526 W/kg



0 dB = 0.523 W/kg = -2.81 dBW/kg

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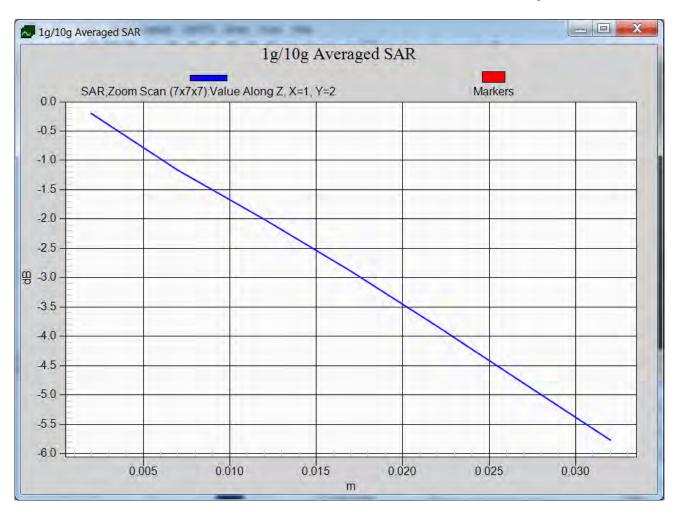
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Date: 1/31/2014

# GSM 850\_Speech mode\_Back side\_CH 128

Communication System: GSM; Frequency: 824.2 MHz

Medium parameters used: f = 824.2 MHz;  $\sigma$  = 0.995 S/m;  $\epsilon_r$  = 53.674;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

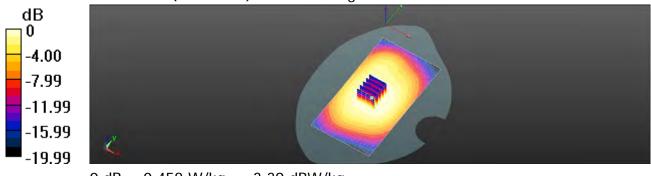
- Probe: EX3DV4 SN3770; ConvF(9.62, 9.62, 9.62); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 0.458 W/kg

#### Configuration/Speech mode/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 21.727 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 0.546 W/kg SAR(1 g) = 0.419 W/kg; SAR(10 g) = 0.317 W/kg Maximum value of SAR (measured) = 0.487 W/kg



0 dB = 0.458 W/kg = -3.39 dBW/kg

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Date: 1/31/2014

# GPRS 850\_Hotspot\_Front side\_CH 251

Communication System: GPRS(1Dn4Up); Frequency: 848.8 MHz Medium parameters used: f = 849 MHz;  $\sigma$  = 1.021 S/m;  $\epsilon_r$  = 53.473;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 SN3770; ConvF(9.62, 9.62, 9.62); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 0.646 W/kg

Configuration/Hotspot/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.066 V/m; Power Drift = 0.01 dBPeak SAR (extrapolated) = 0.759 W/kg

SAR(1 g) = 0.448 W/kg; SAR(10 g) = 0.284 W/kg

Maximum value of SAR (measured) = 0.601 W/kg

# Configuration/Hotspot/Zoom Scan (5x5x7)/Cube 1: Measurement grid:

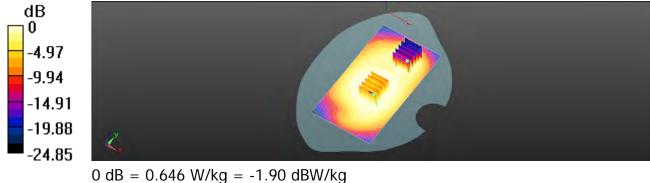
dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.066 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.723 W/kg

#### SAR(1 g) = 0.552 W/kg; SAR(10 g) = 0.423 W/kg

Maximum value of SAR (measured) = 0.639 W/kg



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Date: 2/4/2014

# GSM 1900\_Head\_RE Cheek\_CH 661\_DTM

Communication System: GSM; Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz;  $\sigma$  = 1.36 S/m;  $\epsilon_r$  = 39.019;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section

DASY 5 Configuration:

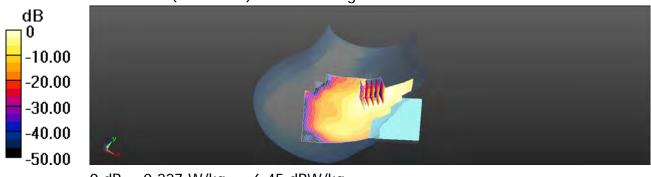
- Probe: EX3DV4 SN3770; ConvF(7.98, 7.98, 7.98); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/RE Cheek/Area Scan (81x131x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.227 W/kg

## Configuration/RE Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 2.294 V/m; Power Drift = 0.06 dB Peak SAR (extrapolated) = 0.272 W/kg SAR(1 g) = 0.171 W/kg; SAR(10 g) = 0.104 W/kg Maximum value of SAR (measured) = 0.207 W/kg



0 dB = 0.227 W/kg = -6.45 dBW/kg

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# GSM 1900\_Speech mode\_Front side\_CH 512\_DTM

Communication System: GSM; Frequency: 1850.2 MHz

Medium parameters used: f = 1850.2 MHz;  $\sigma$  = 1.476 S/m;  $\epsilon_r$  = 54.23;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 SN3770; ConvF(7.63, 7.63, 7.63); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 1.50 W/kg

## Configuration/Speech mode/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 3.929 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 1.90 W/kg SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.615 W/kg Maximum value of SAR (measured) = 1.51 W/kg



0 dB = 1.50 W/kg = 1.76 dBW/kg

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# GPRS 1900\_Hotspot\_Bottom side\_CH 512

Communication System: GPRS(1Dn4Up); Frequency: 1850.2 MHz Medium parameters used: f = 1850.2 MHz;  $\sigma$  = 1.476 S/m;  $\epsilon_r$  = 54.23;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

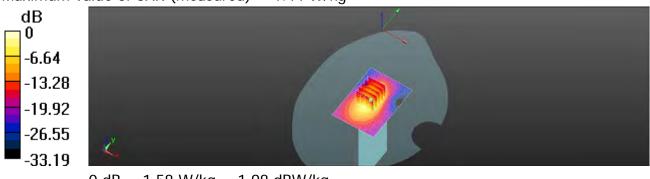
- Probe: EX3DV4 SN3770; ConvF(7.63, 7.63, 7.63); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Hotspot/Area Scan (51x71x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 1.58 W/kg

#### Configuration/Hotspot/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 25.531 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 1.80 W/kg SAR(1 g) = 1.01 W/kg; SAR(10 g) = 0.509 W/kg Maximum value of SAR (measured) = 1.44 W/kg



0 dB = 1.58 W/kg = 1.98 dBW/kg

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# GPRS 1900\_Hotspot\_Bottom side\_CH 512\_repeat sar test at the highest sar measurement

Communication System: GPRS(1Dn4Up); Frequency: 1850.2 MHz Medium parameters used: f = 1850.2 MHz;  $\sigma$  = 1.476 S/m;  $\epsilon_r$  = 54.23;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 SN3770; ConvF(7.63, 7.63, 7.63); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

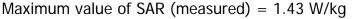
**Configuration/Hotspot/Area Scan (51x71x1):** Interpolated grid: dx=15 mm, dy=15 mm

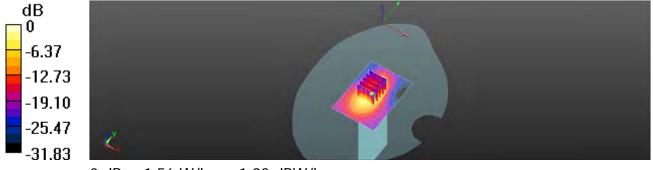
Maximum value of SAR (interpolated) = 1.56 W/kg

## Configuration/Hotspot/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 24.851 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 1.80 W/kg

SAR(1 g) = 1.01 W/kg; SAR(10 g) = 0.504 W/kg





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

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# GPRS 1900\_Hand\_Front side\_CH 661

Communication System: GPRS(1Dn4Up); Frequency: 1880 MHz Medium parameters used: f = 1880 MHz;  $\sigma$  = 1.509 S/m;  $\epsilon_r$  = 54.138;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

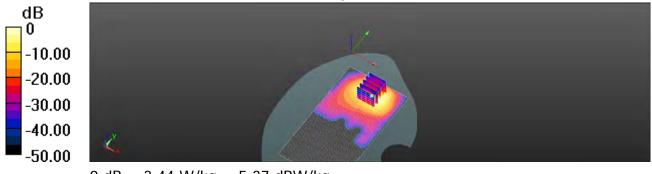
- Probe: EX3DV4 SN3770; ConvF(7.63, 7.63, 7.63); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 3.44 W/kg

## Configuration/Hand/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 0.571 V/m; Power Drift = 0.09 dB Peak SAR (extrapolated) = 5.32 W/kg SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.04 W/kg Maximum value of SAR (measured) = 3.76 W/kg



0 dB = 3.44 W/kg = 5.37 dBW/kg

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Date: 2/4/2014

# WCDMA Band 2\_Head\_RE Cheek\_CH 9538

Communication System: WCDMA; Frequency: 1907.6 MHz Medium parameters used: f = 1908 MHz;  $\sigma$  = 1.388 S/m;  $\epsilon_r$  = 38.898;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section

DASY 5 Configuration:

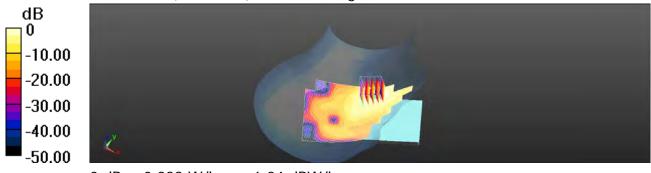
- Probe: EX3DV4 SN3770; ConvF(7.98, 7.98, 7.98); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 0.238 W/kg

## Configuration/RE Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 2.916 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 0.334 W/kg SAR(1 g) = 0.202 W/kg; SAR(10 g) = 0.113 W/kg Maximum value of SAR (measured) = 0.254 W/kg



0 dB = 0.238 W/kg = -6.24 dBW/kg

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# WCDMA Band 2\_Speech mode\_Front side\_CH 9262

Communication System: WCDMA; Frequency: 1852.4 MHz

Medium parameters used: f = 1852.4 MHz;  $\sigma$  = 1.479 S/m;  $\epsilon_r$  = 54.222;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

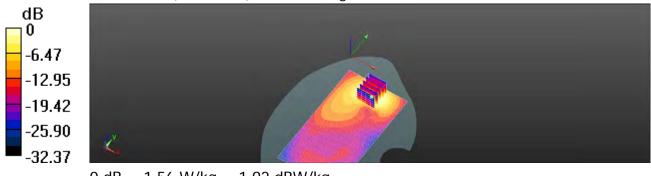
- Probe: EX3DV4 SN3770; ConvF(7.63, 7.63, 7.63); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

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

## Configuration/Speech mode/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 5.022 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 1.85 W/kg SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.634 W/kg Maximum value of SAR (measured) = 1.51 W/kg



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

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# WCDMA Band 2\_Hotspot\_Bottom side\_CH 9262\_repeat sar test at the highest sar measurement

Communication System: WCDMA ;Frequency: 1852.4 MHz

Medium parameters used: f = 1852.4 MHz;  $\sigma$  = 1.479 S/m;  $\epsilon_r$  = 54.222;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 SN3770; ConvF(7.63, 7.63, 7.63); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Hotspot/Area Scan (51x71x1):** Interpolated grid: dx=15 mm, dy=15 mm

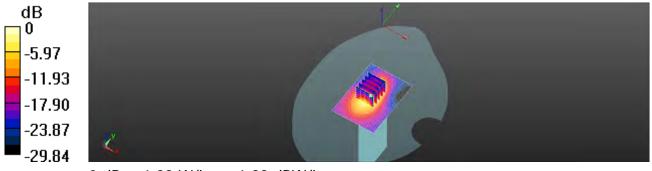
Maximum value of SAR (interpolated) = 1.33 W/kg

#### Configuration/Hotspot/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 22.180 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 1.58 W/kg

SAR(1 g) = 0.880 W/kg; SAR(10 g) = 0.443 W/kg

Maximum value of SAR (measured) = 1.23 W/kg



0 dB = 1.33 W/kg = 1.23 dBW/kg

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# WCDMA Band 2\_Hand\_Front side\_CH 9400

Communication System: WCDMA; Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz;  $\sigma$  = 1.509 S/m;  $\epsilon_r$  = 54.138;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

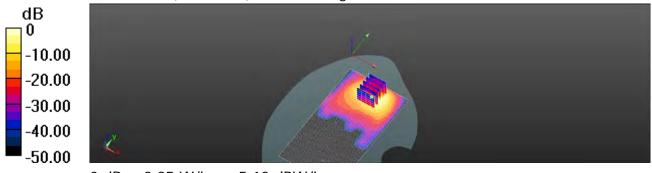
- Probe: EX3DV4 SN3770; ConvF(7.63, 7.63, 7.63); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 3.25 W/kg

## Configuration/Hand/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 0.174 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 4.99 W/kg SAR(1 g) = 2.23 W/kg; SAR(10 g) = 0.985 W/kg Maximum value of SAR (measured) = 3.67 W/kg



0 dB = 3.25 W/kg = 5.12 dBW/kg

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# WCDMA Band 4\_Head\_RE Cheek\_CH 1312

Communication System: WCDMA; Frequency: 1712.4 MHz

Medium parameters used: f = 1712.4 MHz;  $\sigma$  = 1.339 S/m;  $\epsilon_r$  = 41.248;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section

DASY 5 Configuration:

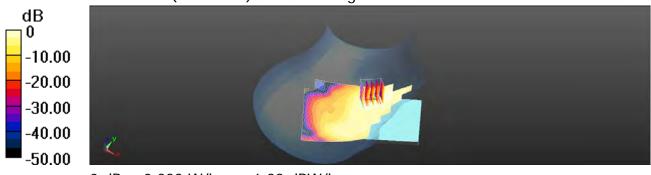
- Probe: EX3DV4 SN3770; ConvF(8.29, 8.29, 8.29); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 0.233 W/kg

## Configuration/RE Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 3.523 V/m; Power Drift = -0.07 dB Peak SAR (extrapolated) = 0.250 W/kg SAR(1 g) = 0.167 W/kg; SAR(10 g) = 0.105 W/kg Maximum value of SAR (measured) = 0.214 W/kg



0 dB = 0.233 W/kg = -6.33 dBW/kg

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# WCDMA Band 4\_Speech mode\_Front side\_CH 1513

Communication System: WCDMA; Frequency: 1752.6 MHz

Medium parameters used: f = 1753 MHz;  $\sigma$  = 1.439 S/m;  $\epsilon_r$  = 54.143;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

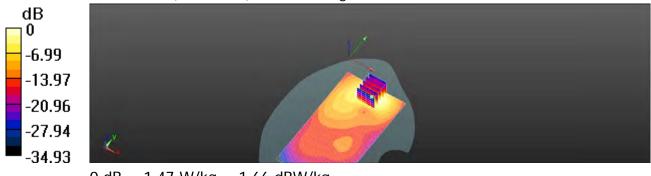
- Probe: EX3DV4 SN3770; ConvF(7.85, 7.85, 7.85); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 1.47 W/kg

#### Configuration/Speech mode/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 6.440 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 1.86 W/kg SAR(1 g) = 1.14 W/kg; SAR(10 g) = 0.636 W/kg Maximum value of SAR (measured) = 1.50 W/kg



0 dB = 1.47 W/kg = 1.66 dBW/kg

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# WCDMA Band 4\_Speech mode\_Front side\_CH 1513\_repeat sar test at the highest sar measurement

Communication System: WCDMA; Frequency: 1752.6 MHz

Medium parameters used: f = 1753 MHz;  $\sigma$  = 1.439 S/m;  $\epsilon_r$  = 54.143;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 SN3770; ConvF(7.85, 7.85, 7.85); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

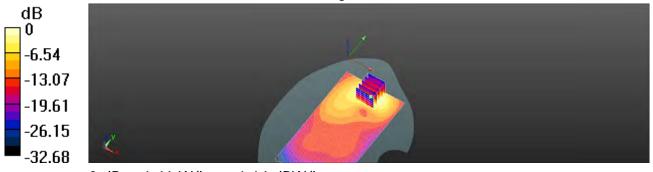
**Configuration/Speech mode/Area Scan (71x131x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 1.46 W/kg

#### Configuration/Speech mode/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 6.562 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 1.87 W/kg

SAR(1 g) = 1.14 W/kg; SAR(10 g) = 0.638 W/kg Maximum value of SAR (measured) = 1.51 W/kg



0 dB = 1.46 W/kg = 1.64 dBW/kg

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# WCDMA Band 4\_Hotspot\_Bottom side\_CH 1513

Communication System: WCDMA ; Frequency: 1752.6 MHz Medium parameters used: f = 1753 MHz;  $\sigma$  = 1.439 S/m;  $\epsilon_r$  = 54.143;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

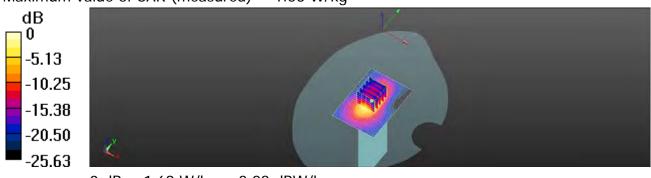
- Probe: EX3DV4 SN3770; ConvF(7.85, 7.85, 7.85); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Hotspot/Area Scan (51x71x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 1.69 W/kg

#### Configuration/Hotspot/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 27.474 V/m; Power Drift = -0.09 dB Peak SAR (extrapolated) = 1.93 W/kg SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.541 W/kg Maximum value of SAR (measured) = 1.53 W/kg



 $0 \, dB = 1.69 \, W/kg = 2.28 \, dBW/kg$ 

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# WCDMA Band 4\_Hotspot\_Bottom side\_CH 1513\_ repeat sar test at the highest sar measurement

Communication System: WCDMA ;Frequency: 1752.6 MHz

Medium parameters used: f = 1753 MHz;  $\sigma$  = 1.439 S/m;  $\epsilon_r$  = 54.143;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 SN3770; ConvF(7.85, 7.85, 7.85); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

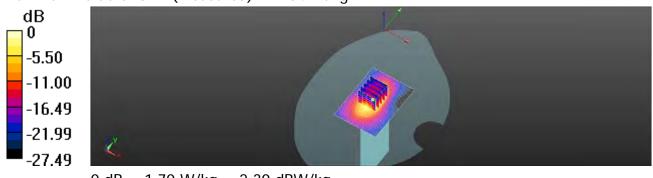
**Configuration/Hotspot/Area Scan (51x71x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 1.70 W/kg

#### Configuration/Hotspot/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 25.565 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 1.97 W/kg

SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.540 W/kgMaximum value of SAR (measured) = 1.54 W/kg



0 dB = 1.70 W/kg = 2.30 dBW/kg

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# WCDMA Band 4\_Hand\_Front side\_CH 1412

Communication System: WCDMA; Frequency: 1732.4 MHz

Medium parameters used: f = 1732.4 MHz;  $\sigma$  = 1.418 S/m;  $\epsilon_r$  = 54.197;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

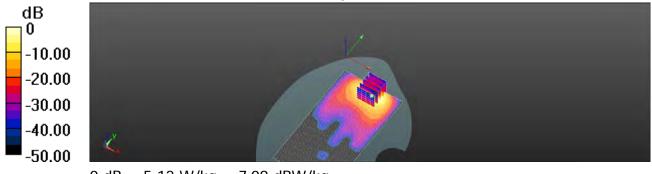
- Probe: EX3DV4 SN3770; ConvF(7.85, 7.85, 7.85); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 5.12 W/kg

## Configuration/Hand/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 1.229 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 6.85 W/kg SAR(1 g) = 2.93 W/kg; SAR(10 g) = 1.25 W/kg Maximum value of SAR (measured) = 5.08 W/kg



 $0 \, dB = 5.12 \, W/kg = 7.09 \, dBW/kg$ 

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Date: 1/30/2014

# WCDMA Band 5\_Head\_RE Cheek\_CH 4233

Communication System: WCDMA; Frequency: 846.6 MHz Medium parameters used: f = 847 MHz;  $\sigma$  = 0.897 S/m;  $\epsilon$ r = 41.798;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section

DASY 5 Configuration:

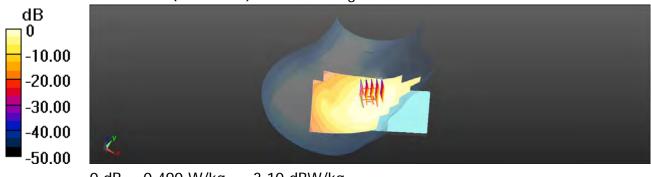
- Probe: EX3DV4 SN3770; ConvF(9.83, 9.83, 9.83); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 0.490 W/kg

#### Configuration/RE Cheek/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 8.491 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 0.542 W/kg SAR(1 g) = 0.429 W/kg; SAR(10 g) = 0.329 W/kg Maximum value of SAR (measured) = 0.487 W/kg



0 dB = 0.490 W/kg = -3.10 dBW/kg

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Date: 1/31/2014

# WCDMA Band 5\_Speech mode\_Front side\_CH 4132

Communication System: WCDMA; Frequency: 826.4 MHz

Medium parameters used: f = 826.4 MHz;  $\sigma$  = 0.997 S/m;  $\epsilon_r$  = 53.656;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

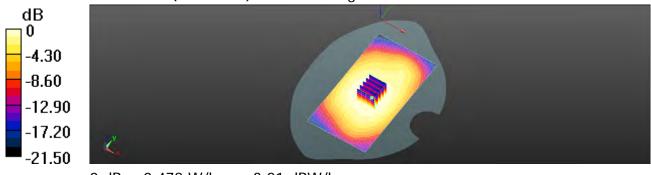
- Probe: EX3DV4 SN3770; ConvF(9.62, 9.62, 9.62); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

Maximum value of SAR (interpolated) = 0.478 W/kg

#### Configuration/Speech mode/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 21.915 V/m; Power Drift = 0.06 dB Peak SAR (extrapolated) = 0.531 W/kg SAR(1 g) = 0.408 W/kg; SAR(10 g) = 0.312 W/kg Maximum value of SAR (measured) = 0.475 W/kg



0 dB = 0.478 W/kg = -3.21 dBW/kg

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Date: 1/31/2014

# WCDMA Band 5\_Hotspot\_Left side\_CH 4183

Communication System: WCDMA ; Frequency: 836.6 MHz Medium parameters used: f = 837 MHz;  $\sigma$  = 1.009 S/m;  $\epsilon_r$  = 53.568;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

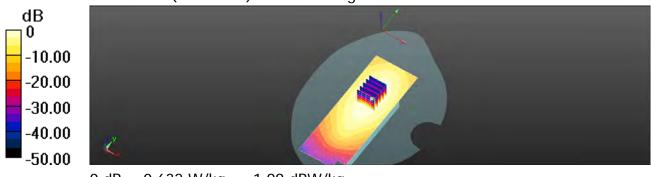
- Probe: EX3DV4 SN3770; ConvF(9.62, 9.62, 9.62); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Hotspot/Area Scan (51x141x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 0.632 W/kg

#### Configuration/Hotspot/Zoom Scan (5x5x7)/Cube 0: Measurement grid:

dx=8mm, dy=8mm, dz=5mm Reference Value = 23.997 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 0.747 W/kg SAR(1 g) = 0.508 W/kg; SAR(10 g) = 0.345 W/kg Maximum value of SAR (measured) = 0.634 W/kg



0 dB = 0.632 W/kg = -1.99 dBW/kg

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# LTE Band 4\_Head\_Re Cheek\_CH 20175\_QPSK\_1-0

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used (interpolated): f = 1732.5 MHz;  $\sigma$  = 1.372 S/m;  $\epsilon_r$  = 38.76;  $\rho$  = 1000 kg/m^3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 SN3831; ConvF(8, 8, 8); Calibrated: 2014/1/31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Head;
- DASY52 52.8.5; SEMCAD X 14.6.10

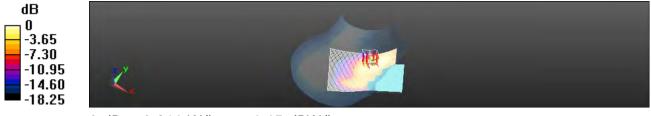
**Configuration/Head/Area Scan (71x121x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.227 W/kg

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

dy=8mm, dz=5mm Reference Value = 3.145 V/m; Power Drift = -0.19 dB Peak SAR (extrapolated) = 0.257 W/kg SAR(1 g) = 0.172 W/kg; SAR(10 g) = 0.110 W/kg

