

13 Evaluation of Simultaneous

Table 13.1: The sum of reported SAR values for main antenna and WiFi

	Position	Main antenna	WiFi	Sum
Highest reported SAR value for Head	Right hand, Touch cheek	0.31	0.21	0.52
Highest reported SAR value for Body	Rear 0mm	1.16	0.34	1.50

Table 13.2: The sum of reported SAR values for main antenna and BT

	Position	Main antenna	BT	Sum
Maximum reported SAR value for Head	Right hand, Touch cheek	0.31	0.15	0.46
Maximum reported SAR value for Body	Rear 0mm	1.16	0.07	1.23

[1] - Estimated SAR for Bluetooth (see the table 13.3)

Table 13.3: Estimated SAR for Bluetooth

Mode/Band	F (GHz)	Position	Distance (mm)	Upper limit of power *		Estimated _{1g} (W/kg)
				dBm	mW	
Bluetooth	2.441	Head	5	5.5	3.55	0.15
Bluetooth	2.441	Body	10	5.5	3.55	0.07

* - Maximum possible output power declared by manufacturer

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

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm) · [$\sqrt{f(\text{GHz})/x}$] W/kg for test separation distances ≤ 50 mm;

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

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

Conclusion:

According to the above tables, the sum of reported SAR values is < 1.6 W/kg. So the simultaneous transmission SAR with volume scans is not required.

14 SAR Test Result

It is determined by user manual for the distance between the EUT and the phantom bottom. The distance is 12mm or 5mm or 4mm or 0mm and just applied to the condition of body worn accessory.

It is performed for all SAR measurements with area scan based 1-g SAR estimation (Fast SAR). A zoom scan measurement is added when the estimated 1-g SAR is the highest measured SAR in each exposure configuration, wireless mode and frequency band combination or more than 1.2W/kg.

The calculated SAR is obtained by the following formula:

$$\text{Reported SAR} = \text{Measured SAR} \times 10^{(P_{\text{Target}} - P_{\text{Measured}})/10}$$

Where P_{Target} is the power of manufacturing upper limit;

P_{Measured} is the measured power in chapter 11.

Mode	Duty Cycle
Speech for GSM850/1900	1:8.3
GPRS&EGPRS for GSM850/1900 #1	1:2
GPRS&EGPRS for GSM850/1900 #2	1:2.67
WCDMA	1:1

14.1 SAR results

Table 14-1 GSM850 #1 Head

GSM850 #1 Head									
Ambient Temperature:			22.5			Liquid Temperature:			22.3
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]			
			CH251 848.8 MHz	CH190 836.6 MHz	CH128 824.2 MHz	CH251 848.8 MHz	CH190 836.6 MHz	CH128 824.2 MHz	
GSM	Tune-up		34.00	34.00	34.00	Scaling factor*			
	Slot Average Power [dBm]		33.10	33.08	33.12	1.23	1.24	1.22	
	Left Cheek	1g SAR		0.158			0.20		
		10g SAR		0.124			0.15		
		Deviation		0.05			0.05		
	Left Tilt	1g SAR		0.137			0.17		
		10g SAR		0.109			0.13		
		Deviation		-0.02			-0.02		
	Right Cheek	1g SAR	0.248	0.216	0.206	0.31	0.27	0.25	
		10g SAR	0.189	0.166	0.158	0.23	0.21	0.19	
		Deviation	0.06	-0.01	0.12	0.06	-0.01	0.12	
	Right Tilt	1g SAR		0.127			0.16		
		10g SAR		1.001			1.24		
		Deviation		0.05			0.05		
	GSM SKU2	Right Cheek	1g SAR	0.241			0.30		
10g SAR			0.183			0.23			
Deviation			0.06			0.06			