Maximum value of SAR (measured) = 0.216 W/kg



0 dB = 0.216 W/kg = -6.65 dBW/kg

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# LTE Band 4\_Body-worn\_Front\_CH 20175\_QPSK\_1-0\_15mm

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used (interpolated): f = 1732.5 MHz;  $\sigma$  = 1.454 S/m;  $\epsilon_r$  = 55.435;  $\rho$  = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 SN3831; ConvF(7.63, 7.63, 7.63); Calibrated: 2014/1/31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Body;
- DASY52 52.8.7; SEMCAD X 14.6.10

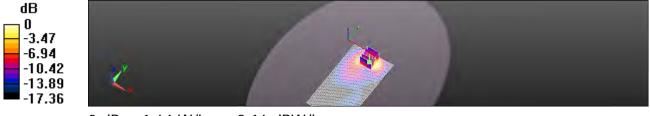
**Configuration/Body/Area Scan (71x131x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.55 W/kg

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

dy=8mm, dz=5mm Reference Value = 5.972 V/m; Power Drift = 0.16 dB Peak SAR (extrapolated) = 1.98 W/kg SAR(1 g) = 1.26 W/kg; SAR(10 g) = 0.715 W/kg

Maximum value of SAR (measured) = 1.64 W/kg



0 dB = 1.64 W/kg = 2.16 dBW/kg

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# LTE Band 4\_Hotspot\_Bottom\_CH 20300\_QPSK\_100-0\_10mm

Communication System: LTE; Frequency: 1745 MHz

Medium parameters used: f = 1745 MHz;  $\sigma$  = 1.463 S/m;  $\epsilon_r$  = 55.275;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

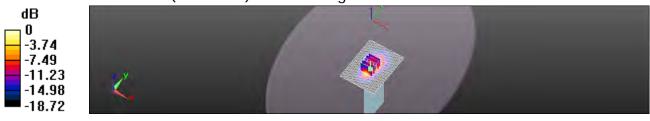
- Probe: EX3DV4 SN3831; ConvF(7.63, 7.63, 7.63); Calibrated: 2014/1/31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Body;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Body/Area Scan (61x81x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

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

dy=8mm, dz=5mm Reference Value = 35.587 V/m; Power Drift = -0.07 dB Peak SAR (extrapolated) = 2.25 W/kg SAR(1 g) = 1.29 W/kg; SAR(10 g) = 0.655 W/kg Maximum value of SAR (measured) = 1.77 W/kg



0 dB = 1.77 W/kg = 2.48 dBW/kg

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# LTE Band 4\_Hand\_Front\_CH 20300\_QPSK\_50-0\_0mm

Communication System: LTE; Frequency: 1745 MHz

Medium parameters used: f = 1745 MHz;  $\sigma$  = 1.461 S/m;  $\epsilon_r$  = 55.416;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

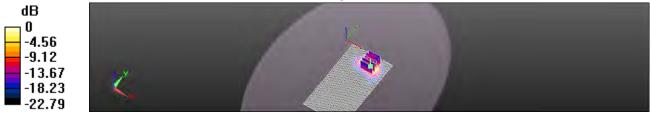
- Probe: EX3DV4 SN3831; ConvF(7.63, 7.63, 7.63); Calibrated: 2014/1/31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Body;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Body/Area Scan (71x131x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 5.39 W/kg

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

dy=8mm, dz=5mm Reference Value = 0.921 V/m; Power Drift = 0.12 dB Peak SAR (extrapolated) = 8.03 W/kg SAR(1 g) = 3.47 W/kg; SAR(10 g) = 1.5 W/kg Maximum value of SAR (measured) = 5.51 W/kg



0 dB = 5.51 W/kg = 7.41 dBW/kg

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# LTE Band 7\_Head\_Re Cheek\_CH 20850\_QPSK\_100-0

Communication System: LTE; Frequency: 2510 MHz

Medium parameters used: f = 2510 MHz;  $\sigma$  = 1.886 S/m;  $\epsilon_r$  = 40.164;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Right Section

DASY5 Configuration:

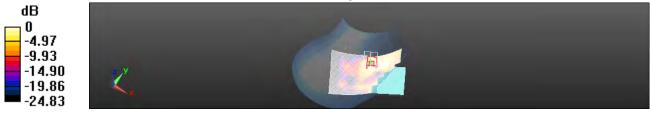
- Probe: EX3DV4 SN3923; ConvF(7.44, 7.44, 7.44); Calibrated: 2013/6/12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Head;
- DASY52 52.8.7; SEMCAD X 14.6.8(7028)

Configuration/Head/Area Scan (91x151x1): Interpolated grid: dx=12 mm,

dy=12 mm Maximum value of SAR (interpolated) = 0.204 W/kg

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

dy=5mm, dz=5mm Reference Value = 1.512 V/m; Power Drift = -0.18 dB Peak SAR (extrapolated) = 0.259 W/kg SAR(1 g) = 0.132 W/kg; SAR(10 g) = 0.067 W/kg Maximum value of SAR (measured) = 0.198 W/kg



0 dB = 0.198 W/kg = -7.03 dBW/kg

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# LTE Band 7\_Body-worn\_Back\_CH 20850\_QPSK\_1-99\_15mm

Communication System: LTE; Frequency: 2510 MHz

Medium parameters used: f = 2510 MHz;  $\sigma$  = 2.12 S/m;  $\epsilon_r$  = 51.072;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 SN3923; ConvF(7.37, 7.37, 7.37); Calibrated: 2013/6/12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Body;
- DASY52 52.8.5; SEMCAD X 14.6.8(7028)

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

dy=12 mm Maximum value of SAR (interpolated) = 1.13 W/kg

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

dy=5mm, dz=5mm Reference Value = 3.389 V/m; Power Drift = 0.17 dB Peak SAR (extrapolated) = 1.51 W/kg SAR(1 g) = 0.771 W/kg; SAR(10 g) = 0.409 W/kg Maximum value of SAR (measured) = 1.12 W/kg



0 dB = 1.12 W/kg = 0.47 dBW/kg

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# LTE Band 7\_Hotspot\_Back\_CH 20850\_QPSK\_100-0\_10mm

Communication System: LTE; Frequency: 2510 MHz

Medium parameters used: f = 2510 MHz;  $\sigma$  = 2.12 S/m;  $\epsilon_r$  = 51.072;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 SN3923; ConvF(7.37, 7.37, 7.37); Calibrated: 2013/6/12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Body;
- DASY52 52.8.7; SEMCAD X 14.6.8(7028)

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

dy=12 mm Maximum value of SAR (interpolated) = 1.34 W/kg

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

dy=5mm, dz=5mm Reference Value = 3.437 V/m; Power Drift = -0.04 dB Peak SAR (extrapolated) = 1.89 W/kg SAR(1 g) = 0.904 W/kg; SAR(10 g) = 0.446 W/kg Maximum value of SAR (measured) = 1.34 W/kg



0 dB = 1.34 W/kg = 1.28 dBW/kg

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# LTE Band 7\_Hand\_Front\_CH 21350\_QPSK\_100-0\_0mm

Communication System: LTE; Frequency: 2560 MHz

Medium parameters used: f = 2560 MHz;  $\sigma$  = 2.161 S/m;  $\epsilon_r$  = 50.787;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

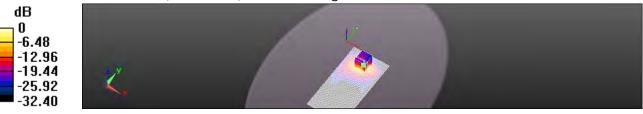
- Probe: EX3DV4 SN3923; ConvF(7.37, 7.37, 7.37); Calibrated: 2013/6/12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Body;
- DASY52 52.8.7; SEMCAD X 14.6.8(7028)

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

dy=12 mm Maximum value of SAR (interpolated) = 10.1 W/kg

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

dy=5mm, dz=5mm Reference Value = 0.711 V/m; Power Drift = 0.20 dB Peak SAR (extrapolated) = 17.8 W/kg SAR(1 g) = 5.58 W/kg; SAR(10 g) = 2.01 W/kg Maximum value of SAR (measured) = 10.1 W/kg



0 dB = 10.1 W/kg = 10.05 dBW/kg

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# LTE Band 17\_Head\_Le Cheek\_CH 23800\_QPSK\_1-49

Communication System: LTE; Frequency: 711 MHz Medium parameters used: f = 711 MHz;  $\sigma$  = 0.867 S/m;  $\epsilon$ r = 43.722;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Left Section

DASY5 Configuration:

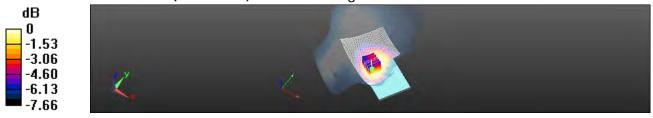
- Probe: EX3DV4 SN3578; ConvF(8.85, 8.85, 8.85); Calibrated: 2013/6/20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: Head;
- DASY52 52.8.7; SEMCAD X 14.6.10

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

dy=15 mm Maximum value of SAR (interpolated) = 0.146 W/kg

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

dy=8mm, dz=5mm Reference Value = 5.331 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 0.155 W/kg SAR(1 g) = 0.128 W/kg; SAR(10 g) = 0.103 W/kg Maximum value of SAR (measured) = 0.143 W/kg



0 dB = 0.143 W/kg = -8.45 dBW/kg

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# LTE Band 17\_Body-worn\_Front\_CH 23800\_QPSK\_1-49\_15mm

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz;  $\sigma$  = 0.927 S/m;  $\epsilon_r$  = 54.538;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

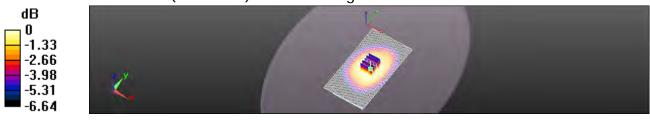
- Probe: EX3DV4 SN3578; ConvF(8.68, 8.68, 8.68); Calibrated: 2013/6/20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: Body;
- DASY52 52.8.5; SEMCAD X 14.6.10

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

dy=15 mm Maximum value of SAR (interpolated) = 0.268 W/kg

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

dy=8mm, dz=5mm Reference Value = 17.885 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 0.297 W/kg SAR(1 g) = 0.244 W/kg; SAR(10 g) = 0.194 W/kg Maximum value of SAR (measured) = 0.275 W/kg



0 dB = 0.275 W/kg = -5.61 dBW/kg

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# LTE Band 17\_Hotspot\_Left\_CH 23780\_QPSK\_1-49\_10mm

Communication System: LTE; Frequency: 709 MHz

Medium parameters used: f = 709 MHz;  $\sigma$  = 0.924 S/m;  $\epsilon_r$  = 54.683;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

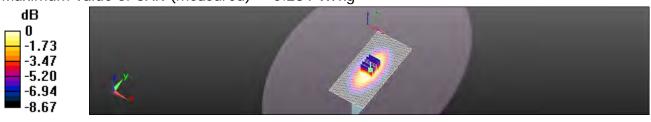
- Probe: EX3DV4 SN3578; ConvF(8.68, 8.68, 8.68); Calibrated: 2013/6/20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: Body;
- DASY52 52.8.5; SEMCAD X 14.6.10

Configuration/Body/Area Scan (61x131x1): Interpolated grid: dx=15 mm,

dy=15 mm Maximum value of SAR (interpolated) = 0.282 W/kg

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

dy=8mm, dz=5mm Reference Value = 18.123 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 0.325 W/kg SAR(1 g) = 0.233 W/kg; SAR(10 g) = 0.165 W/kg Maximum value of SAR (measured) = 0.284 W/kg



0 dB = 0.284 W/kg = -5.47 dBW/kg

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#### WLAN802.11b\_Head\_LE Cheek\_CH 1\_repeated with external Memory card inside

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2412 MHz Medium parameters used: f = 2412 MHz;  $\sigma$  = 1.802 S/m;  $\epsilon_r$  = 39.73;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Left Section

**DASY 5 Configuration:** 

- Probe: EX3DV4 SN3770; ConvF(7.12, 7.12, 7.12); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

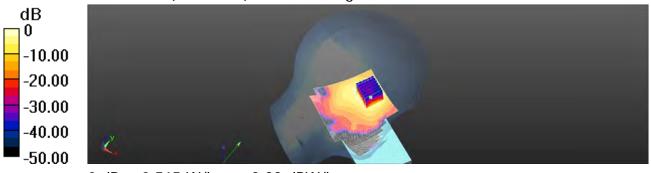
Configuration/LE Cheek/Area Scan (91x161x1): Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.515 W/kg

#### Configuration/LE Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mmReference Value = 5.587 V/m; Power Drift = 0.03 dB Peak SAR (extrapolated) = 0.805 W/kg

SAR(1 g) = 0.341 W/kg; SAR(10 g) = 0.155 W/kgMaximum value of SAR (measured) = 0.550 W/kg



0 dB = 0.515 W/kg = -2.88 dBW/kg

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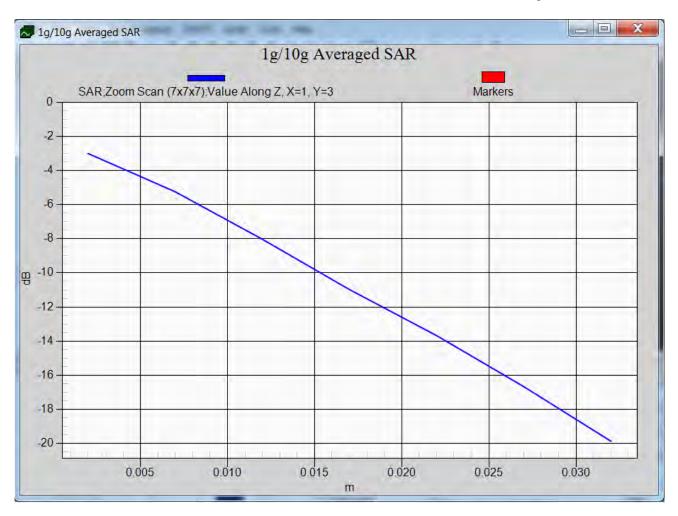
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#### WLAN802.11b\_Hotspot\_Back side\_CH 1

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2412 MHz Medium parameters used: f = 2412 MHz;  $\sigma$  = 1.935 S/m;  $\epsilon_r$  = 51.136;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

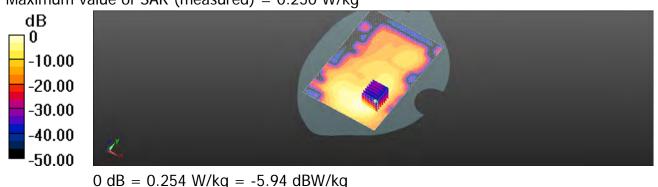
- Probe: EX3DV4 SN3770; ConvF(7.21, 7.21, 7.21); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Hotspot/Area Scan (111x161x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 0.254 W/kg

#### Configuration/Hotspot/Zoom Scan (7x7x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 3.036 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 0.368 W/kg SAR(1 g) = 0.161 W/kg; SAR(10 g) = 0.074 W/kg Maximum value of SAR (measured) = 0.250 W/kg



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#### WLAN802.11a 5.2G\_Head\_LE Cheek\_CH 44

Communication System: WLAN 802.11n/a(5G) FCC ;Frequency: 5220 MHz Medium parameters used: f = 5220 MHz;  $\sigma$  = 4.647 S/m;  $\epsilon_r$  = 36.083;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Left Section

DASY 5 Configuration:

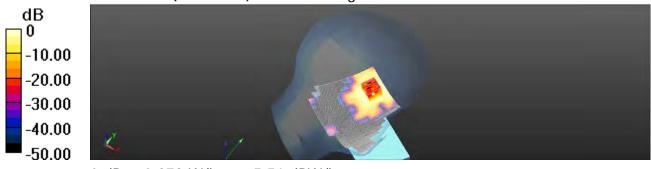
- Probe: EX3DV4 SN3770; ConvF(5.15, 5.15, 5.15); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/LE Cheek/Area Scan (121x191x1):** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 0.276 W/kg

#### Configuration/LE Cheek/Zoom Scan(7x7x12)/Cube 0: Measurement grid:

dx=4mm, dy=4mm, dz=2mm Reference Value = 1.298 V/m; Power Drift = -0.09 dB Peak SAR (extrapolated) = 0.509 W/kg SAR(1 g) = 0.149 W/kg; SAR(10 g) = 0.057 W/kg. Maximum value of SAR (measured) = 0.278 W/kg



0 dB = 0.278 W/kg = -5.56 dBW/kg

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#### WLAN802.11a 5.2G\_Body-worn\_Back side\_CH 44

Communication System: WLAN 802.11n/a(5G) FCC ; Frequency: 5220 MHz Medium parameters used: f = 5220 MHz;  $\sigma$  = 5.202 S/m;  $\epsilon_r$  = 48.357;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

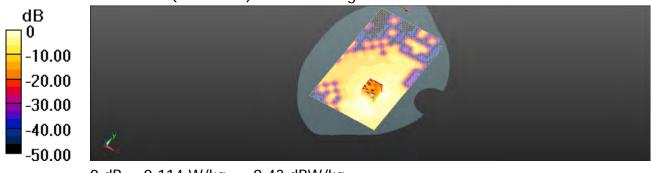
- Probe: EX3DV4 SN3770; ConvF(4.71, 4.71, 4.71); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Body-worn/Area Scan (121x201x1):** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 0.110 W/kg

#### Configuration/Body-worn/Zoom Scan (7x7x12)/Cube 0: Measurement grid:

dx=4mm, dy=4mm, dz=2mm Reference Value = 2.227 V/m; Power Drift = -0.13 dB Peak SAR (extrapolated) = 0.172 W/kg SAR(1 g) = 0.068 W/kg; SAR(10 g) = 0.028 W/kg Maximum value of SAR (measured) = 0.114 W/kg



0 dB = 0.114 W/kg = -9.43 dBW/kg

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#### WLAN802.11a 5.3G\_Head\_LE Cheek\_CH 56

Communication System: WLAN 802.11n/a(5G) FCC ;Frequency: 5280 MHz Medium parameters used: f = 5280 MHz;  $\sigma$  = 4.698 S/m;  $\epsilon_r$  = 35.914;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Left Section

DASY 5 Configuration:

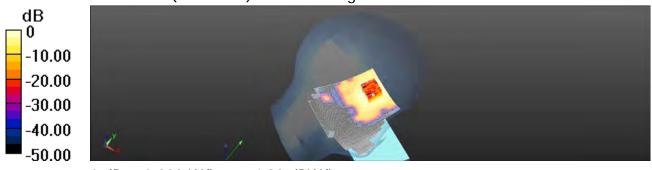
- Probe: EX3DV4 SN3770; ConvF(4.95, 4.95, 4.95); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/LE Cheek/Area Scan (121x191x1):** Interpolated grid: dx=10 mm, dy=10 mm

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

#### Configuration/LE Cheek/Zoom Scan(7x7x12)/Cube 0: Measurement grid:

dx=4mm, dy=4mm, dz=2mm Reference Value = 1.854 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 0.580 W/kg SAR(1 g) = 0.175 W/kg; SAR(10 g) = 0.069 W/kg Maximum value of SAR (measured) = 0.322 W/kg



0 dB = 0.322 W/kg = -4.92 dBW/kg

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#### WLAN802.11a 5.3G\_Body-worn\_Back side\_CH 60

Communication System: WLAN 802.11n/a(5G) FCC ; Frequency: 5300 MHz Medium parameters used: f = 5300 MHz;  $\sigma$  = 5.314 S/m;  $\epsilon_r$  = 48.156;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

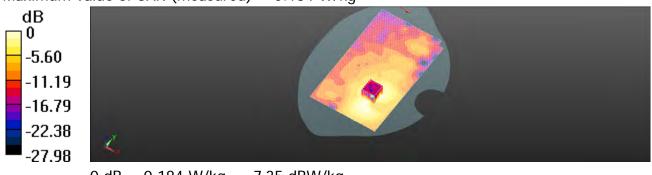
- Probe: EX3DV4 SN3770; ConvF(4.42, 4.42, 4.42); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Body-worn/Area Scan (121x201x1):** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 0.182 W/kg

#### Configuration/Body-worn/Zoom Scan (7x7x12)/Cube 0: Measurement grid:

dx=4mm, dy=4mm, dz=2mm Reference Value = 2.486 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 0.306 W/kg SAR(1 g) = 0.112 W/kg; SAR(10 g) = 0.048 W/kg Maximum value of SAR (measured) = 0.184 W/kg



0 dB = 0.184 W/kg = -7.35 dBW/kg

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# WLAN802.11a 5.6G\_Head\_LE Cheek\_CH 132

Communication System: WLAN 802.11n/a(5G) FCC ;Frequency: 5660 MHz Medium parameters used: f = 5660 MHz;  $\sigma$  = 5.147 S/m;  $\epsilon_r$  = 35.063;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Left Section

DASY 5 Configuration:

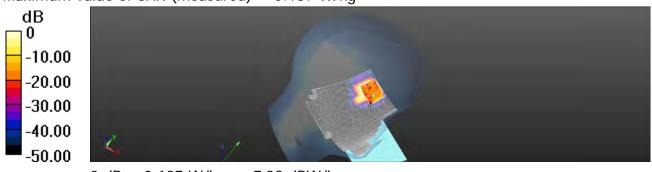
- Probe: EX3DV4 SN3770; ConvF(4.49, 4.49, 4.49); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/LE Cheek/Area Scan (121x191x1):** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 0.264 W/kg

#### Configuration/LE Cheek/Zoom Scan(7x7x12)/Cube 0: Measurement grid:

dx=4mm, dy=4mm, dz=2mm Reference Value = 0.1437 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 0.497 W/kg SAR(1 g) = 0.095 W/kg; SAR(10 g) = 0.026 W/kg Maximum value of SAR (measured) = 0.187 W/kg



0 dB = 0.187 W/kg = -7.28 dBW/kg

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# WLAN802.11a 5.6G\_Body-worn\_Back side\_CH 132\_repeated with external Memory card inside\_repeat sar test at the highest sar measurement

Communication System: WLAN 802.11n/a(5G) FCC ; Frequency: 5660 MHz Medium parameters used: f = 5660 MHz;  $\sigma$  = 5.845 S/m;  $\epsilon_r$  = 47.232;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 SN3770; ConvF(4.01, 4.01, 4.01); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Body-worn/Area Scan (121x201x1):** Interpolated grid: dx=10 mm, dy=10 mm

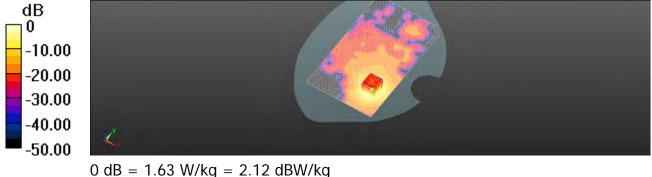
Maximum value of SAR (interpolated) = 1.65 W/kg

#### Configuration/Body-worn/Zoom Scan (7x7x12)/Cube 0: Measurement grid:

dx=4mm, dy=4mm, dz=2mmReference Value = 2.347 V/m; Power Drift = -0.09 dB Peak SAR (extrapolated) = 2.91 W/kg SAP(1 g) = 0.909 W/kg; SAP(10 g) = 0.324 W/kg

SAR(1 g) = 0.909 W/kg; SAR(10 g) = 0.324 W/kg

Maximum value of SAR (measured) = 1.63 W/kg



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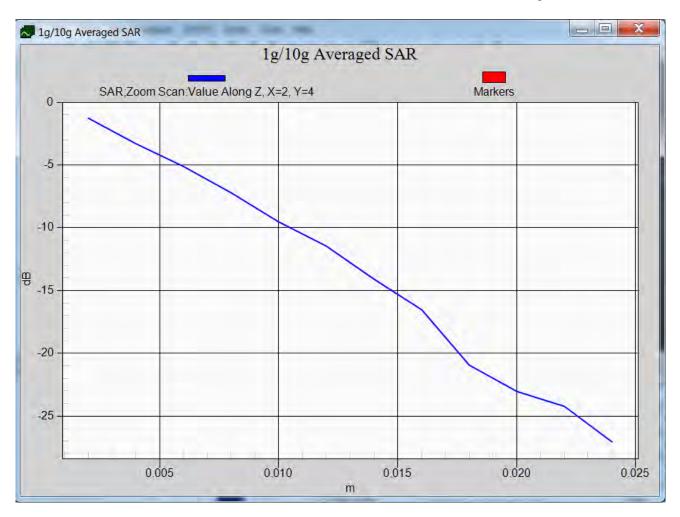
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#### WLAN802.11a 5.8G\_Head\_LE Cheek\_CH 161

Communication System: WLAN 802.11n/a(5G) FCC ;Frequency: 5805 MHz Medium parameters used: f = 5805 MHz;  $\sigma$  = 5.315 S/m;  $\epsilon_r$  = 34.702;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Left Section

DASY 5 Configuration:

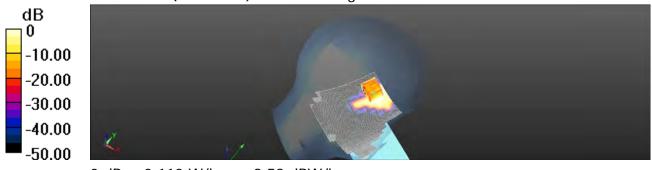
- Probe: EX3DV4 SN3770; ConvF(4.66, 4.66, 4.66); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/LE Cheek/Area Scan (121x191x1):** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 0.261 W/kg

# Configuration/LE Cheek/Zoom Scan(7x7x12)/Cube 0: Measurement grid:

dx=4mm, dy=4mm, dz=2mm Reference Value = 0.940 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 0.205 W/kg SAR(1 g) = 0.058 W/kg; SAR(10 g) = 0.021 W/kg Maximum value of SAR (measured) = 0.110 W/kg



0 dB = 0.110 W/kg = -9.59 dBW/kg

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#### WLAN802.11a 5.8G\_Body-worn\_Back side\_CH 153

Communication System: WLAN 802.11n/a(5G) FCC ; Frequency: 5765 MHz Medium parameters used: f = 5765 MHz;  $\sigma$  = 6 S/m;  $\epsilon_r$  = 46.968;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

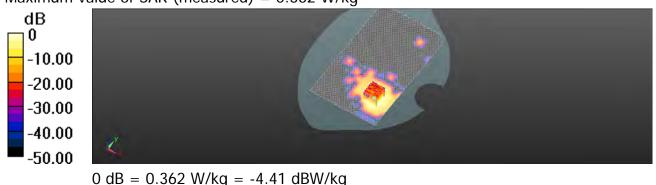
- Probe: EX3DV4 SN3770; ConvF(4.29, 4.29, 4.29); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Body-worn/Area Scan (121x201x1):** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 0.377 W/kg

#### Configuration/Body-worn/Zoom Scan (7x7x12)/Cube 0: Measurement grid:

dx=4mm, dy=4mm, dz=2mm Reference Value = 0.892 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 0.652 W/kg SAR(1 g) = 0.204 W/kg; SAR(10 g) = 0.071 W/kg Maximum value of SAR (measured) = 0.362 W/kg



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# 6. System Verification

Date: 2014/2/5

# Dipole 750 MHz\_SN:1015\_Head

Communication System: CW; Frequency: 750 MHz

Medium parameters used: f = 750 MHz;  $\sigma$  = 0.873 S/m;  $\epsilon_r$  = 43.374;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

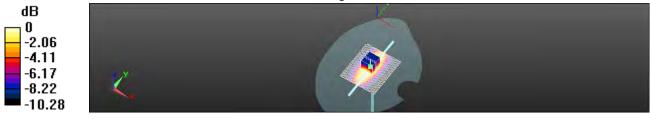
- Probe: EX3DV4 SN3578; ConvF(8.85, 8.85, 8.85); Calibrated: 2013/6/20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: Head;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Pin=250mW/Area Scan (61x71x1):** 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 = 56.050 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 3.09 W/kg SAR(1 g) = 2.01 W/kg; SAR(10 g) = 1.32 W/kg Maximum value of SAR (measured) = 2.58 W/kg



0 dB = 2.58 W/kg = 4.12 dBW/kg

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# Dipole 750 MHz\_SN:1015\_Body

Communication System: CW; Frequency: 750 MHz Medium parameters used: f = 750 MHz;  $\sigma$  = 0.957 S/m;  $\epsilon_r$  = 54.444;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 SN3578; ConvF(8.68, 8.68, 8.68); Calibrated: 2013/6/20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: Body;
- DASY52 52.8.5; SEMCAD X 14.6.10

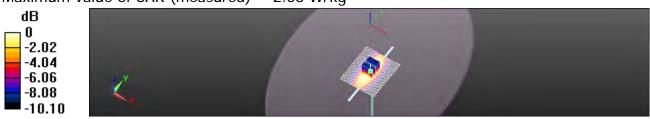
**Configuration/Pin=250mW/Area Scan (61x71x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 2.67 W/kg

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

dx=5mm, dy=5mm, dz=5mm Reference Value = 55.859 V/m; Power Drift = -0.00 dB Peak SAR (extrapolated) = 3.18 W/kg SAR(1 g) = 2.1 W/kg; SAR(10 g) = 1.38 W/kg

Maximum value of SAR (measured) = 2.68 W/kg



0 dB = 2.68 W/kg = 4.28 dBW/kg

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Date: 1/30/2014

# Dipole 835 MHz\_SN:4d156\_Head

Communication System: CW; Frequency: 835 MHz Medium parameters used: f = 835 MHz;  $\sigma$  = 0.885 S/m;  $\epsilon_r$  = 41.947;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

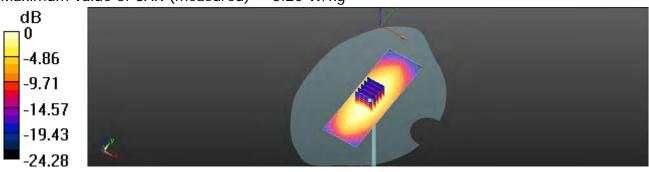
- Probe: EX3DV4 SN3770; ConvF(9.83, 9.83, 9.83); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=15mm, Pin=250mW, dist=2mm:** Interpolated grid: dx=15 mm, dy=15 mm

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

#### Configuration/d=15mm, Pin=250mW, dist=2mm: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 60.727 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 3.83 W/kg SAR(1 g) = 2.5 W/kg; SAR(10 g) = 1.63 W/kg Maximum value of SAR (measured) = 3.20 W/kg



 $0 \, dB = 3.18 \, W/kg = 5.03 \, dBW/kg$ 

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Date: 1/31/2014

# Dipole 835 MHz\_SN:4d156\_Body

Communication System: CW; Frequency: 835 MHz Medium parameters used: f = 835 MHz;  $\sigma$  = 1.006 S/m;  $\epsilon_r$  = 53.585;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

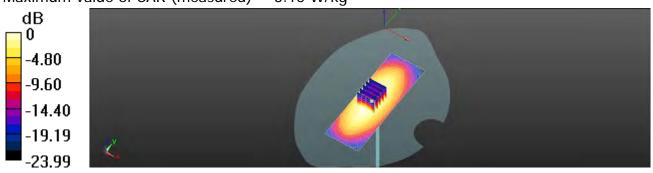
- Probe: EX3DV4 SN3770; ConvF(9.62, 9.62, 9.62); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=15mm, Pin=250mW, dist=2mm:** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 3.11 W/kg

#### Configuration/d=15mm, Pin=250mW, dist=2mm: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 54.924 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 3.76 W/kg SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.59 W/kg Maximum value of SAR (measured) = 3.15 W/kg



 $0 \, dB = 3.11 \, W/kg = 4.92 \, dBW/kg$ 

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# Dipole 1750 MHz\_SN:1095\_Head

Communication System: CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.374 S/m;  $\epsilon_r$  = 41.094;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

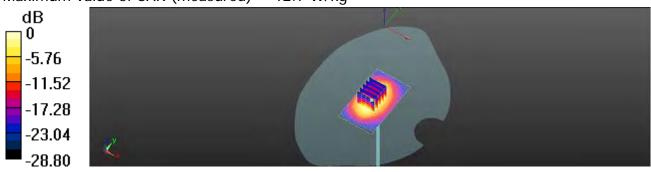
- Probe: EX3DV4 SN3770; ConvF(8.29, 8.29, 8.29); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=250mW, dist=2mm:** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 13.0 W/kg

#### Configuration/d=10mm, Pin=250mW, dist=2mm: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 92.482 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 16.4 W/kg SAR(1 g) = 8.78 W/kg; SAR(10 g) = 4.58 W/kg Maximum value of SAR (measured) = 12.7 W/kg



0 dB = 13.0 W/kg = 11.15 dBW/kg

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# Dipole 1750 MHz\_SN:1095\_Body

Communication System: CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.436 S/m;  $\epsilon_r$  = 54.16;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

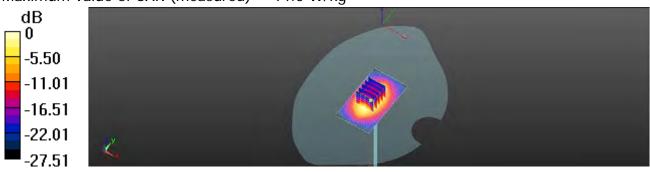
- Probe: EX3DV4 SN3770; ConvF(7.85, 7.85, 7.85); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=250mW, dist=2mm:** Interpolated grid: dx=15 mm, dy=15 mm

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

#### Configuration/d=10mm, Pin=250mW, dist=2mm: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 99.964 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 17.4 W/kg SAR(1 g) = 9.82 W/kg; SAR(10 g) = 5.23 W/kg Maximum value of SAR (measured) = 14.0 W/kg



0 dB = 14.6 W/kg = 11.64 dBW/kg

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# Dipole 1750 MHz\_SN:1008\_Head

Communication System: CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.391 S/m;  $\epsilon_r$  = 38.645;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

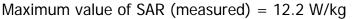
- Probe: EX3DV4 SN3831; ConvF(8, 8, 8); Calibrated: 2014/1/31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Head;
- DASY52 52.8.7; SEMCAD X 14.6.10

# **Configuration/Pin=250mW/Area Scan (41x71x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 12.7 W/kg

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

dx=5mm, dy=5mm, dz=5mm Reference Value = 95.375 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 15.7 W/kg SAR(1 g) = 8.46 W/kg; SAR(10 g) = 4.4 W/kg





0 dB = 12.2 W/kg = 10.86 dBW/kg

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# Dipole 1750 MHz\_SN:1008\_Body

Communication System: CW; Frequency: 1750 MHz Medium parameters used: f = 1750 MHz;  $\sigma = 1.467$  S/m;  $\epsilon_r = 55.384$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 SN3831; ConvF(7.63, 7.63, 7.63); Calibrated: 2014/1/31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Body;
- DASY52 52.8.5; SEMCAD X 14.6.10

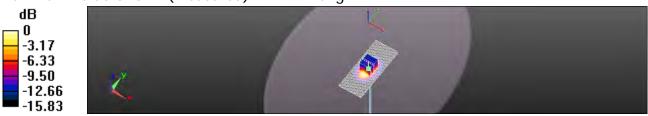
**Configuration/Pin=250mW/Area Scan (41x101x1):** Interpolated grid: dx=15 mm, dy=15 mm

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 = 98.200 V/m; Power Drift = 0.00 dB Peak SAR (extrapolated) = 16.0 W/kg SAR(1 g) = 9.16 W/kg; SAR(10 g) = 4.92 W/kg

#### Maximum value of SAR (measured) = 12.9 W/kg



0 dB = 12.9 W/kg = 11.11 dBW/kg

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# Dipole 1750 MHz\_SN:1008\_Body

Communication System: CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.466 S/m;  $\epsilon_r$  = 55.219;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 SN3831; ConvF(7.63, 7.63, 7.63); Calibrated: 2014/1/31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Body;
- DASY52 52.8.7; SEMCAD X 14.6.10

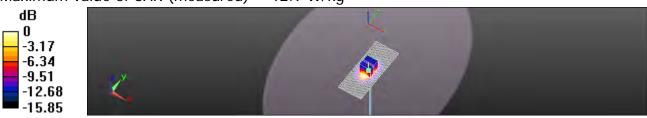
**Configuration/Pin=250mW/Area Scan (41x101x1):** Interpolated grid: dx=15 mm, dy=15 mm

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 = 98.360 V/m; Power Drift = -0.00 dB Peak SAR (extrapolated) = 16.0 W/kg SAR(1 g) = 9.14 W/kg; SAR(10 g) = 4.89 W/kg

#### Maximum value of SAR (measured) = 12.9 W/kg



0 dB = 12.9 W/kg = 11.11 dBW/kg

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# Dipole 1750 MHz\_SN:1008\_Body

Communication System: CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.463 S/m;  $\epsilon_r$  = 55.302;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 SN3831; ConvF(7.63, 7.63, 7.63); Calibrated: 2014/1/31;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Body;
- DASY52 52.8.7; SEMCAD X 14.6.10

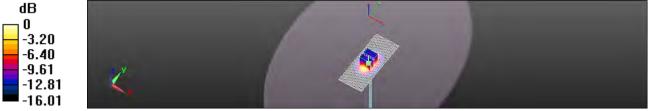
**Configuration/Pin=250mW/Area Scan (41x101x1):** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 12.5 W/kg

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

dx=5mm, dy=5mm, dz=5mm Reference Value = 97.169 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 15.5 W/kg SAR(1 g) = 8.9 W/kg; SAR(10 g) = 4.79 W/kg Maximum value of SAD (measured) = 12.5 W/kg





0 dB = 12.5 W/kg = 10.97 dBW/kg

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Date: 2/4/2014

# Dipole 1900 MHz\_SN:5d173\_Head

Communication System: CW; Frequency: 1900 MHz Medium parameters used: f = 1900 MHz;  $\sigma$  = 1.38 S/m;  $\epsilon_r$  = 38.931;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

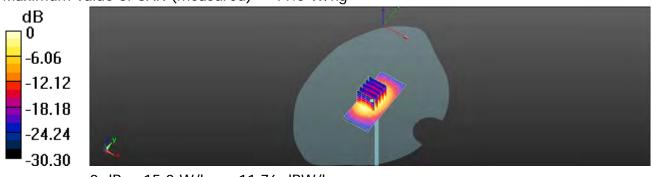
- Probe: EX3DV4 SN3770; ConvF(7.98, 7.98, 7.98); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

Configuration/d=10mm, Pin=250mW, dist=2mm: Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 15.0 W/kg

# Configuration/d=10mm, Pin=250mW, dist=2mm: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 103.4 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 18.8 W/kg SAR(1 g) = 9.83 W/kg; SAR(10 g) = 5.02 W/kg Maximum value of SAR (measured) = 11.0 W/kg



0 dB = 15.0 W/kg = 11.76 dBW/kg

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Date: 2/5/2014

# Dipole 1900 MHz\_SN:5d173\_Body

Communication System: CW; Frequency: 1900 MHz Medium parameters used: f = 1900 MHz;  $\sigma$  = 1.532 S/m;  $\epsilon_r$  = 54.067;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

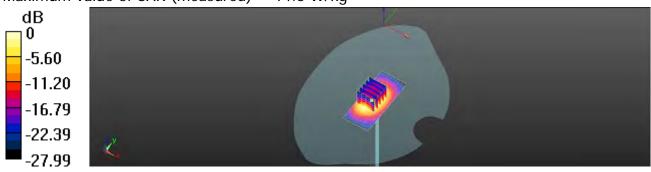
- Probe: EX3DV4 SN3770; ConvF(7.63, 7.63, 7.63); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=250mW, dist=2mm:** Interpolated grid: dx=15 mm, dy=15 mm

Maximum value of SAR (interpolated) = 15.1 W/kg

#### Configuration/d=10mm, Pin=250mW, dist=2mm: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 96.919 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 17.8 W/kg SAR(1 g) = 9.98 W/kg; SAR(10 g) = 5.2 W/kg Maximum value of SAR (measured) = 14.3 W/kg



0 dB = 15.1 W/kg = 11.78 dBW/kg

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# Dipole 2450 MHz\_SN:912\_Head

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz;  $\sigma$  = 1.849 S/m;  $\epsilon_r$  = 39.586;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

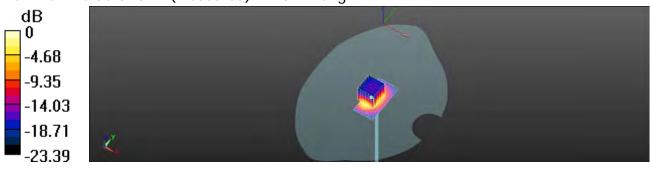
- Probe: EX3DV4 SN3770; ConvF(7.12, 7.12, 7.12); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=250mW, dist=2mm:** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 21.0 W/kg

#### Configuration/d=10mm, Pin=250mW, dist=2mm: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 105.5 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 29.0 W/kg SAR(1 g) = 13.3 W/kg; SAR(10 g) = 5.96 W/kg Maximum value of SAR (measured) = 20.7 W/kg



0 dB = 21.0 W/kg = 13.21 dBW/kg

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# Dipole 2450 MHz\_SN:912\_Body

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz;  $\sigma$  = 1.99 S/m;  $\epsilon_r$  = 51.052;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

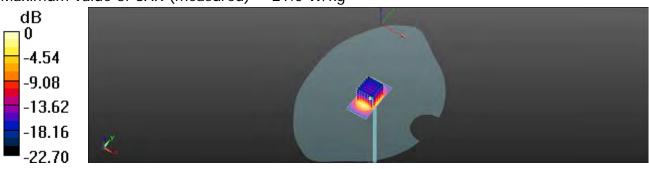
- Probe: EX3DV4 SN3770; ConvF(7.21, 7.21, 7.21); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=250mW, dist=2mm:** Interpolated grid: dx=12 mm, dy=12 mm

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

#### Configuration/d=10mm, Pin=250mW, dist=2mm: Measurement grid:

dx=5mm, dy=5mm, dz=5mm Reference Value = 101 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 29.0 W/kg SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.14 W/kg Maximum value of SAR (measured) = 21.0 W/kg



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

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# Dipole 2600 MHz\_SN:1005\_Head

Communication System: CW; Frequency: 2600 MHz

Medium parameters used: f = 2600 MHz;  $\sigma$  = 2.003 S/m;  $\epsilon_r$  = 39.635;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

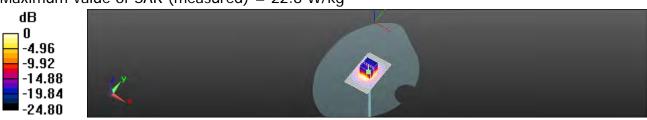
- Probe: EX3DV4 SN3923; ConvF(7.44, 7.44, 7.44); Calibrated: 2013/6/12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Head;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/Pin=250mW/Area Scan (51x81x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 23.7 W/kg

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

dx=5mm, dy=5mm, dz=5mm Reference Value = 105.9 V/m; Power Drift = 0.01 dB Peak SAR (extrapolated) = 31.7 W/kg SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.41 W/kg Maximum value of SAR (measured) = 22.8 W/kg



0 dB = 22.8 W/kg = 13.58 dBW/kg

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# Dipole 2600 MHz\_SN:1005\_Body

Communication System: CW; Frequency: 2600 MHz

Medium parameters used: f = 2600 MHz;  $\sigma$  = 2.224 S/m;  $\epsilon_r$  = 50.622;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

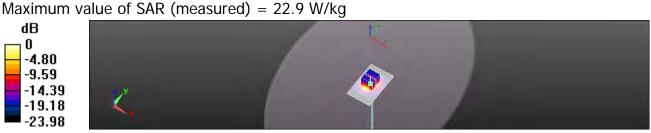
- Probe: EX3DV4 SN3923; ConvF(7.37, 7.37, 7.37); Calibrated: 2013/6/12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Body;
- DASY52 52.8.7; SEMCAD X 14.6.10

# **Configuration/Pin=250mW/Area Scan (51x81x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 23.8 W/kg

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

dx=5mm, dy=5mm, dz=5mm Reference Value = 100.6 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 32.0 W/kg SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.34 W/kg Maximum value of SAR (measured) = 22.0 W/kg



0 dB = 22.9 W/kg = 13.60 dBW/kg

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# Dipole 2600 MHz\_SN:1005\_Body

Communication System: CW; Frequency: 2600 MHz

Medium parameters used: f = 2600 MHz;  $\sigma$  = 2.234 S/m;  $\epsilon_r$  = 50.662;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 SN3923; ConvF(7.37, 7.37, 7.37); Calibrated: 2013/6/12;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2013/5/3
- Phantom: Body;
- DASY52 52.8.7; SEMCAD X 14.6.10

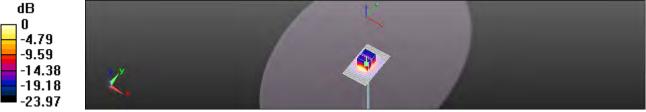
# **Configuration/Pin=250mW/Area Scan (51x81x1):** Interpolated grid: dx=12 mm, dy=12 mm

Maximum value of SAR (interpolated) = 24.0 W/kg

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

dx=5mm, dy=5mm, dz=5mm Reference Value = 100.8 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 32.3 W/kg SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.38 W/kg





0 dB = 23.1 W/kg = 13.64 dBW/kg

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# Dipole 5200 MHz\_SN:1104\_Head

Communication System: CW; Frequency: 5200 MHz Medium parameters used: f = 5200 MHz;  $\sigma$  = 4.612 S/m;  $\epsilon_r$  = 36.097;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

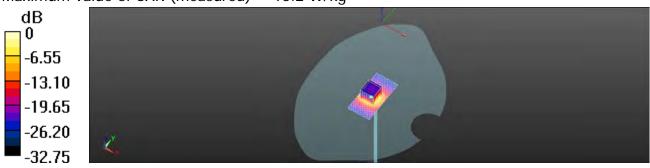
- Probe: EX3DV4 SN3770; ConvF(5.15, 5.15, 5.15); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=100mW, dist=2mm:** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 18.7 W/kg

#### Configuration/d=10mm, Pin=100mW, dist=2mm: Measurement grid:

dx=4mm, dy=4mm, dz=1.4mm Reference Value = 65.731 V/m; Power Drift = -0.06 dB Peak SAR (extrapolated) = 28.3 W/kg SAR(1 g) = 8.11 W/kg; SAR(10 g) = 2.42 W/kg Maximum value of SAR (measured) = 16.2 W/kg



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

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## Dipole 5200 MHz\_SN:1104\_Body

Communication System: CW; Frequency: 5200 MHz Medium parameters used: f = 5200 MHz;  $\sigma$  = 5.167 S/m;  $\epsilon_r$  = 48.422;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

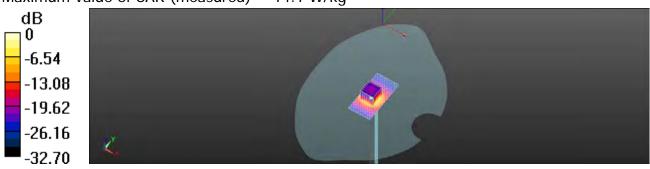
- Probe: EX3DV4 SN3770; ConvF(4.71, 4.71, 4.71); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=100mW, dist=2mm:** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 14.7 W/kg

## Configuration/d=10mm, Pin=100mW, dist=2mm: Measurement grid:

dx=4mm, dy=4mm, dz=1.4mm Reference Value = 51.348 V/m; Power Drift = -0.09 dB Peak SAR (extrapolated) = 25.3 W/kg SAR(1 g) = 7.53 W/kg; SAR(10 g) = 2.16 W/kg Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.49 dBW/kg

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## Dipole 5300 MHz\_SN:1104\_Head

Communication System: CW; Frequency: 5300 MHz Medium parameters used: f = 5300 MHz;  $\sigma$  = 4.726 S/m;  $\epsilon_r$  = 35.85;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

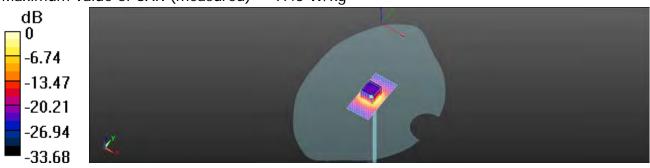
- Probe: EX3DV4 SN3770; ConvF(4.95, 4.95, 4.95); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=100mW, dist=2mm:** Interpolated grid: dx=10 mm, dy=10 mm

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

## Configuration/d=10mm, Pin=100mW, dist=2mm: Measurement grid:

dx=4mm, dy=4mm, dz=1.4mm Reference Value = 73.631 V/m; Power Drift = -0.11 dB Peak SAR (extrapolated) = 30.4 W/kg SAR(1 g) = 8.72 W/kg; SAR(10 g) = 2.5 W/kg Maximum value of SAR (measured) = 17.5 W/kg



0 dB = 17.5 W/kg = 12.43 dBW/kg

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## Dipole 5300 MHz\_SN:1104\_Body

Communication System: CW; Frequency: 5300 MHz Medium parameters used: f = 5300 MHz;  $\sigma$  = 5.314 S/m;  $\epsilon_r$  = 48.156;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

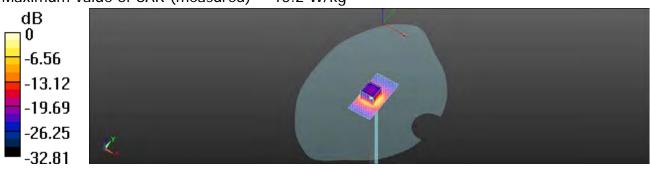
- Probe: EX3DV4 SN3770; ConvF(4.42, 4.42, 4.42); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=100mW, dist=2mm:** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 15.8 W/kg

## Configuration/d=10mm, Pin=100mW, dist=2mm: Measurement grid:

dx=4mm, dy=4mm, dz=1.4mm Reference Value = 52.610 V/m; Power Drift = -0.06 dB Peak SAR (extrapolated) = 26.9 W/kg SAR(1 g) = 7.72 W/kg; SAR(10 g) = 2.17 W/kg Maximum value of SAR (measured) = 15.2 W/kg



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

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## Dipole 5600 MHz\_SN:1104\_Head

Communication System: CW; Frequency: 5600 MHz Medium parameters used: f = 5600 MHz;  $\sigma$  = 5.075 S/m;  $\epsilon_r$  = 35.164;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

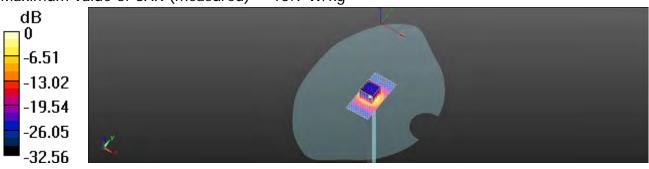
- Probe: EX3DV4 SN3770; ConvF(4.49, 4.49, 4.49); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=100mW, dist=2mm:** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 17.0 W/kg

## Configuration/d=10mm, Pin=100mW, dist=2mm: Measurement grid:

dx=4mm, dy=4mm, dz=1.4mm Reference Value = 61.425 V/m; Power Drift = -0.08 dB Peak SAR (extrapolated) = 30.5 W/kg SAR(1 g) = 8.49 W/kg; SAR(10 g) = 2.48 W/kg Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 12.28 dBW/kg

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## Dipole 5600 MHz\_SN:1104\_Body

Communication System: CW; Frequency: 5600 MHz Medium parameters used: f = 5600 MHz;  $\sigma$  = 5.754 S/m;  $\epsilon_r$  = 47.391;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

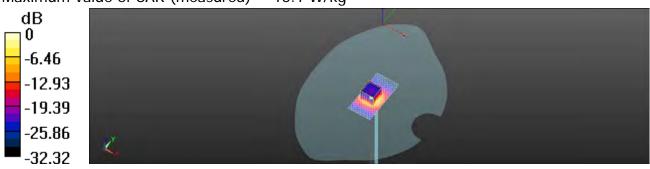
- Probe: EX3DV4 SN3770; ConvF(4.01, 4.01, 4.01); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=100mW, dist=2mm:** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 16.9 W/kg

## Configuration/d=10mm, Pin=100mW, dist=2mm: Measurement grid:

dx=4mm, dy=4mm, dz=1.4mm Reference Value = 52.457 V/m; Power Drift = -0.07 dB Peak SAR (extrapolated) = 29.9 W/kg SAR(1 g) = 8.23 W/kg; SAR(10 g) = 2.34 W/kg Maximum value of SAR (measured) = 16.1 W/kg



0 dB = 16.1 W/kg = 12.07 dBW/kg

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## Dipole 5800 MHz\_SN:1104\_Head

Communication System: CW; Frequency: 5800 MHz Medium parameters used: f = 5800 MHz;  $\sigma$  = 5.309 S/m;  $\epsilon_r$  = 34.725;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

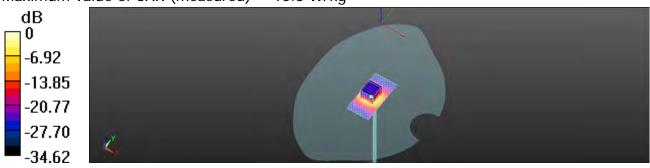
- Probe: EX3DV4 SN3770; ConvF(4.66, 4.66, 4.66); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=100mW, dist=2mm:** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 16.5 W/kg

## Configuration/d=10mm, Pin=100mW, dist=2mm: Measurement grid:

dx=4mm, dy=4mm, dz=1.4mm Reference Value = 59.432 V/m; Power Drift = -0.01 dB Peak SAR (extrapolated) = 30.7 W/kg SAR(1 g) = 7.95 W/kg; SAR(10 g) = 2.34 W/kg Maximum value of SAR (measured) = 16.3 W/kg



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

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## Dipole 5800 MHz\_SN:1104\_Body

Communication System: CW; Frequency: 5800 MHz Medium parameters used: f = 5800 MHz;  $\sigma$  = 6.046 S/m;  $\epsilon_r$  = 46.896;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section

DASY 5 Configuration:

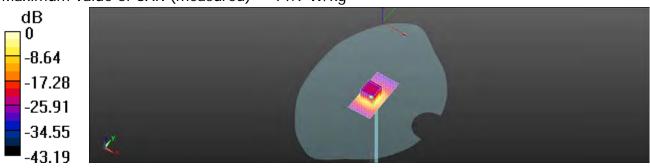
- Probe: EX3DV4 SN3770; ConvF(4.29, 4.29, 4.29); Calibrated: 4/30/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn856; Calibrated: 5/23/2013
- Phantom: SAM2;
- DASY52 52.8.7; SEMCAD X 14.6.10

**Configuration/d=10mm, Pin=100mW, dist=2mm:** Interpolated grid: dx=10 mm, dy=10 mm

Maximum value of SAR (interpolated) = 15.4 W/kg

## Configuration/d=10mm, Pin=100mW, dist=2mm: Measurement grid:

dx=4mm, dy=4mm, dz=1.4mm Reference Value = 47.822 V/m; Power Drift = -0.07 dB Peak SAR (extrapolated) = 27.7 W/kg SAR(1 g) = 7.56 W/kg; SAR(10 g) = 2.13 W/kg Maximum value of SAR (measured) = 14.9 W/kg



0 dB = 14.9 W/kg = 11.73 dBW/kg

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## 7. DAE & Probe Calibration Certificate

ccredited by the Swiss Accredit te Swiss Accreditation Servic ultilateral Agreement for the	ce is one of the signatories	to the EA	Io.: SCS 108
lient SGS-TW (Aud	en)	Certificate No:	DAIE4-856_May13
CALIBRATION O	CERTIFICATE		
Dbject	DAE4 - SD 000 D	04 BM - SN: 856	
Calibration procedure(s)	QA CAL-06.v26 Calibration proces	dure for the data acquisition electr	ronics (DAE)
Celibration date:	May 23, 2013		
The measurements and the uno	ertainties with confidence pro	nal standards, which realize the physical units obability are given on the following pages and $\gamma$ facility: environment temperature (22 $\pm$ 3)°C :	are part of the certificate.
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstranse 43, 8004 Zurich, Switzerland



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Accreditation No.: SCS 108

Accordited 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

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.

Certificate No: DAE4-856 May13

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#### DC Voltage Measurement

High Range:	1LSB =	5.1µV.	full range =	-100+300 mV
Low Range:	1LSB =	61nV,	full range =	-1+3mV
DASY measurement	parameters; Au	to Zero Time: 3	sec; Measuring	time: 3 sec

Calibration Factors	x	Y	Z
High Range	403.416 ± 0.02% (k=2)	404.540 ± 0.02% (k=2)	403.867 ± 0.02% (k=2)
Low Range	3.97422 ± 1.50% (k=2)	3.97703 ± 1.50% (k=2)	3.97733 ± 1.50% (k=2)

**Connector Angle** 

Connector Angle to be used in DASY system	52.5°±1°

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## Appendix

## 1. DC Voltage Linearity

High Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	199987.92	-6.55	-0.00
Channel X + Input	19997.24	-3,32	-0.02
Channel X - Input	-19998.80	1.29	-0.01
Channel Y + Input	199992.46	-2.23	-0.00
Channel Y + Input	19997.79	-2.80	-0.01
Channel Y - Input	-19998.99	1.02	-0.01
Channel Z + Input	199989.59	-5.43	-0.00
Channel Z + Input	19995.44	-5.08	-0.03
Channel Z - Input	-20001.02	-0.96	0.00

Low Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	2001.12	0.11	0.01
Channel X + Input	202.01	0.43	0.21
Channel X - Input	-199.13	-0.70	0,35
Channel Y + Input	2001.13	0.10	0.00
Channel Y + Input	200.48	-1,04	-0.52
Channel Y - Input	-199.06	-0.54	0.27
Channel Z + Input	2001.11	0.21	0.01
Channel Z + Input	200.59	-0.87	-0.43
Channel Z - Input	-199,44	-0.99	0.50

#### 2. Common mode sensitivity

DASY measurement parameters: Aulo 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	-15.25	-16.64
	- 200	18,50	16.42
Channel Y	200	-1.88	-1.90
	- 200	1.30	0.86
Channel Z	200	10.99	10.38
	- 200	-13.49	-12.90

#### 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		2.15	-3.07
Channel Y	200	7.09	-	3.02
Channel Z	200	8.11	5.37	

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

	High Range (LSB)	Low Range (LSB)
Channel X	16270	16836
Channel Y	15934	16230
Channel Z	15862	15687

#### 5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec. Measuring time: 3 sec. Input 10MD

	Average (µV)	min. Offset (µV)	max. Offset (µV)	Std. Deviation (µV)
Channel X	0.87	-0.19	2.70	0.40
Channel Y	-0.41	-1.96	0.66	0.46
Channel Z	-0.75	-1.60	0.05	0.32

#### 6. Input Offset Current

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

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

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

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

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

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

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

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Calibration date:	May 03, 2013		
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Calibration Laboratory of Schmid & Partner Engineering AG ughausstrasse 43, 8004 Zurich, Switzerland Zeugh



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#### Glossary

data acquisition electronics DAF information used in DASY system to align probe sensor X to the robot Connector angle 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 #	6.1µV.	full range =	-100+300 mV
Low Range:	1LSB =	61nV.	full range =	-1
ASY measurement	10.000			

Calibration Factors	X	Y	Z
High Range	406.022 ± 0.02% (k=2)	404.988 ± 0.02% (k=2)	405.575±0.02% (k=2)
Low Range	3.95574 ± 1.50% (k=2)	4.01997 ± 1.50% (k=2)	4.00367 ± 1.50% (k=2)

**Connector Angle** 

Connector Angle to be used in DASY system 85.5 ° ± 1 °
--

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#### Appendix

1.

High Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	199995.25	-0.61	-0.00
Channel X + Input	20002.51	2.55	D.01
Channel X - Input	-19997.65	3.41	-0.02
Channel Y + Input	199996.90	1.29	0.00
Channel Y + Input	19999.21	-0.82	-0.00
Channel Y - Input	-20002.81	-1.72	0.01
Channel Z + Input	199996.08	0.05	0.00
Channel Z + Input	20000.21	0.24	0.00
Channel Z - Input	-20002.01	-0.82	0.00

Low Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	2000.32	0.08	0.00
Channel X + Input	201.12	0.32	0.16
Channel X - Input	-198.54	0.64	-0.32
Channel Y + Input	1999.87	-0.37	-0.02
Channel Y + Input	199.82	-0.86	-0.43
Channel Y - Input	-199.99	-0.69	0.35
Channel Z + Input	1999.72	-0.47	-0.02
Channel Z + Input	199.92	-0.73	-0.37
Channel Z - Input	-199.77	-0.46	0.23

#### 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	0.30	-1.55
-	- 200	3.24	1.37
Channel Y	200	12.54	11,97
	200	-14,60	-14.70
Channel Z	200	-0.92	-0.66
	- 200	-0.59	-0.63

#### 3. Channel separation

	Input Voltage (mV)	Channel X (µV)	Channel Y (µV)	Channel Z (µV)
Channel X	200		5.57	-1.95
Channel Y	200	9.87		7.47
Channel Z	200	10.03	6.92	

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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	15916	15135
Channel Y	15816	15911
Channel Z	16041	16099

## 5. Input Offset Measurement

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

	Average (µV)	min. Offset (µV)	max. Offset (µV)	Std. Deviation (µV)
Channel X	-1.40	-2.24	0.17	0.43
Channel Y	-2.03	-3.15	0.29	0.50
Channel Z	-1.12	-2.10	-0.02	0.45

#### 6. Input Offset Current

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

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

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

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

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

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

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

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Calibration Laboratory of

Schmid & Partner

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Schweizerischer Kalibrierdienst

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he Swiss Accreditation Servio Iultilateral Agreement for the			
lient SGS-TW (Aud	en)	Certificate No	DAE4-547_Mar13
CALIBRATION	CERTIFICAT	TE	
Dbject	DAE4 - SD 000	) D04 BJ - SN: 547	
Calibration procedure(s)	QA CAL-06.v2 Calibration pro-	5 cedure for the data acquisition elect	tronics (DAE)
Calibration date:	March 19, 2013	3	
The measurements and the unc	ertainties with confidence	national standards, which realize the physical unit e probability are given on the following pages and atory facility: environment temperature ( $22 \pm 3$ )°C i)	are part of the certificate.
The measurements and the unc All calibrations have been condu Calibration Equipment used (Mé Primary Standards	ertainties with confidence	e probability are given on the following pages and atory facility: environment temperature ( $22 \pm 3$ )°C	are part of the certificate.
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The measurements and the unc All calibrations have been condu- Calibration Equipment used (Ma Primary Standards Keithley Multimeter Type 2001 Secondary Standards Auto DAE Calibration Unit	ertainties with confidence ucted in the closed labora &TE critical for calibration ID # SN: 0810278 ID # SE UWS 053 AA 10	e probability are given on the following pages and atory facility: environment temperature (22 ± 3)°C i) Cal Date (Certificate No.)	and humidity < 70%. Scheduled Calibration
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura

Swiss Calibration Service

Accreditation No.: SCS 108

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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 =	6.1µV	full range =	-100+300 mV
Low Range:	1LSB =	61nV	full range =	-1+3mV

<b>Calibration Factors</b>	х	Y	Z
High Range	404.021 ± 0.02% (k=2)	404.067 ± 0.02% (k=2)	404.200 ± 0.02% (k=2)
Low Range	3.95755 ± 1.55% (k=2)	3.96067 ± 1.55% (k=2)	3.97511 ± 1.55% (k=2)

**Connector Angle** 

Connector Angle to be used in DASY system	159.5 ° ± 1 °
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#### Appendix

High Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	199989.94	-2.47	-0.00
Channel X + Input	20003.37	3.96	0.02
Channel X - Input	-19997.23	3.73	-0.02
Channel Y + Input	199995.29	2.73	0.00
Channel Y + Input	19998.90	-0.61	-0.00
Channel Y - Input	-20001.19	-0.37	0.00
Channel Z + Input	199992.88	0.36	0.00
Channel Z + Input	20000.94	1.49	0.01
Channel Z - Input	-20003.26	-2.37	0.01

Low Range	Reading (µV)	Difference (µV)	Error (%)
Channel X + Input	2000.36	0.34	0.02
Channel X + Input	200.82	0.29	0,14
Channel X - Input	-200.37	-0.99	0.50
Channel Y + Input	2000.08	-0.04	-0.00
Channel Y + Input	200.50	-0.17	-0.08
Channel Y - Input	-199.79	-0.52	0,26
Channel Z + Input	2000.48	0.30	0.02
Channel Z + Input	199.82	-0.83	-0.42
Channel Z - Input	-200.63	-1.34	0.67

#### 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	2.87	1,74
	- 200	-1.69	-2.59
Channel Y	200	-21.18	-22.16
	- 200	20.02	20,39
Channel Z	200	20.06	20.09
	- 200	-21.97	-22.40

#### 3. Channel separation

	Input Voltage (mV)	Channel X (µV)	Channel Y (µV)	Channel Z (µV)
Channel X	200	2	3.33	-2.42
Channel Y	200	9.32		4.14
Channel Z	200	6.20	7.89	2

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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	16138	15290
Channel Y	16452	16239
Channel Z	15982	16909

## 5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec Input 10  $M\Omega$ 

	Average (µV)	min. Offset (µV)	max. Offset (µV)	Std. Deviation (µV)
Channel X	2.86	1.75	3.69	0.45
Channel Y	-1.52	-2.51	-0.79	0.37
Channel Z	0.34	-1.21	1.52	0.53

#### 6. Input Offset Current

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

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

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

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

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

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

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

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ient SGS-TW (Aud	lon)	Cartificate No:	EX3-3770_Apr13
ALIBRATION	CERTIFICATE		
bject	EX3DV4 - SN:37	70	
Calibration procedure(s)		A CAL-14.v3, QA CAL-23.v4, QA dure for dosimetric E-field probes	CAL-25.v4
Calibration date:	April 30, 2013		
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Calibration Laboratory of Schmid & Partner Engineering AG oughausstrasse 43, 8004 Zurich, Switzerland Zeur



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Glossary

Gluadaly,	
TSL	tissue simulating liquid
NORMx,y,z	sansitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization @	o rotation around probe axis
Potarization 9	9 rotation around an axis that is in the plane normal to probe axis (at measurement center),
	i.e., 8 = 0 is normal to probe axis

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

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

#### Methods Applied and Interpretation of Parameters:

- NORMx, y, z: Assessed for E-field polarization  $\theta = 0$  (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*). ٠
- $NORM(\eta_{x,y,z} = NORM_{x,y,z}$  \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax, y, z; Bx, y, z; Cx, y, z; Dx, y, z; VRx, y, z; A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- Media, Wris the maximum calibration range expression in KMS voltage ad obside order. ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz, The same setups are used for assessment of the parameters applied for boundary compensation (appra, deprin) or which typical uncenainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensibility in TSL corresponds to NORMs, y, z \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required,

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EX3DV4 - SN:3770

April 30, 2013

# Probe EX3DV4

## SN:3770

Manufactured: Calibrated: July 6, 2010 April 30, 2013

(Note: non-compatible with DASY2 systems)

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EX30V4-SN-3770

April 30, 2013

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3770

#### **Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) <sup>2</sup> ) <sup>A</sup>	0.31	0.60	0.41	± 10.1 %
DCP (mV) <sup>8</sup>	106.9	96.2	103.0	

#### **Modulation Calibration Parameters**

UID	Communication System Name		A dB	B dBõV	с	D dB	VR mV	Unc <sup>c</sup> (k=2)
D	CW	X	0.0	0.0	1.0	0.00	125.8	:2.5 %
		Y	0.0	0.0	1.0		129.7	
		Z	0.0	0.0	1.0		142.2	

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>b</sup> The uncertainties of NormX,Y Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages S and 6).
<sup>9</sup> Numerical Insertzation parameter: uncertainty not required.
<sup>6</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of this field value.

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EX3DV4- SN:3770

April 30, 2013

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3770

f (MHz) c	Relative Permittivity*	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. {k=2}
750	41.9	0.89	10.28	10.28	10.28	0.74	0.65	± 12.0 %
835	41.5	0.90	9.83	9.83	9.83	0.77	0.60	± 12.0 %
900	41.5	0.97	9.89	9.89	9.89	0.78	0.55	= 12.0 %
1750	40.1	1.37	8.29	8.29	8.29	0.72	0.65	≡ 12.0 %
1900	40.0	1.40	7.98	7.98	7.98	0.44	0.83	± 12.0 %
2000	40.0	1.40	7.94	7.94	7.94	0.45	0,79	± 12.0 %
2300	39.5	1.67	7.48	7.48	7.48	0.45	0.78	12.0 %
2450	39.2	1.80	7.12	7.12	7.12	0.33	0.99	± 12.0 %
5200	36.0	4.66	5.15	5.15	5.15	0.40	1.80	± 13.1 %
5300	35.9	4.76	4.95	4.95	4.95	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.49	4.49	4.49	0.45	1.80	± 13.1 %
5800	35.3	5.27	4.66	4.66	4.66	0.45	1.80	± 13.1 %

#### Calibration Parameter Determined in Head Tissue Simulating Media

<sup>5</sup> Procussory validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), also it is rediricted to ± 50 MHz. The uncertainty is the IRSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
<sup>6</sup> At requencies below 3 GHz, the validity of issue parameters (c and o) can be releved to ± 50% Highed compensation formula is applied to measured SAR values. At requencies above 3 GHz, the validity of tasue parameters (c and o) is isolricited to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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EX3DV4-SN:3770

April 30, 2013

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3770

f (MHz) C	Relative Permittivity"	Conductivity (S/m)*	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	9.74	9.74	9.74	0.47	0.84	± 12.0 %
835	55.2	0.97	9.62	9.62	9.62	0.62	0.69	± 12.0 %
900	55.0	1.05	9.50	9.50	9.50	0,35	0.97	± 12.0 %
1750	53.4	1.49	7.85	7.85	7.85	0.39	0.88	± 12.0 %
1900	53.3	1.52	7.63	7.63	7.63	0.27	1.08	\$ 12.0 %
2000	53.3	1.52	7.72	7.72	7.72	0.27	1.17	± 12.0 %
2300	52.9	1.81	7.36	7.36	7,36	0.50	0.78	± 12.0 %
2450	52.7	1.95	7.21	7.21	7.21	0.56	0.68	# 12.0 %
5200	49.0	5.30	4.71	4.71	4.71	0.40	1.90	± 13.1 %
5300	48.9	5.42	4.42	4.42	4.42	0.45	1.90	± 13.1 %
5600	48.5	5.77	4.01	4.01	4.01	0.45	1.90	± 13.1 %
5800	48.2	6.00	4.29	4.29	4.29	0.50	1.90	± 13.1 9

Calibration Parameter Determined in Body Tissue Simulating Media

<sup>55</sup> Erequency velidity of a 100 MHz only applies for DASY v4.4 and higher (ase Page 2), else it is instituted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
<sup>76</sup> At requencies below 3 GHz, the validity of issue parameters (*c* and *c*) can be released to ± 10%. If iquid companisation formula is applied to measured SAR values. At frequencies below 3 GHz, the validity of tissue parameters (*c* and *c*) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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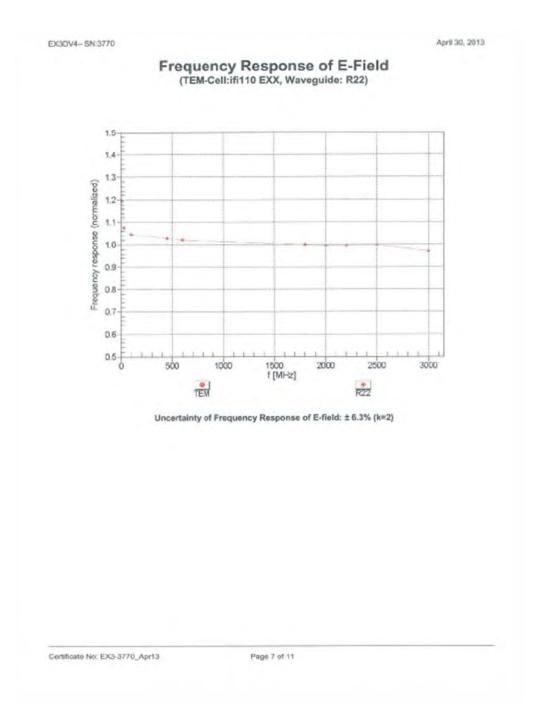
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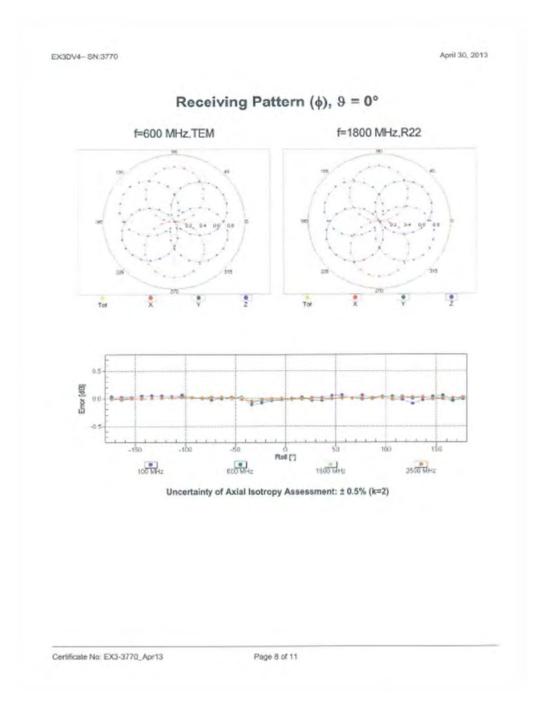
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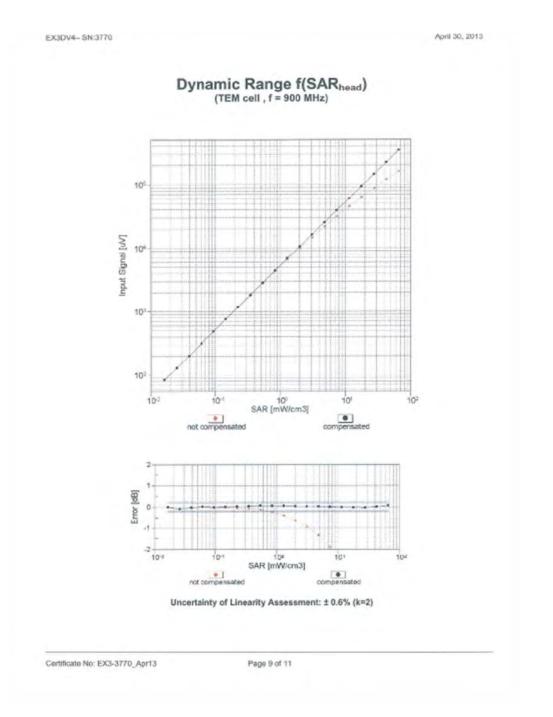
台灣檢驗科技股份有限公司 t (886-2) 2299-3279

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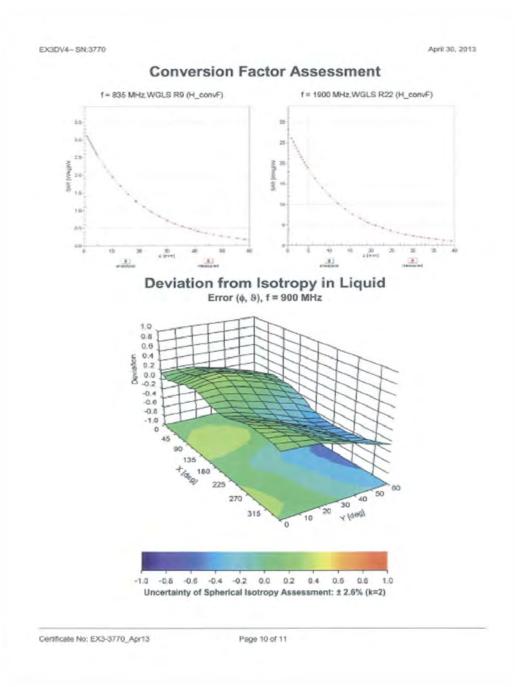
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EX30V4-SN:3770

April 30, 2013

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3770

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	+33.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

Certificate No: EX3-3770\_Apr13

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## Report No. : ES/2014/10005 Page : 214 of 319

corected by the Swiss Accredit he Swiss Accreditation Servi lultilateral Agreement for the	ice is one of the signatories	to the EA	No.: SCS 108
lient SGS-TW (Aud			EX3-3923_Jun13
CALIBRATION	CERTIFICATE		
Object	EX3DV4 - SN:39		
o open	EX3074 - 34.38.	23	
Calibration procedure(s)	the second se	A CAL-14.v3, QA CAL-23.v4, QA dure for desimetric E-field probes	CAL-25.v4
Calibration date:	June 12, 2013		
This calibration certificale doou	ments the traceability to natio	inal standards, which reakze the physical units	of measurements (SI).
The measurements and the un	certainties with confidence pr	obability are given on the following pages and a facility: environment temperature (22 ± 3)°C is	are part of the certificate.
The measurements and the uno All califorations have been cond Califoration Equipment used (M	certainties with confidence pr lucted in the closed laboratory &TE critical for calibration)	obletikly are given on the following pages and y facility: environment temperature (22 ± 3)°C (	are part of the certificate. and humidity < 70%.
The measurements and the unc M calibrations have been cond Calibration Equipment used (M Primary Standards	certainties with confidence pr lucked in the closed laboratory &TE critical for calibration)	obletility are given on the following pages and y facility: environment temperature (22 ± 3)°C ( Cal Date (Certificate No.)	are part of the certificate. and humidity < 70%. Scheduled Calibration
The measurements and the unc Mical/brations have been cond Calibration Equipment used (M Primary Standards Power meter E/419B	certainties with confidence pri lucited in the closed laboratory \$TE critical for calibration) 8D GB41293874	Cal Date (Certificate No.) 04-Apr:13 (No. 217-01733)	are part of the certificate. and humidity < 70%. Scheduled Calibration Apr14
The measurements and the unc Micalibration have been cond Calibration Equipment used (Mi Primary Standards Power meter E44198 Power service E4412A	entainties with confidence pri lucted in the closed laboratory &TE critical for cellbration) ID GB41293874 MY41498087	Cal Date (Centricate No.) 04-Apr-13 (No. 217-01733)	are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-14 Apr-14
The measurements and the unc All calibration Equipment used (M Primary Standards Power meter E4419B Power service E4412A Reference 3 dB Attenuator	entainces with confidence pri luced in the closed laboratory &TE critical for calibration) GB4 1293874 MY41498087 SN: SS054 (3c)	Oblicitity are given on the following pages and         y facility: environment temperature (22 ± 3)°C i           Call Date (Centricate No.)         04-Apr-13 (No. 217-01733)           04-Apr-13 (No. 217-01733)         04-Apr-13 (No. 217-01733)	are part of the certificate. and humidity < 70% Scheduled Calibration Apr-14 Apr-14 Apr-14
The measurements and the unc M calibration Equipment used (M Primary Standards Power meter E-4198 Power server E-4198 Power server E-4198 Reference 3 di Attenuator Reference 3 di Attenuator	entainties with confidence pri lucited in the closed laboratory &TE ontical for calibration) GB41293874 MY41498057 SN: SS054 (3c) SN: SS054 (3c)	Cal Date (Certificate No.) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01735)	are part of the certificate. and humidity < 70%. Scheduled Calibration Apr.14 Apr.14 Apr.14 Apr.14
The measurements and the unc Micalibration Equipment used (Mi Calibration Equipment used (Mi Primary Standards Power meter E44198 Power sensor E44198 Reference 3 dB Attenuator Reference 3 dB Attenuator Reference 30 dB Attenuator	entainties with confidence pri lucited in the closed laboratory &TE critical for calibration) GB41293874 MY41498057 SN: SS054 (3c) SN: SS0277 (20x) SN: SS129 (30b)	Cal Date (Certificate No.)           04-Apr: 13 (No. 217-01733)	are part of the certificate. and humidity < 70%. Scheduled Calibration Apr.14 Apr.14 Apr.14 Apr.14 Apr.14 Apr.14 Apr.14
The measurements and the unc All calibration Equipment used (M Calibration Equipment used (M Primary Standards Power meter E4419B Power samon E4412A Reference 3 dB Attenuator Reference 30 dB Attenuator Reference 30 dB Attenuator Reference 30 dB Attenuator	entainties with confidence pri lucited in the closed laboratory &TE ontical for calibration) GB41293874 MY41498057 SN: SS054 (3c) SN: SS054 (3c)	Cal Date (Certificate No.) Cal Date (Certificate No.) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. 217-01735) 04-Apr-14 (No. 217-01735) 04-Apr-14 (No. 217-01735) 04-Apr-14 (No. 217-	are part of the certificate. and humidity < 70%. Scheduled Calibration Apr.14 Apr.14 Apr.14 Apr.14
The measurements and the unc All calibration Equipment used (M Calibration Equipment used (M Primary Standards Power sensor E4419B Power sensor E4419B Reference 3 dB Attenuator Reference 3 dB Attenuator Reference 30 dB Attenuator Reference 30 dB Attenuator Reference 570be ES3DV2	entainces with confidence pri lucted in the closed laboratory &TE critical for calibration) ID GB41293874 MM41498087 SN: SS054 (3c) SN: SS054 (3c) SN: SS054 (3c) SN: SS077 (20x) SN: SS077 (20x) SN: S013	Cal Date (Certificate No.)           04-Apr: 13 (No. 217-01733)	are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Dec-13
The measurements and the unc M calibration Equipment used (M Calibration Equipment used (M Primary Standards Power meter E-4419B Power senso E-412A Reference 3 dB Attenuator Reference 3 dB Attenuator Reference 30 dB Attenuator Reference 30 dB Attenuator Reference 9 hobe ES3DV2 DAE4 Secondary Standards	entainces with confidence pri lucted in the closed laboratory &TE critical for calibration) ID GB41293874 MM41498087 SN: SS054 (3c) SN: SS054 (3c) SN: SS054 (3c) SN: SS077 (20x) SN: SS077 (20x) SN: S013	Cal Date (Certificate No.) Cal Date (Certificate No.) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. 217-01735) 04-Apr-14 (No. 217-01735) 04-Apr-14 (No. 217-01735) 04-Apr-14 (No. 217-	are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Dec-13
The measurements and the unc M calibration Equipment used (M Primary Standards Power meter E4419B Power sensor E4412A Reference 3 dB Attenuator Reference 30 dB Attenuator Reference 1906 ES30V2 DAE4 Secondary Standards RF generator HP 8648C	entainces with confidence private in the closed laboratory &TE critical for calibration) ID GB41293874 MY41498087 SN: S5054 (3c) SN: S5054 (3c) SN: S5029 (30b) SN: S5013 SN: 690 ID US3642U01700	Cal Date (Certificate No.) Cal Date (Certificate No.) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. DAE4-660_Jan13) 050-012 (No. DAE4-660_Jan13)	are part of the certificate. and humitity < 70%. Scheduled Calibration Apr.14 Apr.14 Apr.14 Apr.14 Apr.14 Apr.14 Apr.14 Apr.14 Apr.14 Apr.14 Apr.14
The measurements and the unc M calibration Equipment used (M Primary Standards Power meter E4419B Power sensor E4412A Reference 3 dB Attenuator Reference 30 dB Attenuator Reference 1906 ES30V2 DAE4 Secondary Standards RF generator HP 8648C	entainties with confidence pri lucited in the closed laboratory &TE critical for calibration) GB41293874 MrV41498037 SN: SS054 (3c) SN: SS0277 (20x) SN: SS277 (20x) SN: SS277 (20x) SN: SS277 (20x) SN: SS129 (30b) SN: 3013 SN: 650	Cal Date (Certificate No.) Cal Date (Certificate No.) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. 217-01736) 04-Apr-13 (No. 217-01738) 28-Dec-12 (No. ES3-3013, Dec12) 31-Jim-13 (No. DAE4-660, Jan13) Check Date (in house)	are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Dec-13 Jan-14 Scheduled Check
The measurements and the uno All califorations have been cond Califoration Equipment used (M	entainces with confidence private in the closed laboratory &TE critical for calibration) ID GB41293874 MY41498087 SN: S5054 (3c) SN: S5054 (3c) SN: S5029 (30b) SN: S5013 SN: 690 ID US3642U01700	Cal Date (Certificate Na.)           Cal Date (Certificate Na.)           04-Apr-13 (Ne. 217-01733)           04-Apr-13 (Ne. 217-01738)           28-Dec-12 (Ne. E33-3013, Dec12)           31-Jim-13 (No. DAE4-660_Jan13)           Check Date (in house)           4-Apr-99 (in house check Apr-13)           18-DcI-D1 (in house check Apr-13)	are part of the certificate. and humitity < 70%. Scheduled Calibration Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Dec-13 Jan-14 Scheduled Check In house check: Apr-15 In house check: Oct-13
The measurements and the unc All calibration Equipment used (M Calibration Equipment used (M Primary Standards Power meter E4419B Power samous E4412A Reference 3 dB Attenuator Reference 30 dB Attenuator Reference 20 dB Attenuator Referen	entainties with confidence pri- lucied in the closed laboratory ATE critical for calibration) GB41293874 MY41498037 SN: S8054 (3c) SN: S8077 (20x) SN: S8277 (	Cal Date (Certificate No.) Cal Date (Certificate No.) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. 217-01738) 28-Dec-12 (No. E33-3013, Dec12) 31-Jim-13 (No. DAE4-860, Jan13) Check Date (In house) 4-Aug-90 (In house check Apr-13)	are part of the certificate. and humidity < 70%. Scheduled Calibration Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Dec-13 Jan-14 Scheduled Check In house check Apr-15
The measurements and the unc All calibration Equipment used (M Calibration Equipment used (M Primary Standards Power meter E4419B Power samous E4412A Reference 3 dB Attenuator Reference 30 dB Attenuator Reference 20 dB Attenuator Reference Phobe ES30V2 DAE4 Secondary Standards RF generator HP 8648C	entainces with confidence pri lucied in the closed laboratory &TE critical for calibration) ID GB41293874 MY41498087 SN: 55054 (3c) SN: 55054 (3c) SN: 55054 (3c) SN: 55129 (30b) SN: 55129 (30b) SN: 5513 SN: 650 ID US3642001700 US37390565 Nicma	Cal Date (Centricate No.) Cal Date (Centricate No.) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01733) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. 217-01735) 04-Apr-13 (No. 217-01738) 28-Dec-12 (No. E33-31013, Dec12) 31-Jim-13 (No. DAE4-060, Jan 13) Check Date (In house) 4-Apr-9/90 (In house check Apr-13) 18-Dct-01 (In house check Apr-13) 18-Dct-01 (In house check Apr-13)	are part of the certificate. and humitity < 70%. Scheduled Calibration Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Dec-13 Jan-14 Scheduled Check In house check: Apr-15 In house check: Oct-13
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The measurements and the unc All calibration Equipment used (M Calibration Equipment used (M Primary Standards Power meter E4419B Power sensor E4412A Reference 3 dB Attenuator Reference 30 dB Attenuator Reference 40 dB	entainces with confidence private in the closed laboratory ATE ontical for calibration)  D GB41293874 MY4149037 SN: 55054 (3c) SN: 55054 (3c) SN: 55129 (30b) SN: 55129 (30b) SN: 5513 SN: 650  D US3642001700 US37390565  Name Claudic Leubler Kelja Pokovc	Coll Date (Certificate No.)           Call Date (Certificate No.)           04-Apr:13 (No. 217-01733)           04-Apr:13 (No. 217-01733)           04-Apr:13 (No. 217-01733)           04-Apr:13 (No. 217-01735)           04-Apr:13 (No. DAE4-650_Jan13)           01-Jan:-13 (No. DAE4-650_Jan13)           04-Apr:0 (in house)           4-Aug-90 (in house check Apr:13)           18-De1-01 (in house check Apr:13)	are part of the certificate. and humitity < 70%. Scheduled Calibration Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Dec-13 Jan-14 Scheduled Check In house check: Apr-15 In house check: Oct-13

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#### Calibration Laboratory of Schmid & Partner Engineering AG Zevel



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

Accreditation No.: SCS 108

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

#### Glassan

Glussaly,	
TSL	tissue simulating liquid
NORMx,y,z	sensit/vity in free space
CONVE	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization o	e rotation around probe axis
Polarization 9	3 rotation around an axis that is in the plane normal to probe axis (at measurement center),
	i.e., 9 = 0 is normal to probe axis

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

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

#### Methods Applied and Interpretation of Parameters:

- NORMx.y.z: Assessed for E-field polarization 8 = 0 (f ≤ 900 MHz in TEM-cell; I > 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 . characteristics
- Ax, y.z: Bx, y.z: Cx, y.z: Dx, y.z: VRx, y.z: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode. •
- Theose will be maximum catoration range expressed in reads votinge across the torus. ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for 1 < 800 MHz) and inside waveguide using analytical field distributions based on power measurements for 1 > 800 MHz, The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depit) of which typical uncertainty values are given. These parameters are used in DASV4 software to improve probe accuracy close to the boundary. The sensibility 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 . MHz
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- . Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip. (on probe axis). No tolerance required.

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EX3DV4 - SN-3923

June 12, 2013

# Probe EX3DV4

## SN:3923

Manufactured: March 8, 2013 Calibrated: June 12, 2013

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

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June 12, 2013

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

#### **Basic Calibration Parameters**

	Sonsor X	Sensor Y	Sensor Z	Unio (k=2)
Norm (µV/(V/m) <sup>2</sup> ) <sup>A</sup>	0.58	0.48	0.47	\$ 10.1 %
Narm (µV/(V/m) <sup>2</sup> ) <sup>A</sup> DCP (mV) <sup>B</sup>	99.8	101.1	96.6	

#### Modulation Calibration Parameters

UID	Communication System Name		A dB	B dBõV	с	D dB	VR mV	Unc <sup>E</sup> (k=2)
0	CW	X	0.0	0.0	1.0	0.00	185.8	±3.3 %
-		Y	0.0	0.0	1.0		158.5	
		Z	0.0	0.0	1.0		160.8	

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%.

\* The uncertainties of NamiX V.2 do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 8).
\* Numerical Interstation parameter: uncertainty not required.
\* Uncertainty is determined using the max. deviation from lineer response applying rectangular distribution and is expressed for the equire of the field value.

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June 12, 2013

## 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	Depth (mm)	Unct. (k=2)
750	41,9	0.89	10.53	10.53	10.53	0.32	0.92	± 12.0 %
835	41.5	0.90	10.08	10.08	10.08	0.26	0.97	= 12,0 %
900	41.5	0.97	10.04	10.04	10.04	0.36	0.87	± 12.0 %
1750	40.1	1.37	9.09	9.09	9.09	0.46	0.82	± 12.0 %
1900	40.0	1.40	8.67	8.67	8.67	0.52	0.75	± 12.0 %
2000	40.0	1.40	8.49	8.49	8.49	0.45	0.80	1 12.0 %
2300	39.5	1.67	8.05	8.05	8.05	0.32	0.91	112.0%
2450	39.2	1,80	7.59	7.59	7.59	0.39	0.85	+ 12.0 %
2600	39.0	1.95	7.44	7,44	7.44	0.42	0.85	# 12.0 %
5200	36.0	4.66	5.06	5.06	5.00	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.82	4.82	4.82	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.66	4.65	4.66	0.35	1.80	113.1%
5800	35.3	5.27	4.49	4.49	4.49	0.45	1.80	1 13.1 %

#### Calibration Parameter Determined in Head Tissue Simulating Media

<sup>12</sup> Prequency velicity 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 ConvE uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
<sup>14</sup> At frequencies below 3 GHz, the validity of tissue parameters (*i* and *n*) can be retered to ± 10% if fliquid compensation formule is applied to measured SAR values. At frequencies helps is the NSS of the ConvE uncertainty for indicated target 5issue parameters.

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EX30V4- SN:3923

June 12, 2013

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

f {MHz} <sup>c</sup>	Relative Permittivity	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	10.55	10.55	10.55	0.38	0.92	± 12.0 %
835	55.2	0.97	10.35	10.35	10.35	0.24	1.25	# 12.0 %
900	55.0	1.05	10.29	10.29	10.29	0.43	0.86	± 12.0 %
1750	53.4	1.49	8.46	8.46	8.46	0.47	08.0	± 12.0 %
1900	53.3	1.52	8.10	8.10	8.10	0.41	0.82	± 12.0 %
2000	53.3	1.52	8.18	8.18	8.18	0.30	0.96	± 12.0 %
2300	52.9	1,81	7.79	7,79	7.79	0.47	0.72	2 12.0 %
2450	52.7	1.95	7.55	7.55	7.55	0.59	0.64	112.09
2600	52.5	2.16	7.37	7.37	7.37	0.80	0.50	± 12.0 9
5200	49.0	5.30	4.33	4.33	4.33	0.50	1.90	# 13.1 9
5300	48.9	5.42	4,13	4.13	4,13	0.50	1.90	: 13.1 %
5600	48.5	5.77	3.85	3.85	3.85	0.45	1.90	± 13.1 %
5800	48.2	6.00	3.94	3.94	3,94	0.55	1.90	= 13.1 %

Calibration Parameter Determined in Body Tissue Simulating Media

<sup>6</sup> Frequency validity of a 100 MHz only applies (or DASY v4.4 and higher (sate Page 2), asset it is relaticized to a 50 MHz. The uncertainty is the RSS of the ConsF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
<sup>7</sup> At inspancies testive 3 CHz, the velidity of source parameters (is and e) can be related to a 10% if liquid compensation formula is applied to memory band.
<sup>8</sup> At inspancies testive 3 CHz, the velidity of testive parameters (is and e) an estimated to a 10%. The uncertainty is the RSS of the ConsF uncertainty for indicated target tissue parameters.

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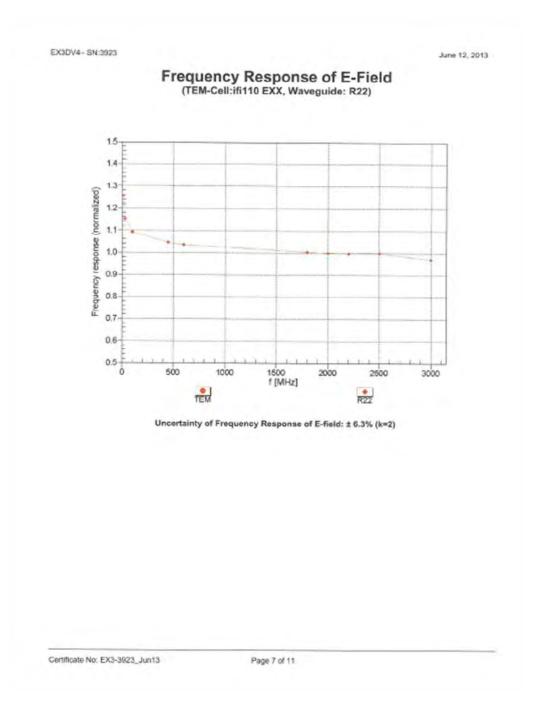
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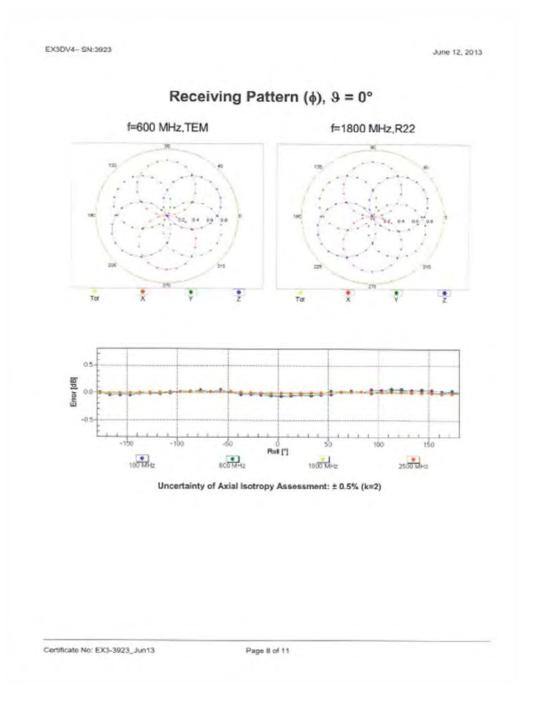
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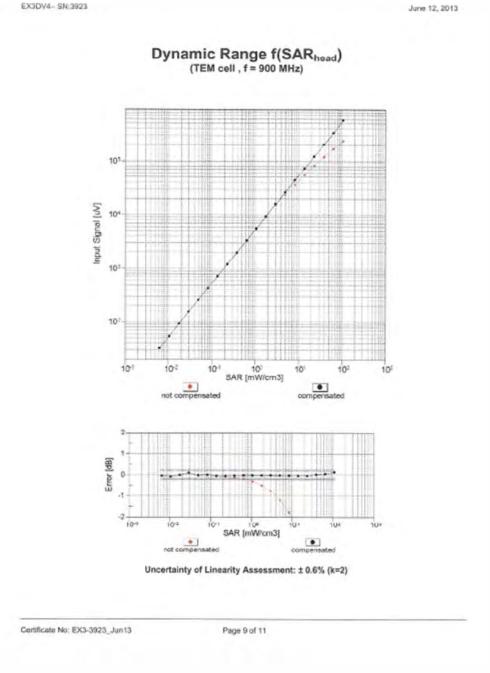
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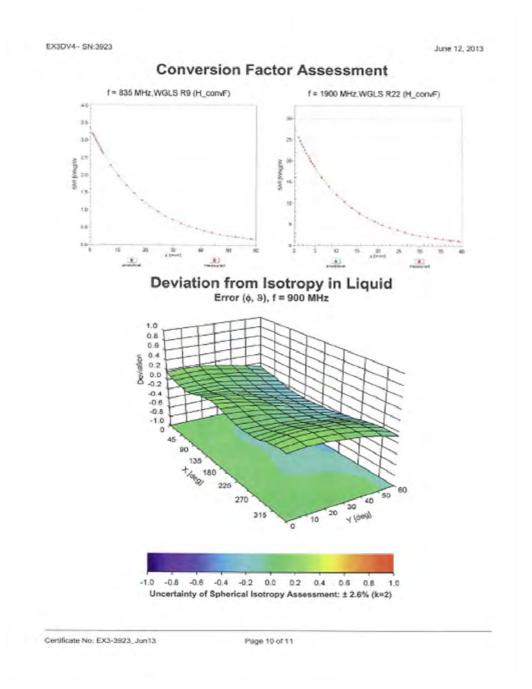
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Aine 12, 2013

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

#### Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	-57.1
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Prote 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 17977
Recommended Measurement Distance from Surface	2 mm

Certificate No: EX3-3923\_Jun13

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CALIBRATION	CERTIFICATI	E	
Colact	EX3DV4 - SN:38	31	
Calenator procedure(s)	CAL-01.v9, C Calibration proce	3A CAL-14,v4, QA CAL-23,v5, QA dure for dosimetric E-field probes	CAL-25.v6
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### Calibration Laboratory of Schmid & Partner Engineering AG sughausstrasse 43, 8004 Zurich, Switzerland



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Schweizerischer Kalibrierdienst Service suisse d'étalonn Servizio svizzero di teratura viss Calibration Service

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Accreditation No.: SCS 108

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 C1----

GI	ossary:	
TS	L	tissue simulating liquid
NC	RMx,y,z	sensitivity in free space
Co	nvF	sensitivity in TSL / NORMx,y,z
DC	P	diode compression point
CF		crest factor (1/duty_cycle) of the RF signal
Α,	B, C, D	modulation dependent linearization parameters
Po	larization φ	o rotation around probe axis
Po	larization 9	8 rotation around an axis that is in the plane normal to probe axis (at measurement center),
		i.e., 9 = 0 is normal to probe axis
Co	nnector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

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

#### Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 8 = 0 (f ≤ 900 MHz in TEM-cell; f > 1600 MHz; R22 wavegu NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E<sup>2</sup>-field eguide). 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 medi
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z; A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f < 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters applied for used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

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EX3DV4 -- SN:3831

January 31, 2014

# Probe EX3DV4

# SN:3831

Manufactured: September 6, 2011 Calibrated:

January 31, 2014

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

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January 31, 2014

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831

#### **Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m) <sup>2</sup> ) <sup>A</sup>	0.45	0.42	0.43	± 10.1 %
DCP (mV) <sup>B</sup>	102.4	100.1	97.7	

#### Modulation Calibration Parameters

UID	Communication System Name		A dB	B dBõV	С	D dB	VR mV	Unc <sup>L</sup> (k=2)
0	CW	X	0.0	0.0	1.0	0.00	153.1	±3.0 %
		Y	0.0	0.0	1.0		146.3	
		Z	0.0	0.0	1.0		154.8	

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 NormX,Y,Z do not affect the E<sup>5</sup>-field uncertainty inside TSL (see Pages 5 and 6). <sup>B</sup> Numerical incortantly is datamined using the mox, deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831

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f (MHz) <sup>c</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>o</sup>	Depth <sup>G</sup> (mm)	Unct. (k=2)	
750	41.9	0.89	9.59	9.59	9.59	0.74	0.64	± 12.0 %	
835	41.5	0.90	9.14	9.14	9.14	0.22	1.36	± 12.0 %	
900	41.5	0.97	9.17	9.17	9.17	0.28	0.96	± 12.0 %	
1750	40.1	1.37	8.00	8.00	8.00	0.26	0.99	± 12.0 %	
1900	40.0	1.40	7.79	7.79	7.79	0.60	0.65	± 12.0 %	
2000	40.0	1.40	7.71	_7.71	7.71	0.39	0.79	± 12.0 %	
2300	39.5	1.67	7.35	7.35	7.35	0.43	0.76	± 12.0 %	
2450	39.2	1.80	6.99	6.99	6.99	0.37	0.85	± 12.0 %	
2600	39.0	1.96	6.62	6.62	6.62	0.38	0.87	± 12.0 %	
5200	36.0	4.66	4.67	4.67	4.67	0.35	1.80	± 13.1 %	
5300	35.9	4.76	4.41	4.41	4.41	0.40	1.80	± 13.1 %	
5600	35.5	5.07	3.99	3.99	3.99	0.50	1.80	± 13.1 %	
5800	35.3	5.27	4.12	4.12	4.12	0.45	1.80	± 13.1 %	

### Calibration Parameter Determined in Head Tissue Simulating Media

<sup>6</sup> Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSB of the CornF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. <sup>7</sup> At frequencies below 3 GHz, the validity of tissue parameters (s and e) can be released to ± 10% if liquid compensation formule is applied to measured SAR values. At frequencies above 3 GHz, the validity of fasue parameters (s and e) is restricted to ± 5%. The uncertainty is the RSS of the CornF uncertainty for indicated target. Sale parameters. <sup>8</sup> AthenDepth are determined during estilization. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than 1 % of requencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than holf the probe tip diameter from the boundary.

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January 31, 2014

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831

f (MHz) <sup>c</sup>	Relative Permittivity"	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha <sup>5</sup>	Depth <sup>G</sup> (mm)	Unct. (k=2)
750	55.5	0.96	9.10	9.10	9.10	0.50	0.80	± 12.0 %
835	55.2	0.97_	9.03	9.03	9.03	0.28	1.15	± 12.0 %
900	55.0	1.05	8.84	8.84	8.84	0.29	1.08	± 12.0 %
1750	53.4	1.49	7.63	7.63	7.63	0.26	1.16	± 12.0 %
1900	53.3	1.52	7.19	7.19	7.19	0.32	1.01	± 12.0 %
2000	53.3	1.52	7.17	7.17	7.17	0.44	0.83	± 12.0 %
2300	52.9	1.81	6.90	6.90	6.90	0.52	0.76	± 12.0 %
2450	52.7	1.95	6.68	6.68	6.68	0.80	0.56	± 12.0 %
2600	52.5	2.16	6.60	6.50	6.50	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.08	4.08	4.08	0.50	1.90	± 13.1 %
5300	48.9	5.42	3.87	3.87	3.87	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.36	3.36	3.36	0.60	1.90	± 13.1 %
5800	48.2	6.00	3.78	3.78	3.78	0.55	1.90	± 13.1 %

## Calibration Parameter Determined in Body Tissue Simulating Media

<sup>C</sup> Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the CornF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. <sup>A</sup> A frequencies below 3 GHz, the validity of tissue parameters (s and e) can be released to ± 10% if liquid companiation formula is applied to measured SAR values. At the requencies above 3 GHz, the validity of tissue parameters (s and e) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target issue parameters. <sup>A</sup> A therapenties below 3 GHz, the validity of tissue parameters (s and e) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target issue parameters. <sup>A</sup> AlthraDepth are determined during calibration. SPEAG warrants that the remaining division due to the boundary effect after compensation is always less than 1 1% of requencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Certificate No: EX3-3831\_Jan14

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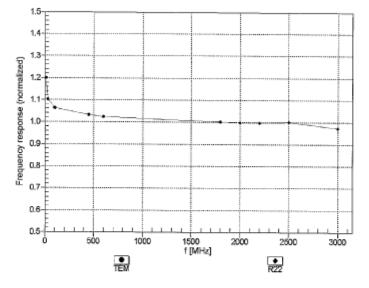
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January 31, 2014

### 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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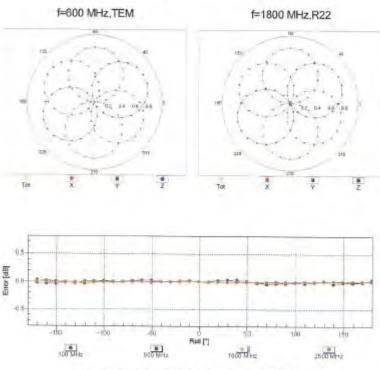
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EX3DV4- SN:3831

January 31, 2014



Receiving Pattern (\$), 9 = 0°

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

Centificate No: EX3-3831\_Jan14

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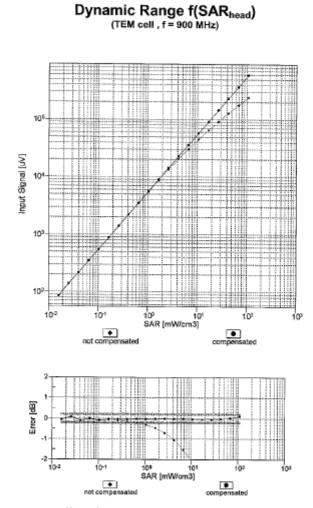
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January 31, 2014



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

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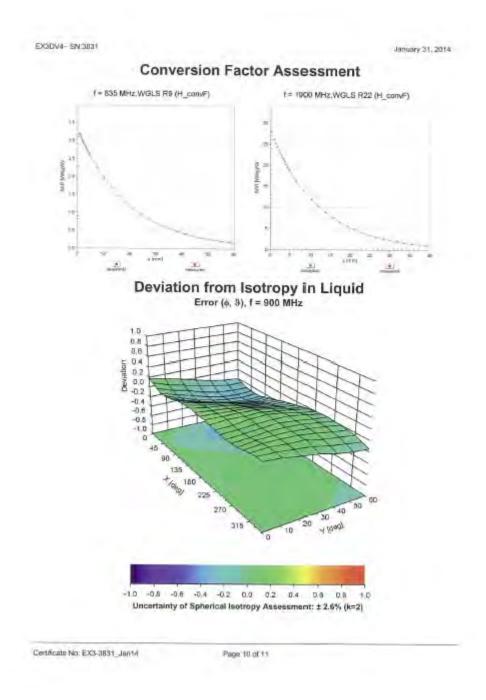
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January 31, 2014

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831

#### Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	-20.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

Certificate No: EX3-3831\_Jan14

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coredited by the Swiss Accredine Swiss Accredine Swiss Accreditation Servi Iultilateral Agreement for the	ice is one of the signatorie	s to the EA	No.: SCS 108
lient Auden		Gent/icate No:	EX3-3578_Jun13
CALIBRATION	CERTIFICATI	E	
Object	EX3DV4 - SN:35	78	-
Calibration proced(irele)		DA CAL-14.v3, QA CAL-23.v4, QA dura for dosimetric E-field probes	CAL-25,v4
Calibration date:	.June 20, 2013		
	ucted in the closed laborator	robobility are given on the following pages and ry facility: environment temperature (22 $\pm$ 3)°C (	
All calibrations have been cond Calibration Equipment used (M	ucted in the closed laborator 6TE onlices for calibration)	ry facility. environment temperature (22 $\pm$ 3)°C $_{\rm d}$	and trumidity < 70%.
Al calibrations have been cond Calibration Equipment used (M Primary Standards	ucted in the closed laborator 6TE onlices for calibration)	ry facility: environment temperature (22 ± 3)°C a Cal Date (Certificate No.)	and flumidity < 70%, Scheduled Celibratien
Al calibrations have been cond Calibration Equipment used (Al Primary Standards Power muter E44.198	ucted in the closed laborator 6TE onlices for calibration)	ry facility. environment temperature (22 $\pm$ 3)*C $_{\rm d}$	and trumidity < 70%.
At calibrations have been cond Calibration Equipment used (M Primary Standards Power mitter S44198 Power sensor E4412A	ucted in the closed laborator RTE ortikal for calibration) ID 0B41293874	y facility: environment temperature (22 ± 3)°C a Cat Date (Certificate No.) D4-Apr-13 (No. 217-01/23)	and trumidity < 70%). Schedulind Calibration Apr-14
Al calibrations have been cond Calibration Equipment used (Al Primary Standards Power meter E44198 Power sensor E4412A Reference 2 of Attenuator Reference 20 dB Attenuator	In the closed laborator ID ID ID ID ID ID ID ID ID ID	y facility: environment temperature (22 ± 3)°C a Cal Date (Certificate No.) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01733)	and trumidity < 70%, Schedulard Celibratian Apr-14 Apr-14
All calibrations have been cond Calibration Equipment used (M Primary Standards Power meter E44198 Power sensor E4412A Reference 3 08 Attenuator Reference 30 08 Attenuator	ID ID ID ID ID ID ID ID ID ID	y facility: environment temperature (22 ± 3)°C a Cat Date (Certificate No.) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01735) D4-Apr-13 (No. 217-01735) D4-Apr-13 (No. 217-01738)	and trumidity < 70%, Schedulied Calibration Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Apr-14
Al calibrations have been cond Calibration Equipment used (M Primary Standards Power meter 544198 Power sensor E4412A Reference 3 d8 Attributor Reference 30 d8 Attributor Reference 30 d8 Attributor Reference 30 d8 Attributor	ucted in the closed laborator 8TE onlice! for calibration) 00 0B41293874 MV41498087 SN: \$5577 (20) SN: \$5129 (300) SN: \$5129 (300) SN: \$3013	vy facility: environment temperature (22 ± 3)°C a Cat Date (Certificate No.) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01737) D4-Apr-13 (No. 217-01738) 28-Dec-12 (No. ES3-3013_Dec12)	and trunidity < 70%, Scheduled Celibration Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Dec-13
Al calibrations have been cond Calibration Equipment used (M Primary Standards Power meter 544198 Power sensor E4412A Reference 3 d8 Attributor Reference 30 d8 Attributor Reference 30 d8 Attributor Reference 30 d8 Attributor	ID ID ID ID ID ID ID ID ID ID	y facility: environment temperature (22 ± 3)°C a Cat Date (Certificate No.) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01735) D4-Apr-13 (No. 217-01735) D4-Apr-13 (No. 217-01738)	and trumidity < 70%, Schedulied Calibration Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Apr-14
Al celibrations have been cond Celibration Equipment used (A4 Primary Standards Power nuter E44198 Power sensor E4412A Reference 30 dB Attenuator Reference 30 dB Attenuator Reference 30 dB Attenuator Reference 30 dB Attenuator Reference Stoto ES30V/2 DAE4	ucted in the closed laborator 8TE onlice! for calibration) 00 0B41293874 MV41498087 SN: \$5577 (20) SN: \$5129 (300) SN: \$5129 (300) SN: \$3013	vy facility: environment temperature (22 ± 3)°C a Cat Date (Certificate No.) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01737) D4-Apr-13 (No. 217-01738) 28-Dec-12 (No. ES3-3013_Dec12)	and trunidity < 70%, Scheduled Celibration Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Dec-13
Al calibrations have been cond Calibration Equipment used (M Primary Standards Power meter 544198 Power sensor 544198 Reference 3 d8 Attenuator Reference 30 d8 Attenuator	ucted in the closed laborator ATE onlicel for calibration) ID 0B41293874 MV41498887 SN 50547 (20) SN 55129 (30) SN 55129 (30) SN 55129 (30) SN 5512 (30) SN 5512 (30)	v facility: environment temperature (22 ± 3)°C a Cal Date (Certificate No.) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01736) D4-Apr-13 (No. 217-01736) D4-Apr-13 (No. 217-01738) 28-Dec-12 (No. ES3-3013_Dec12) 31-Jen-13 (No. DAE4-660_Jun13)	Scheduled Celbratem Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Apr-14 Dec-13 Jim-14
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All calibrations have been cond Calibration Equipment used (M Primary Standards Power meter 544198 Power sensor E4412A Reference 3 dB Atteriuator Reference 30 dB Atteriuator Reference Frobe ES30V2 DAE4 Secondary Standards RF generator HP 8648C	uciaa in the closed laborator 8TE onlicel for calibration) 00 0B41293874 MV41498087 SN: 55577 (20x) SN: 55577 (20x) SN: 55277 (20x) SN: 5527 (20x) SN: 55277 (20x) SN: 5527 (20x) SN	y facility: environment temperature (22 ± 3)°C a Cat Date (Certificate No.) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01733) D4-Apr-13 (No. 217-01738) 28-Dec-12 (No. ES3-3013_Dec12) 31-Jan-13 (No. DAE4-660_Jan13) D1eck Date (in trause) 4-Aug-99 (in house check Apr-13)	and trumidity < 70%, Scheduled Celibration Apr-14 Apr-14 Apr-14 Apr-14 Dec-13 Jun-14 Scheduled Check In house check: Apr-15
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Accreditation No.: SCS 108

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Glossary:

ilssue simulating liquid TSL NORMX, y.z sensitivity in free space ConvF sensitivity in TSL / NORMx.y.z. diode compression paint DOP crest factor (1/duty\_cycle) of the RF signal modulation dependent linearization parameters CF A, B, C, D Polarization m in rotation around probe axis Polarization 8 8 rotation around an axis that is in the plane normal to probe axis (al measurement center). i.e.,  $\theta = 0$  is normal to probe axis

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

- IEEE Skt 1526-2003, 'IEEE Recommended Practice for Determining the Reek Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices; Measurement.
- Techniques", December 2003 b) TEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)". February 2005

#### Methods Applied and Interpretation of Parameters:

- NORMx,y,z; Assessed for E-field polarization 8 = 0 (f ≤ 800 MHz in TEM-cell, f > 1800 MHz; R22 waveguide). NORMx, y, z are only intermediate values, i.e., the uncertainties of NORMx, y, z does not affect the E2-field uncertainty inside TSL (seu below ConvF).
- NORM(f)x,y,z = NORMx,y,z \* frequency, response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax, y, z; Bx, y, z; Cx, y, z; Dx, y, z; VRx, y, z; A, B, C, D are numerical linearization perameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f < 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for to boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical lastropy (3D deviation from isotropy): In a field of low gradients realized using a flat phantom exposed by a patch antonna.
- Sensor Offsel: The sensor offset porresponds to the offset of virtual measurement center from the probe lip (on probe axis). No tolerance required

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EX3DV4 - SN:3578

-June 20, 2013

# Probe EX3DV4

## SN:3578

Manufactured: Calibrated: November 4, 2005 June 20, 2013

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

Certificate No: EX3-3578\_Jun13

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Jane 20, 2013

### DASY/EASY - Parameters of Probe: EX3DV4 - SN:3578

#### **Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV((V/m) <sup>2</sup> ) <sup>A</sup>	0.53	0.50	0.56	# 10.1 %
DCP (mV) <sup>®</sup>	100.0	100.4	100.7	

#### **Modulation Calibration Parameters**

UID	Communication System Name		A dB	B dBõV	c	D de	VR mV	Unc <sup>t</sup> (k=2)
Q	CW9	X 0.0	0,0	D,0	1.0	0.00	166.0	±3.3 %
		Y.	0,0	0.0	1.0	1.	167.7	-
		Z	0,0	0.0	9.0		173.2	

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%.

The uncertainties of NormX.V.Z do not affect the E<sup>7</sup> field uncertainty inside TBL (are Pages 5 and 6).

Numerical linewization parameter: uncertainty not resource: Uncertainty is determined using the treat, deviation from linear response applying restanguiar distribution and is expressed for the aquare of the first value.

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EX30V4- SN:3578

June 20, 2013

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3578

f (MHz) C	Relative Permittivity <sup>F</sup>	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Deptn (mm)	Unct. (k=2)
750	41,9	Ô.89	8.85	8.85	8.85	0.26	1.13	± 12.0 %
835	41,5	0.90	8.41	8.41	5,41	0.25	1.18	± 12.0%
900	41,5	0:97	8.29	8.29	8.29	0.19	1.45	± 12.0 %
1750	40.1	1.37	7.53	7:53	7,53	0,47	0.62	± 12.0 %
1900	40,0	1.40	7.37	7.17	7.17	0.59	0.75	± 12.0 %
2000	40.0	1.40	2.51	7.17	7.11	0,45	0.90	± 12.0 %
2450	39.2	1.80	6.39	6.39	6.39	0.61	0.76	± 12.0 %
5200	36.0	4,66	4.44	4.44	4.44	0,40	1.80	± 13.1 %
5300	35.9	4.76	4.26	4.26	4.26	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.02	4.02	4.02	0,45	1.80	± 13.1 %
5600	35.5	5.07	3.92	3.92	3.92	0,40	1.80	± 13.1 %
5600	35.3	5.27	3.77	377	3.77	0.50	1.80	± 13.1 %

### Calibration Parameter Determined in Head Tissue Simulating Media

<sup>6</sup> Frequency validity of a 100 MHz only applies for UASY v4.4 and higher (see Page 2), size it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvE uncertainty of calibration frequency and the uncertainty for the indicated frequency band.
<sup>6</sup> All frequencies below 3 GHz, the which of the parentees (it and n) can be releved to ± 10% if liquid compensation formula is applied to measured 844 values. At frequencies 3 GHz, the validity of these parentees (it and n) can be releved to ± 10% if liquid compensation formula is applied to measured 844 values. At frequencies 3 GHz, the validity of the parentees (it and n) can be releved to ± 10% if liquid compensation formula is applied to measured 844 values. At frequencies 3 GHz, the validity of the sate comparentees (cand in a monitored to ± 5%. The uncertainty is the R85 of the ConvE origination formula to get tage) to an one test.

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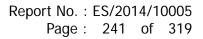
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### EX30V4- SN 3578

June 20, 2013

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3578

I (MHz) C	Relative Permittivity*	Conductivity (S/m)	ConvF X	ConvF Y	ConvF Z	Alpha	Gepth (mm)	Unct. (k=2)
750	65.6	0.98	8.68	8.68	8.68	0.52	0.80	± 12.0 %
835	55.2	0.97	8.50	8.50	8.50	0.25	1.24	± 12.0 %
900	65.0	1.05	8.43	B.43	8.43	0,56	0.76	± 12.0 %
1750	53.4	1.49	7,18	7.18	7.18	0.44	0.89	± 12.0 %
1900	53.3	1.52	6.78	6.78	6,78	0.61	0,76	112.0 %
2000	53,3	1.52	6.87	6.87	6.87	0.45	0.83	± 12.0 %
2450	52.7	1.95	6.31	6.31	6,31	0,80	0.62	± 12.0 %
5200	49,0	6.30	3.90	3.90	3.90	6,50	1.90	± 13.1 %
5300	48.9	5.42	3.64	3,64	3.64	0.50	T.90	± 13.1 %
5500	48.6	5,65	3.39	3,39	3.39	0.55	T.90	± 13,1 %
5600	48,5	5.77	3.29	3.29	3,29	0.50	1.90	± 13,1 %
5800	48.2	6.00	3.35	3.35	3.35	0.55	1.90	± 13.1 %

#### Calibration Parameter Determined in Body Tissue Simulating Media

<sup>1</sup> Frequency validity of ± 100 MHz only applies for DASY v4,4 and higher (see Page 2), dise it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvE uncertainty (it onlytation frequency and the uncertainty for the indicated frequency band. <sup>1</sup> All insurances below 3 GHz, the validity of itsuit parameters (u and e) can be reasoned to ± 10% if liquid compareation formula is applied to measured RA values. Wherearcies acrows 3 GHz, the validity of taxies comments (u and r) is restricted to ± 5%. The uncertainty is the RSS of the ConvE uncertainty for indicated target taxes garaneiters.

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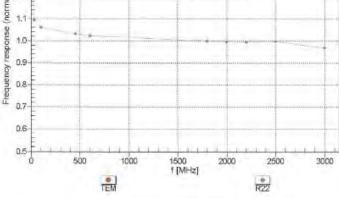
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EX30V4- SN:3578 June 20, 2013 Frequency Response of E-Field (TEM-Cell:iff110 EXX, Waveguide: R22)



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

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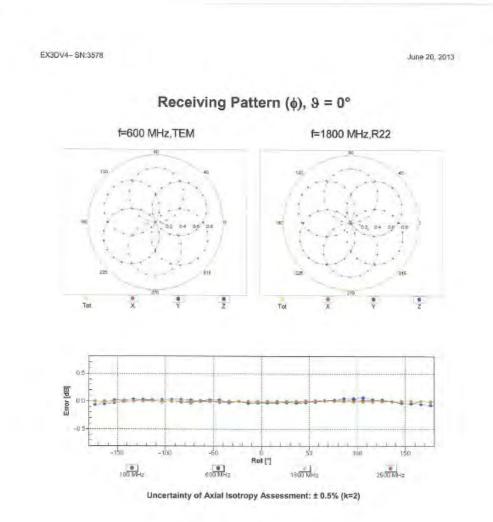
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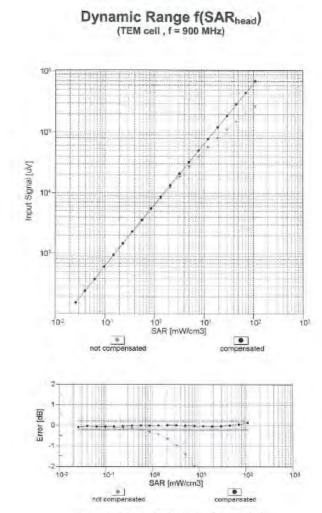
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EX3DV4- SN:3578

June 20, 2013



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

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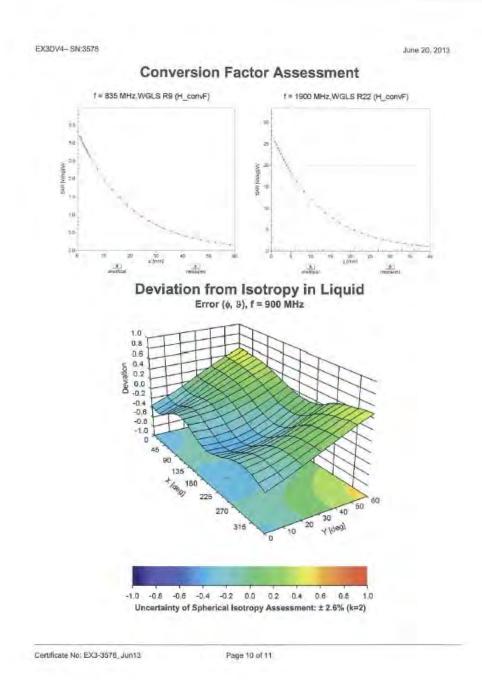
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EX3DV4-SN:3578

June 20, 2013

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3578

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (*)	-113,6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

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## 8. Uncertainty Budget

Measurement Uncertainty evaluation template for DUT SAR test IEEE 1528

IEEE IS28					T	1.	1	1
А	с	D	e	f	g	h=c * f / e	i=c * g / e	k
Source of Uncertainty	Tolerance/ Uncertainty %	Probability Distributioin	Div	ci (1g)	ci (10g)	Standard uncertainty	Standard uncertainty	vi, or Veff
Measurement system								
Probe calibration(under 6Ghz)	6.55%	Ν	1	1	1	6.55%	6.55%	~
Isotropy, Axial	3.50%	R	$\sqrt{3}$	1	1	2.02%	2.02%	$\infty$
Isotropy, Hemispherical	9.60%	R	$\sqrt{3}$	1	1	5.54%		
Boundary Effect	1.00%	R	$\sqrt{3}$	1	1	0.58%	0.58%	$\infty$
Linearity	4.70%	R	$\sqrt{3}$	1	1	2.71%		
Detection Limits	1.00%	R	$\sqrt{3}$	1	^	0.58%	0.58%	
Readout Electronics	0.30%	N	1	1	1	0.30%		
Response time	0.80%	R	$\sqrt{3}$	1	_	0.46%	0.46%	
Integration Time	2.60%	R	$\sqrt{3}$	1		1.50%		
Measurement drift								
(class A evaluation)	1.75%	R	$\sqrt{3}$	1	1	1.01%	1.01%	$^{\infty}$
RF ambient condition - noise	3.00%	R	√3	1	1	1.73%	1.73%	∞
RF ambient conditions -reflections	3.00%	R	√3	1	1	1.73%	1.73%	∞
Probe positioner Mechanical restrictions	0.40%	R	√3	1	1	0.23%	0.23%	∞
Probe Positioning with respect to phantom	2.90%	R	√3	1	1	1.67%	1.67%	∞
Post-processing	1.00%	R	$\sqrt{3}$	1	1	0.58%	0.58%	$\infty$
Max SAR Eval	1.00%	R	$\sqrt{3}$	1	1	0.58%	0.58%	
	1.0070		v J			0.5070	0.5070	
Test Sample related	0.00%	N	1	-	-	0.00%	0.00%	N 1
Test sample	2.90%	N	1	1	1	2.90%	2.90%	IVI-1
Device Holder Uncertainty	3.60%	Ν	1	1	1	3.60%		
Drift of output power	5.00%	R	$\sqrt{3}$	1	1	2.89%	2.89%	$\infty$
Phantom and Setup								
Phantom Uncertainty	4.00%	R	$\sqrt{3}$	1	1	2.31%	2.31%	$\infty$
Liquid conductivity(meas.) Max at 1900 band	4.86%	N	1	0.64	0.43			
Liquid permitivity(meas.) Max at 750 band	4.33%	N	1	0.6	0.49	2.60%	2.12%	М
Combined standard uncertainty		RSS				12.26%	11.95%	
Expant uncertainty (95% confidence interval), K=2						24.52%	23.90%	

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## 9. Phantom Description

Schmid & Partner Engineering AG

Zeugheusstrasse 43, 6004 Zunich, Switzerland Phone +41 1 245 9700, Pax +41 1 245 9778 m/c@apeag.com, http://www.apeag.com

**Certificate of Conformity / First Article Inspection** 

Item	SAM Twin Phantom V4.0	
Type No.	QD 000 P40 C	
Series No	TP-1150 and higher	
Manufacturar	SPEAG Zeughausstrasse 43 CH-8004 Zorich Switzerland	

Tests The series production process used allows the limitation to test of first articles. Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series 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, Semples, TP-1314 ft.
Material thickness at ERP	Compliant with the requirements according to the standards	6mm +/- 0.2mm at ERP	First article, All items
Material parameters	Dielectric parameters for required frequencies	300 MHz - 6 GHz: Relative permittivity < 5, Loss tangent < 0.05	Material samples
Material resistivity The material has been tested to be compatible with the liquids defined in the standards if handled and cleaned according to the instructions. Observe technical Note for material 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 tissue aimulating liquid	< 1% typical < 0.8% if filled with 155mm of HSL900 and without DUT below	Prototypes, Sample testing

#### Standards

- CENELEC EN 50381 IEEE Std 1528-2003 IEC 62209 Part I
- [1] [2] [3] [4]

FCC DET Bulletin 65, Supplement C, Edition 01-01 The IT1S 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 above, 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	<u>speag</u>
Signature / Stamp		Belgentd % Paparet Engineering AG 1990 Autorites 53, 2004 2016 Switzerland Phone 541, 2018 9700542010 Switzerland Info Septes.com, http://www.sbaeg.com

Dechip MIT-OD DOD PAD C ... P

1201

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www.tw.sas.com
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## **10. System Validation from Original Equipment Supplier**

Chmid & Partner Engineering AG sughausstrasse 43, 8004 Zuric	y of h. Switzerland		S Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service
correctited by the Swiss Accredite he Swiss Accreditation Service Aultilatoral Agreement for the m	a is one of the signatorie	s to the EA	ion No.: SCS 108
Client SGS-TW (Audo	in)	Certificate	No: D750V3-1015_Aug13
CALIBRATION C	ERTIFICATE		
Object	D750V3 - SN: 10	15	
Calibration propodute(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits a	bove 700 MHz
Calleration gate	August 26, 2013		
The measurements and the unite All calibrations have been condu	mainties with confidence p stad in the closed laborator	onel standards, which realize the physical robuility are given on the following pages y techtly: environment temporature (22 ± 3	and are pert of the carificate
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



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

Accreditation No.: SCS 108

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 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

d) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

Certificate No: D750V3-1015\_Aug13

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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



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#### Measurement Conditions

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 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 mhc/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.7 ± 6 %	0.90 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	2.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.48 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	1.39 W/kg

#### Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.5 ± 6 %	0.98 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	2.23 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.75 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	1.46 W/kg

Certificate No: D750V3-1015\_Aug13

Page 3 of 8

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#### Appendix

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.8 Ω - 0.3 jΩ
Return Loss	- 31.2 dB

#### Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.4 Ω - 2.6 jΩ
Return Loss	- 30.1 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.036 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	March 22, 2010

Certificate No: D750V3-1015\_Aug13

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#### **DASY5 Validation Report for Head TSL**

Date: 26.08.2013

Test Laboratory: SPEAG, Zurich, Switzerland

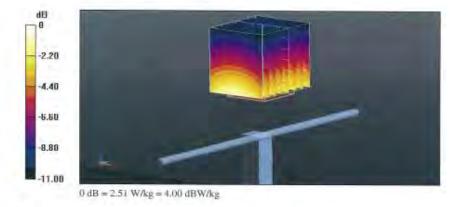
## DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1015

Communication System: UID 0 - CW ; Frequency: 750 MHz Medium parameters used: f = 750 MHz;  $\sigma = 0.9$  S/m;  $\epsilon_r = 41.7$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(6.28, 6.28, 6.28); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 53.165 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 3.27 W/kg SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.39 W/kg Maximum value of SAR (measured) = 2.51 W/kg



Certificate No: D750V3-1015\_Aug13

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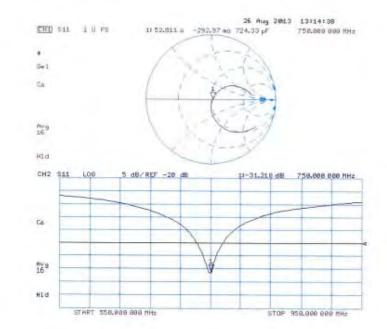
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Impedance Measurement Plot for Head TSL

Certificate No: D750V3-1015\_Aug13

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### **DASY5 Validation Report for Body TSL**

Date: 26.08.2013

Test Laboratory: SPEAG, Zurich, Switzerland

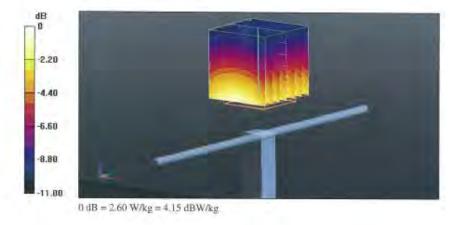
## DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1015

Communication System: UID 0 - CW ; Frequency: 750 MHz Medium parameters used: f = 750 MHz;  $\sigma$  = 0.98 S/m;  $\epsilon_e$  = 54.5;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(6,11, 6,11, 6,11); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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 = 53.165 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 3.28 W/kg SAR(1 g) = 2.23 W/kg; SAR(10 g) = 1.46 W/kg Maximum value of SAR (measured) = 2.60 W/kg



Certificate No: D750V3-1015\_Aug13

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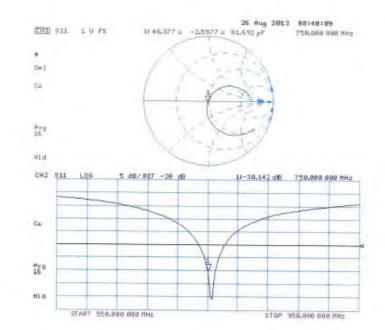
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Impedance Measurement Plot for Body TSL

Certificate No: D750V3-1015\_Aug13

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## Report No. : ES/2014/10005 Page : 257 of 319

		"Indator"	
Accredited by the Swiss Accredit The Swiss Accreditation Servic Multilateral Agreement for the	e is one of the signatorie	to the EA	ion No.: SCS 108
SGS-TW (Aud			No: D835V2-4d156_Jun13
CALIBRATION	CERTIFICATE		
Object	D835V2 - SN: 4d	1156	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits a	bove 700 MHz
Calibration date:	June 06, 2013		
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughnumstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: SCS 108

Accredited by the Swiss Accreditation Service (SAS) The Swiss Accreditation Service is one of the signatories to the EA Multilatival 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 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

#### Additional Documentation:

d) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

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#### Measurement Conditions

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

DASY Version	DASY5	V52.8.6
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 m/ho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.4±8%	0.94 mho/m ±6 %
Head TSL temperature change during test	< 0.5 °C	-	1. Career 1. 1

### SAR result with Head TSL

SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power.	2.48 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.54 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	1.60 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 mha/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.5±6%	1.00 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	2.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.59 W/kg ± 17.0 % (ke2)
SAR averaged over 10 cm* (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	1.60 W/kg

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### Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.0 12 - 2.4 12	
Réturn Loss	- 30.3 dB	

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.4 Ω - 4.6 μΩ	
Return Losa	- 25.3 dB	

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1,430 ns
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After long term use with 100W radiated power, only a slight warming of the cipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 28, 2012

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# **DASY5 Validation Report for Head TSL** Date: 06.05.2013 Test Laboratory: SPEAG, Zurich, Switzerland DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d156 Communication System: UID 0 - CW ; Frequency: 835 MHz Medium parameters used: f = 835 MHz; $\sigma = 0.94$ S/m; $\varepsilon_r = 40.4$ ; $\rho = 1000$ kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007) DASY52 Configuration: Probe: ES3DV3 - SN3205; ConvF(6.05, 6.05, 6.05); Calibrated: 28.12.2012; · Sensor-Surface: 3mm (Mechanical Surface Detection) Electronics: DAE4 Sn601; Calibrated: 25.04.2013 Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001 ٠ DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117) 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 = 57.269 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 3.78 W/kg SAR(1 g) = 2.48 W/kg; SAR(10 g) = 1.6 W/kg Maximum value of SAR (measured) = 2.92 W/kg 2.41 4.84 1.21 1.64 0 dB = 2.92 W/kg = 4.65 dBW/kg Certificate No: D835V2-4d156\_Jun13 Page 5 of 8

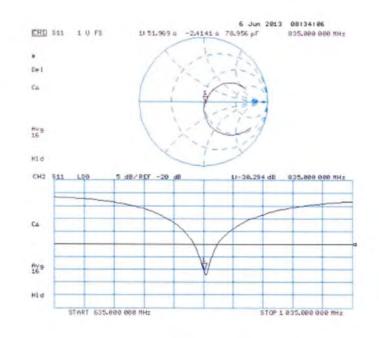
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### Impedance Measurement Plot for Head TSL

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#### **DASY5 Validation Report for Body TSL**

Date: 05.06.2013

Test Laboratory: SPEAG, Zurich, Switzerland

## DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d156

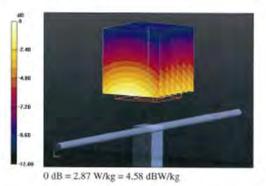
Communication System: UID 0 - CW ; Frequency: 835 MHz Medium parameters used: f = 835 MHz;  $\sigma = 1$  S/m;  $\epsilon_e = 54.5$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(6.04, 6.04, 6.04); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

## 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 = 55.321 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 3.64 W/kg SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.6 W/kg Maximum value of SAR (measured) = 2.87 W/kg



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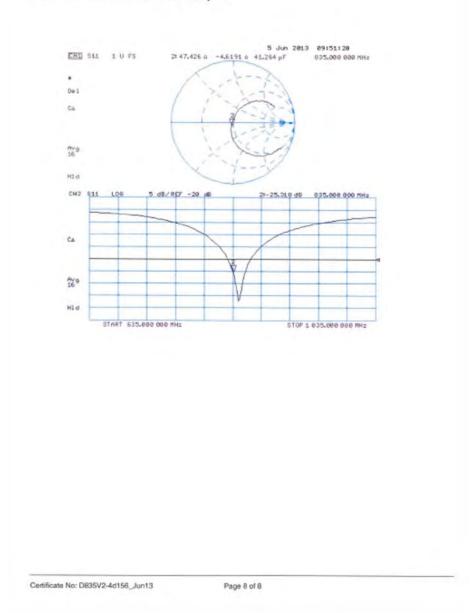
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### Impedance Measurement Plot for Body TSL

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Nent SGS-TW (Aude			No: D1750V2-1095_Jun13
CALIBRATION C	ERTIFICATE		
Dbject	D1750V2 - SN: 1	095	00.00
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits at	bove 700 MHz
Calibration date:	June 06, 2013		
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



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Swiss Calibration Service

Accreditation No.: SCS 108

Accordited 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

#### Glossarv:

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 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- Federal Communications Commission Office of Engineering & Technology (FCC OET), Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

### Additional Documentation:

d) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

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## Report No. : ES/2014/10005 Page : 267 of 319

#### **Measurement Conditions**

DASY Version	DASY5	V52.8,6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

#### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.1 ± 6 %	1.32 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	9.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.7 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	4.80 W/kg

### **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.7 ± 6 %	1.47 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	9.50 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	38.0 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	5.09 W/kg

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#### Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.9 Ω + 0.4 jΩ	
Return Loss	- 38.3 dB	

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.9 Ω + 0.2 jΩ
Return Loss	- 25.4 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.217 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	November 07, 2012

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## **DASY5 Validation Report for Head TSL**

Date: 06.06.2013

Test Laboratory: SPEAG, Zurich, Switzerland

### DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1095

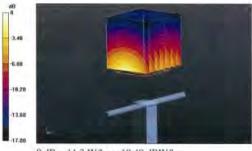
Communication System: UID 0 - CW ; Frequency: 1750 MHz Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.32 S/m;  $\epsilon_r$  = 39.1; p = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(5.18, 5.18, 5.18); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

### 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 = 93.648 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 16.2 W/kg SAR(1 g) = 9.01 W/kg; SAR(10 g) = 4.8 W/kg Maximum value of SAR (measured) = 11.2 W/kg



0 dB = 11.2 W/kg = 10.49 dBW/kg

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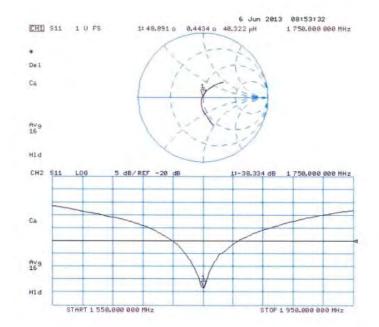
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### Impedance Measurement Plot for Head TSL



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### **DASY5 Validation Report for Body TSL**

Date: 05.06.2013

Test Laboratory: SPEAG, Zurich, Switzerland

### DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1095

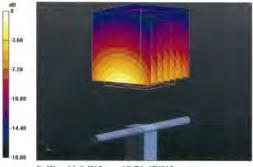
Communication System: UID 0 - CW ; Frequency: 1750 MHz Medium parameters used; f = 1750 MHz;  $\sigma$  = 1.47 S/m;  $\epsilon_r$  = 51.7; p = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.83, 4.83, 4.83); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

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 = 93.648 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 16.4 W/kg SAR(1 g) = 9.5 W/kg; SAR(10 g) = 5.09 W/kg

Maximum value of SAR (measured) = 11.9 W/kg



0 dB = 11.9 W/kg = 10.76 dBW/kg

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## 5 Jun 2013 10:23:50 CHI S11 1 U FS 4: 44.926 0 0.2129 a 19.361 pH 1 758.888 888 MHz . De 1 Cá Av9 16 Hld CH2 LOG 5 dB/REF -20 dB S11 41-25.438 dB 1 750.000 000 MHz Ca Av9 HId START 1 559,000 000 MHz STOP 1 950.000 000 MHz

### Impedance Measurement Plot for Body TSL

Certificate No: D1750V2-1095\_Jun13

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## Report No. : ES/2014/10005 Page: 273 of 319

ccredited by the Swiss Accredit he Swiss Accreditation Servic lutilateral Agreement for the r	e is one of the signatorie	es to the EA	in No.: SCS 108
lient SGS-TW (Aude	en)	Certificate N	lo: D1750V2-1008_May13
CALIBRATION O	CERTIFICATE		
Dbject	D1750V2 - SN: 1	008	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits ab	ove 700 MHz
Calibration date:	May 29, 2013		
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Accreditation No.: SCS 108

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### 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 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

### Additional Documentation:

d) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

Certificate No: D1750V2-1008\_May13

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### Measurement Conditions

DASY system confi	guration, a	s far as not g	given on page 1.
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DASY Version	DASY5	V52.8.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.1 ± 6 %	1.32 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	9.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.8 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	4.83 W/kg

#### Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.7±6%	1.47 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	9.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.9 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	5.07 W/kg

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### Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$50.2 \Omega + 0.2 j\Omega$
Return Loss	- 50.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.0 \$2 - 0.1 j\$2	
Return Loss	- 27.6 dB	

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.222 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 leedpoint may be damaged.

#### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	February 11, 2009

Certificate No: D1750V2-1008\_May13

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#### **DASY5 Validation Report for Head TSL**

Date: 28.05.2013

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1008

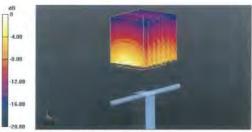
Communication System: UID 0 - CW ; Frequency: 1750 MHz Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.32 S/m;  $\varepsilon_r$  = 39.1;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(5.18, 5.18, 5.18); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

### 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 = 95,241 V/m; Power Drift = 0.02 dB Peak SAR (extrapolated) = 16.2 W/kg SAR(1 g) = 9.04 W/kg; SAR(10 g) = 4.83 W/kg Maximum value of SAR (measured) = 11.2 W/kg



0 dB = 11.2 W/kg = 10.49 dBW/kg

Certificate No: D1750V2-1008\_May13

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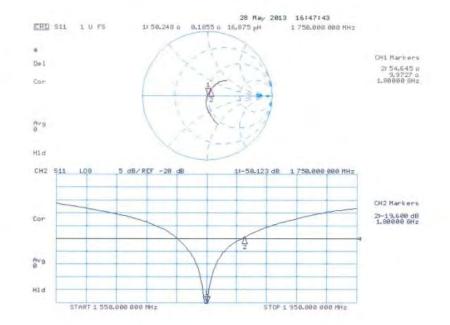
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### Impedance Measurement Plot for Head TSL

Certificate No: D1750V2-1008\_May13

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## **DASY5 Validation Report for Body TSL**

Date: 29.05.2013

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1008

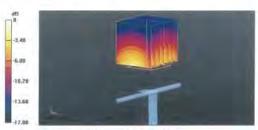
Communication System: UID 0 - CW ; Frequency: 1750 MHz Medium parameters used: f = 1750 MHz;  $\sigma$  = 1.47 S/m;  $\epsilon_r$  = 51.7;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.83, 4.83, 4.83); Calibrated: 28.12.2012;
- · Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- · Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

#### 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 = 93.817 V/m; Power Drift = 0.00 dB Peak SAR (extrapolated) = 16.3 W/kg SAR(1 g) = 9.46 W/kg; SAR(10 g) = 5.07 W/kg Maximum value of SAR (measured) = 11.9 W/kg



0 dB = 11.9 W/kg = 10.76 dBW/kg

Certificate No: D1750V2-1008\_May13

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## 29 May 2013 11:54:39 CHI S11 1 U FS 11 46,018 0 -64.453 mū 1.4118 m 1 758.000 000 MHz De 1 CA AV9 HId CH2 511 LOG 5 dB/REF -20 dB 11-27.641 dB 1 750.000 000 MHz Cá Av9 Hld START 1 550.000 000 MH2 STOP 1 950,000 000 MHz

### Impedance Measurement Plot for Body TSL

Certificate No: D1750V2-1008\_May13

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## Report No. : ES/2014/10005 Page : 281 of 319

	h, Switzerland	Carlos Carlos	S Swiss Calibration Service
condited by the Swiss Accordit he Swiss Accreditation Servic fulfillateral Agreement for the r	e is one of the signatorie	s to the EA	on No.: SCS 108
tient SGS-TW (Aude			No: D1900V2-5d173_Jun13
CALIBRATION (	CERTIFICATE		
Object	D1900V2 - SN: 5	d173	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits al	bove 700 MHz
Calibration date:	June 10, 2013		
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## Report No. : ES/2014/10005 Page: 282 of 319

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Accreditation No.: SCS 108

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 not applicable or not measured N/A

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

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless
- Communications Devices: Measurement Techniques\*, December 2003 b) IEC 62209-1, \*Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)\*, February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

#### Additional Documentation:

d) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Moduler 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	39.3 ± 6 %	1.34 mho/m ± 5 %
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	9.82 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.2 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>2</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	5.17 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	53.7±0%	1.50 mha/m ± 8 %
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	10.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	40.8 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>2</sup> (10 g) of Body TSL SAR measured	condition 250 mW input power	5.42 W/kg

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### Appendix

	Antenna	Parameters	with	Head	TSL
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Impedance, transformed to feed point	52.2 Ω + 5.4 jΩ
Return Loss	- 24.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.3 Q + 5.8 jQ
Réturn Loss	- 23.6 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.200 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 seminigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The anternia 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

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Date: 10.06.2013

## DASY5 Validation Report for Head TSL

Test Laboratory: SPEAG, Zurich, Switzerland

### DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d173

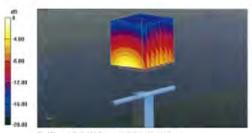
Communication System: UID 0 - CW ; Frequency: 1900 MHz Medium parameters used: f = 1900 MHz;  $\sigma = 1.34 \text{ S/m}$ ;  $\varepsilon_i = 39.3$ ;  $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.98, 4.98, 4.98); Calibrated: 28.12.2012;
- · Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

### Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 96.647 V/m; Power Drift = 0.06 dB Peak SAR (extrapolated) = 17.8 W/kg SAR(1 g) = 9.82 W/kg; SAR(10 g) = 5.17 W/kg Maximum value of SAR (measured) = 12.2 W/kg



0 dB = 12.2 W/kg = 10.86 dBW/kg

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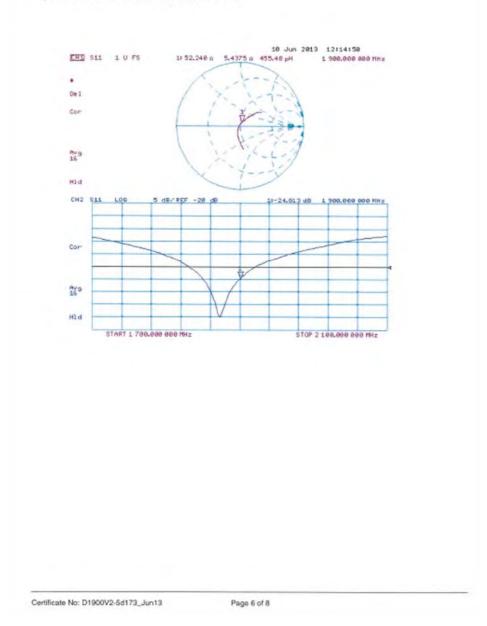
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Impedance Measurement Plot for Head TSL

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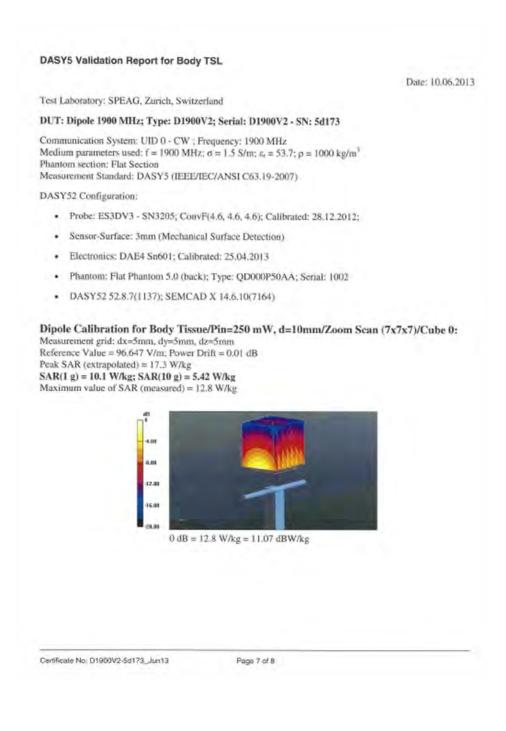
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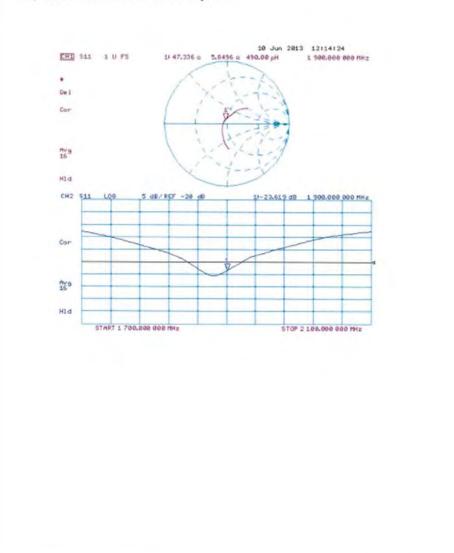
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### Impedance Measurement Plot for Body TSL

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coredited by the Swiss Accredit he Swiss Accreditation Servic fulfilateral Agreement for the	te is one of the signatorie	is to the EA	n No.: SCS 108
CALIBRATION			io: D2450V2-912_Jun13
ALIBRATION	SERTIFICATE		
Object	D2450V2 - SN: 9	112	
Calibration procedure(s)	QA CAL-05.v9 Calibration proce	dure for dipole validation kits ab	ove 700 MHz
Calibration date:	June 07, 2013		
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## Report No. : ES/2014/10005 Page: 290 of 319

Calibration Laboratory of Schmid & Partner Engineering AG Zaugh signifrance 43, 8004 Zurich, Bwitzarland



CINIS.

Schweizerischer Kalbrierdienst S Service suisse d'étaionnag С Servizio svizzero di tarutura S Swiss Calibration Service

Accreditation No.: SCS 108

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

## Glossary:

C

N

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

## Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)". February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

## Additional Documentation:

d) DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end ٠ 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 Version	DASYD	V52.8.7
Extrapolation	Advanced Extrepolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm.	with Spaper
Zoom Scan Resolution	dx, $dy$ , $dz = 5 mm$	
Frequency	2450 MHz ± 1 MHz	

#### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters.	(22.0 ± 0.2) *C	37.8 ± 6 %	1.61 mhoim ± 6 %
Head TSL temperature change during test	<0.5 °C	-	-

## SAR result with Head TSL

SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to tW	53.4 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>2</sup> (10 c) of Head TSL	opedition	
SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL. SAR measured	condition 250 mW input power	6.25 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	50.9±6.%	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	****	

## SAR result with Body TSL

SAR averaged over 1 cm <sup>4</sup> (1 g) of Body TSL	Condition	
SAR maaacred	250 mW input power	13.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	51.5 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>8</sup> (10 g) of Body TSL. SAR measured	condition 250 mW input power	6.06 W/kg

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### Appendix

Antenna	Parameters	with	Head	ISL	

Impedance, transformed to feed point	55.6 Q + 1.3 jQ
Return Loss	- 25.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.8 Q + 2.9 jQ	
Return Loss	- 30.6 dB	-

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.155 ns

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

The dipole is made of standard semirigid coaviel 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 seconding to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is solil according to the Standard.

No excessive force must be applied to the dipole arms, because they might band or the epidered connections near the feedpoint may be damaged.

#### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 19, 2012

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#### **DASY5 Validation Report for Head TSL**

Date: 07.06.2013

Test Laboratory: SPEAG, Zurich, Switzerland

## DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 912

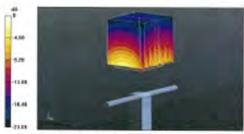
Communication System: UID 0 - CW ; Frequency: 2450 MHz Medium parameters used: f = 2450 MHz;  $\sigma = 1.81$  S/m;  $r_c = 37.8$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.52, 4.52, 4.52); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25,04,2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

## Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0;

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 95,115 V/m; Power Drift = 0.07 dB Peak SAR (extrapolated) = 28.2 W/kg SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.25 W/kg Maximum value of SAR (measured) = 17.1 W/kg



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

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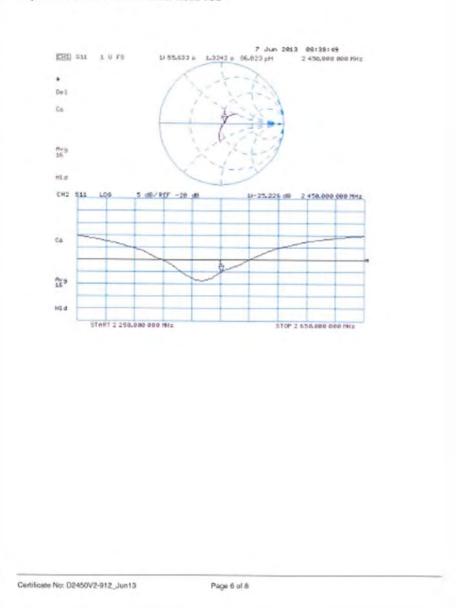
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Impedance Measurement Plot for Head TSL

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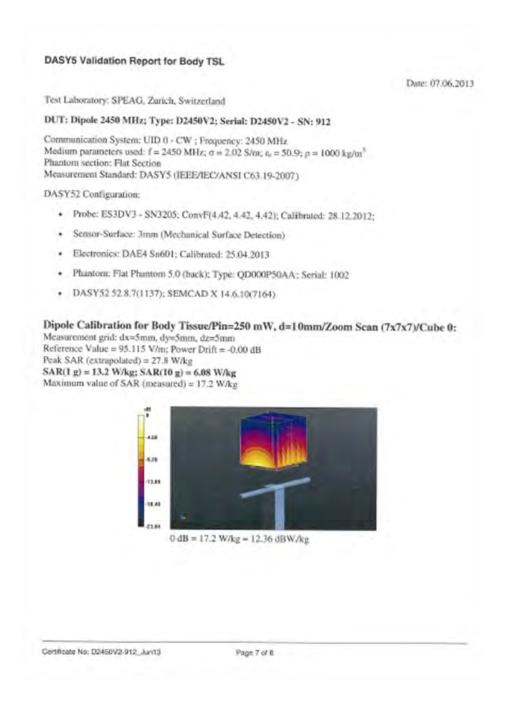
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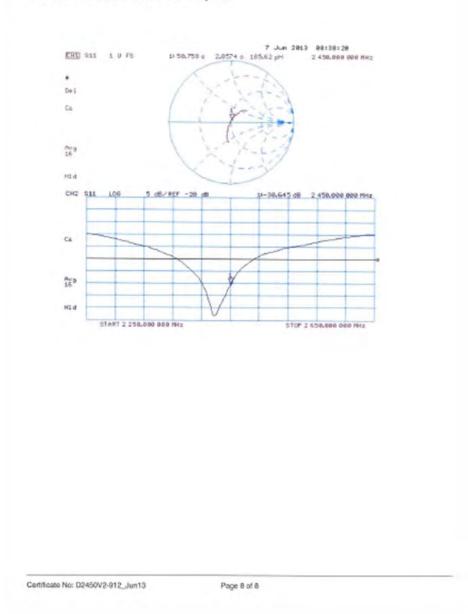
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## Impedance Measurement Plot for Body TSL

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CALIBRATION CI	ERTIFICATE		
00#KI	D2600V2 - SN: 10	205	
Calibration procedure(s)	QA CAL-05.v9 Calibration proces	dure for dipole validation kits abo	ove 700 MHz
Calibration date:	January 28, 2014		
Collorsion Equipment used (MATE	2		Scheduler Carbration
Primery Sendends	(B # G837480704	Cal Dale (CertBoats No.) 09-Oct-13 (No. 217-01627)	Del-14
Power mater EPM-442A Power sensor HP 3481A	US37292783	09-Oct-13 (No 217-01827) 09-Oct-13 (No 217-01827)	()(d-14 ()(d-14
Power sensor PP AnntA	MY41002317	09-Dct-13 (No. 217-01627)	Oct-14
Reference 20 del Abenunion	SN: 5058 (20k)	64-Apr 13 (No. 217-01735)	Apr-14
Type N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Perdonation Photon ES3EV3	SN: 3200	30-Dec-13 (No. F53-3205, Duc13)	Dec-14
DAE+	SN: 601	25-Apr-13 (No. DAE4-601, Apr13)	Apr-14
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RF generator FI&S SMT-00 Network Analyzer HP 8753F	U537390585 54208	04-Aug 99 (in house check Oct-13) 18-Oct-01 (in house check Oct-13)	in house check: Oct-14
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	Name Claudio Le plor	Laboratory Terrimitian	signature
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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstresse 49, 8004 Zurich, Switzerland



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Accreditation No.: SCS 108

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) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

d) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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

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

Certificate No: D2600V2-1005\_Jan14

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#### Measurement Conditions

DASV eveters configuration	as far as not given on page 1.	
DMOT ayabani comigunation,	as lat as not given on page 1.	

DASY Version	DASY5	V62.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	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	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.2 ± 6 %	2.02 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	14.7 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	57.7 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	6.57 W/kg

## Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	$50.9 \pm 6 \%$	2.21 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	14.3 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	56.2 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	6.33 W/kg

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## Appendix

## Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.1 Ω - 3.2 jΩ
Return Loss	- 30.0 dB

## Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.5 Ω - 2.6 jΩ
Return Loss	- 26.8 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.155 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 23, 2006

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#### **DASY5 Validation Report for Head TSL**

Date: 28.01,2014

Test Laboratory: SPEAG, Zarich, Switzerland

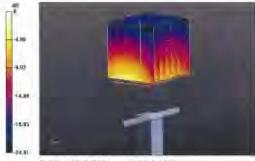
## DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1005

Communication System: UID 0 - CW; Frequency: 2600 MHz Medium parameters used: f = 2600 MHz;  $\sigma$  = 2.02 S/m;  $\epsilon_e$  = 38.2;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.46, 4.46, 4.46); Calibrated: 30,12,2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front): Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 98.590 V/m; Power Drift = 0.08 dB Peak SAR (extrapolated) = 31.3 W/kg SAR(1 g) = 14.7 W/kg; SAR(10 g) = 6.57 W/kg Maximum value of SAR (measured) = 19.3 W/kg



0 dB = 19,3 W/kg = 12,86 dBW/kg

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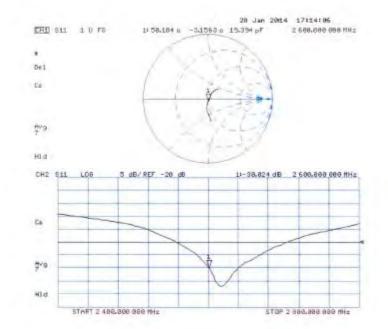
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## Impedance Measurement Plot for Head TSL

Certificate No: D2600V2-1005\_Jan14

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#### **DASY5 Validation Report for Body TSL**

Date: 28.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

### DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1005

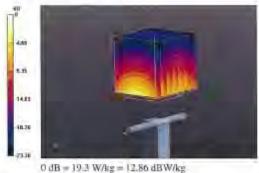
Communication System: UID 0 - CW; Frequency: 2600 MHz Medium parameters used: f = 2600 MHz;  $\alpha = 2.21 \text{ S/m}$ ;  $c_r = 50.9$ ;  $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 SN3205; ConvF(4.24, 4.24, 4.24); Calibrated: 30.12.2013
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Su601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.624 V/m; Power Drift = -0.00 dB Peak SAR (extrapolated) = 30.8 W/kg SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.33 W/kg Maximum value of SAR (measured) = 19.3 W/kg



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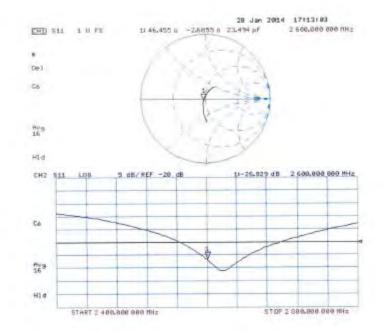
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## Impedance Measurement Plot for Body TSL

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Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 0004 Zurich, Switzerland



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S Schweizerischer Kalibrierdienst Service suisse d'étaionnage Servizio svizzero di taratura S swiss Calibration Service

Accreditation No.: SCS 108

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

#### Glossary:

C

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

## Calibration is Performed According to the Following Standards:

a) IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010

b) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

#### Additional Documentation:

c) 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 Version	DASYS	V52.8.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spaces
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHZ ± 1 MHZ 5300 MHZ ± 1 MHZ 5600 MHZ ± 1 MHZ 5600 MHZ ± 1 MHZ	

#### Head TSL parameters at 5200 MHz

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parametera	(22.0 ± 0.2) °C	34.7 ± 6 %	4.58 mha/m ± 8 %
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.27 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	82.0 W/kg = 19.9 % (k=2)
SAR averaged over 10 cm <sup>1</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL SAR measured	condition 100 mW input power	2.36 W/kg

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#### Head TSL parameters at 5300 MHz

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.5 ± 6 %	4.68 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL at 5300 MHz

SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.51 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	84.4 W / kg ± 19.9 % (km2)
		the second se
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 100 mW input power	2.44 W/kg

## Head TSL parameters at 5600 MHz

 The following parameters and calculations were applied.
 Temperature
 Permittivity
 Conductivity

 Nominal Head TSL parameters
 22.0 °C
 35.5
 5.07 mho/m

 Measured Head TSL parameters
 (22.0 ± 0.2) °C
 34.1 ± 6 %
 4.96 mho/m ± 6 %

 Head TSL temperature change during test
 < 0.5 °C</td>
 --- ---

#### SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm <sup>5</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.62 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	85.4 W/kg ± 19.9 % (k=2)
SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL SAR measured	condition 100 mW input power	2.45 W/kg

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## Head TSL parameters at 5800 MHz

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) *C	$33.8 \pm 6 \%$	5.17 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	in and	-

#### SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.1 W/kg ± 19.9 % (km2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.7 W/kg ± 19.5 % (k=2)

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### Body TSL parameters at 5200 MHz

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The following	parameters a	nd calculations	were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.9 ± 6 %	5.43 mino/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

## SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.64 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	75.8 W/kg ± 19.9 % (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 100 mW input power	2.14 W/kg

## Body TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.42 mha/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.8 ± 6 %	5.56 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

#### SAR result with Body TSL at 5300 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.77 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	77.1 W/kg ± 19.9 % (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 100 mW input power	2.17 W/kg

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## Body TSL parameters at 5600 MHz

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.2±6%	5.94 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		-

## SAR result with Body TSL at 5600 MHz

mW input power	8.25 W/kg 81.8 W/kg ± 19.9 % (k=2)
Wt of besilem	81 8 Willia - 10 0 8 /k-2)
Thankou to The	81.0 Wing = 19.9 % (n=2)
in divis	
	condition

SAR measured	100 mW input power	2.29 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	22.6 W/kg ± 19.5 % (k=2)

## Body TSL parameters at 5800 MHz

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	45.9±6%	6.22 mha/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

#### SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm <sup>2</sup> (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.60 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	75.4 W/kg ± 19.9 % (k=2)
SAR averaged over 10 cm <sup>2</sup> (10 g) of Body TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL SAR measured	condition 100 mW input power	2.10 W/kg

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## Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	52.6 Q - 9.7 Q
Return Loss	- 20.2 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	52.6 Ω - 2.8 jΩ
Return Loss	- 28.6 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	57.2 Ω - 5,1 jΩ	
Return Loss	- 21,7 dB	

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point.	55.5 Ω - 1.0 jΩ
Return Loss	- 25.5 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	53.1 Ω - 8.0 jΩ
Return Loss	- 21.7 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	51.9 Q - 2.0 jQ	
Return Loss	- 31.4 dB	

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	58.7 Q - 3.7 jQ	
Return Loss	- 21.2 dB	

### Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	56.0 $\Omega$ + 1.5 j $\Omega$	
Return Loss	- 24.7 dB	

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#### General Antenna Parameters and Design

Electrical Delay (one direction) 1.207 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

## Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 24, 2010

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## **DASY5 Validation Report for Head TSL**

Date: 07.05.2013

Test Laboratory: SPEAG, Zurich, Switzerland

## DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1104

Communication System: UID 0 - CW ; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5800 MHz, Frequency: 5800 MHz

Medium parameters used: f = 5200 MHz;  $\sigma$  = 4.58 S/m;  $\epsilon_r$  = 34.7;  $\rho$  = 1000 kg/m<sup>3</sup>, Medium parameters used: f = 5300 MHz;  $\sigma$  = 4.68 S/m;  $\epsilon_r$  = 34.5;  $\rho$  = 1000 kg/m<sup>3</sup>, Medium parameters used: f = 5600 MHz;  $\sigma$  = 4.96 S/m;  $\epsilon_r$  = 34.1;  $\rho$  = 1000 kg/m<sup>3</sup>. Medium parameters used: f = 5800 MHz;  $\sigma$  = 5.17 S/m;  $\epsilon_r$  = 33.8;  $\rho$  = 1000 kg/m<sup>3</sup>

Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63,19-2007)

DASY52 Configuration:

- Probe: EX3DV4 SN3503; ConvF(5.41, 5.41, 5.41); Calibrated: 28.12.2012, ConvF(5.1, 5.1); Calibrated: 28.12.2012, ConvF(4.76, 4.76, 4.76); Calibrated: 28.12.2012, ConvF(4.81, 4.81, 4.81); Calibrated: 28.12.2012;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 65.914 V/m; Power Drift = -0.07 dB Peak SAR (extrapolated) = 31.2 W/kg SAR(1 g) = 8.27 W/kg; SAR(10 g) = 2.36 W/kg Maximum value of SAR (measured) = 19.3 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 66.338 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 32.5 W/kg SAR(1 g) = 8.51 W/kg; SAR(10 g) = 2.44 W/kg Maximum value of SAR (measured) = 20.0 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 65.836 V/m; Power Drift = 0.04 dB Peak SAR (extrapolated) = 34.4 W/kg SAR(1 g) = 8.62 W/kg; SAR(10 g) = 2.45 W/kg Maximum value of SAR (measured) = 20.7 W/kg

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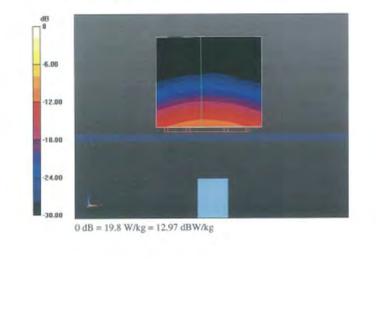
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Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz 2/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 62.381 V/m; Power Drift = 0.05 dB Peak SAR (extrapolated) = 33.9 W/kg SAR(1 g) = 8.09 W/kg; SAR(10 g) = 2.3 W/kg Maximum value of SAR (measured) = 19.8 W/kg



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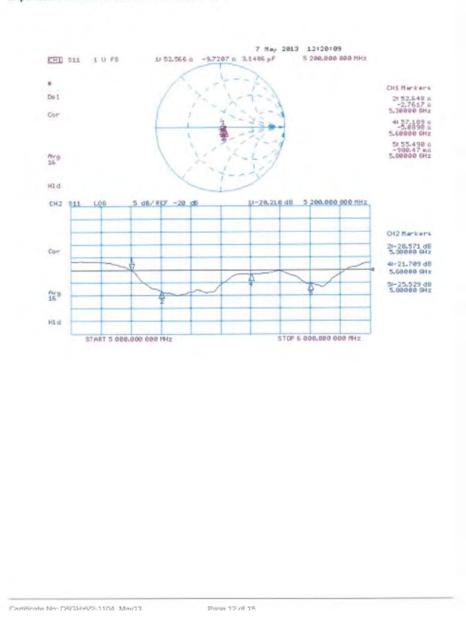
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#### Impedance Measurement Plot for Head TSL

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#### **DASY5 Validation Report for Body TSL**

Date: 06.05.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1104

Communication System: UID 0 - CW ; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz Medium parameters used: f = 5200 MHz;  $\sigma = 5.43$  S/m;  $\varepsilon_t = 46.9$ ;  $\rho = 1000$  kg/m<sup>1</sup>, Medium parameters used: f = 5300 MHz;  $\sigma = 5.56 \text{ S/m}$ ;  $e_c = 46.8$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used: f = 5600 MHz;  $\sigma = 5600 \text{ MHz}$ ;  $\sigma = 5600 \text{ MHz}$ 5.94 S/m;  $\epsilon_r = 46.2$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used: f = 5800 MHz;  $\sigma = 6.22 \text{ S/m}$ ;  $\epsilon_r = 45.9$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 SN3503; ConvF(4.91, 4.91, 4.91); Calibrated; 28.12.2012, ConvF(4.67, 4.67, 4.67); Calibrated: 28.12.2012, ConvF(4.22, 4.22, 4.22); Calibrated: 28.12.2012, ConvF(4.38, 4.38, 4.38); Calibrated: 28.12.2012;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 59.375 V/m; Power Drift = -0.06 dB Peak SAR (extrapolated) = 30.1 W/kg SAR(1 g) = 7.64 W/kg; SAR(10 g) = 2.14 W/kg Maximum value of SAR (measured) = 18.0 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 59.419 V/m; Power Drift = -0.06 dB Peak SAR (extrapolated) = 31.4 W/kg SAR(1 g) = 7.77 W/kg; SAR(10 g) = 2.17 W/kg Maximum value of SAR (measured) = 18.5 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 59,408 V/m; Power Drift = -0.06 dB Peak SAR (extrapolated) = 36.4 W/kg SAR(1 g) = 8.25 W/kg; SAR(10 g) = 2.29 W/kg Maximum value of SAR (measured) = 20.3 W/kg

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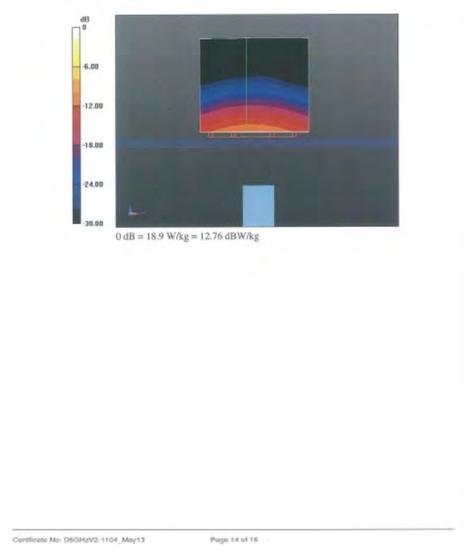
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Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm Reference Value = 56.084 V/m; Power Drift = -0.06 dB Peak SAR (extrapolated) = 35.3 W/kg SAR(1 g) = 7.6 W/kg; SAR(10 g) = 2.1 W/kg Maximum value of SAR (measured) = 18.9 W/kg



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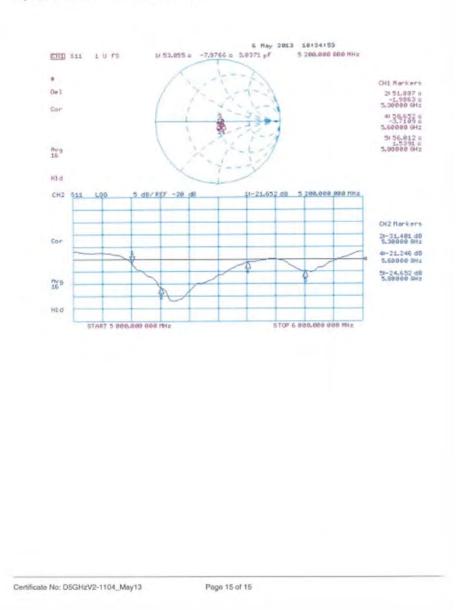
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## Impedance Measurement Plot for Body TSL

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