Table 14-2 GSM850 #1 Body

GSM850 #1 Body									
Ambient Temperature:			22.5			Liquid Temperature:			22.3
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]			
			CH251 848.8 MHz	CH190 836.6 MHz	CH128 824.2 MHz	CH251 848.8 MHz	CH190 836.6 MHz	CH128 824.2 MHz	
GPRS 4 Txslots	Tune-up		30.00	30.00	30.00	Scaling factor*			
	Slot Average Power [dBm]		29.50	29.48	29.49	1.12	1.13	1.12	
	Rear 12mm	1g SAR	0.729	0.786	0.8	0.82	0.89	0.90	
		10g SAR	0.496	0.53	0.545	0.56	0.60	0.61	
		Deviation	0.06	0.1	0.05	0.06	0.10	0.05	
	Left edge 5mm	1g SAR		0.391			0.44		
		10g SAR		0.235			0.27		
		Deviation		0.03			0.03		
	Bottom edge 12mm	1g SAR		0.327			0.37		
		10g SAR		0.213			0.24		
Deviation			0.07			0.07			
EGPRS GMSK 4 Txslots	Tune-up		30.00	30.00	30.00	Scaling factor*			
	Slot Average Power [dBm]		29.48	29.45	29.47	1.13	1.13	1.13	
	Rear 12mm	1g SAR			0.786			0.89	
		10g SAR			0.531			0.60	
		Deviation			0.02			0.02	
GPRS 4 Txslots SKU2	Rear 12mm	1g SAR			0.785			0.88	
		10g SAR			0.529			0.59	
		Deviation			-0.01			-0.01	

Table 14-3 GSM850 #2 Body

GSM850 #2 Body									
Ambient Temperature:			22.5			Liquid Temperature:			22.3
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]			
			CH251 848.8 MHz	CH190 836.6 MHz	CH128 824.2 MHz	CH251 848.8 MHz	CH190 836.6 MHz	CH128 824.2 MHz	
GPRS 3 Txslots	Tune-up		25.00	25.00	25.00	Scaling factor*			
	Slot Average Power [dBm]		24.03	24.11	24.18	1.25	1.23	1.21	
	Rear 0mm	1g SAR	0.41	0.361	0.444	0.51	0.44	0.54	
		10g SAR	0.245	0.239	0.266	0.31	0.29	0.32	
		Deviation	0.12	0.07	0.09	0.12	0.07	0.09	
	Left edge 0mm	1g SAR		0.27			0.33		
		10g SAR		0.15			0.18		
		Deviation		0.1			0.10		
	Bottom edge 0mm	1g SAR		0.248			0.30		
		10g SAR		0.146			0.18		
Deviation			0.17			0.17			

Table 14-4 PCS1900 #1 Head

PCS1900 #1 Head									
Ambient Temperature:			22.5			Liquid Temperature:			22.3
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]			
			CH810 1909.8	CH661 1880 MHz	CH512 1850.2	CH810 1909.8	CH661 1880 MHz	CH512 1850.2	
GSM	Tune-up		30.50	30.50	30.50	Scaling factor*			
	Slot Average Power [dBm]		30.26	30.23	30.24	1.06	1.06	1.06	
	Left Cheek	1g SAR	0.063	0.071	0.068	0.07	0.08	0.07	
		10g SAR	0.036	0.043	0.041	0.04	0.05	0.04	
		Deviation	-0.08	0.04	0.12	-0.08	0.04	0.12	
	Left Tilt	1g SAR		0.03			0.03		
		10g SAR		0.019			0.02		
		Deviation		0.08			0.08		
	Right Cheek	1g SAR		0.035			0.04		
		10g SAR		0.022			0.02		
		Deviation		-0.08			-0.08		
	Right Tilt	1g SAR		0.025			0.03		
		10g SAR		0.016			0.02		
		Deviation		0.08			0.08		
	GSM SKU2	Left Cheek	1g SAR		0.069			0.07	
10g SAR				0.042			0.04		
Deviation				-0.07			-0.07		

Table 14-5 PCS1900 #1 Body

PCS1900 #1 Body									
Ambient Temperature:			22.5			Liquid Temperature:			22.3
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]			
			CH810 1909.8	CH661 1880 MHz	CH512 1850.2	CH810 1909.8	CH661 1880 MHz	CH512 1850.2	
GPRS 4 Txslots	Tune-up		27.00	27.00	27.00	Scaling factor*			
	Slot Average Power [dBm]		26.79	26.71	26.70	1.05	1.07	1.07	
	Rear 12mm	1g SAR	0.667	0.513	0.475	0.70	0.55	0.51	
		10g SAR	0.372	0.289	0.266	0.39	0.31	0.28	
		Deviation	-0.12	0.03	0.02	-0.12	0.03	0.02	
	Left edge 5mm	1g SAR		0.238			0.25		
		10g SAR		0.136			0.15		
		Deviation		0.12			0.12		
	Bottom edge 12mm	1g SAR		0.247			0.26		
		10g SAR		0.139			0.15		
		Deviation		0.06			0.06		
	EGPRS GMSK 4 Txslots	Tune-up		27.00	27.00	27.00	Scaling factor*		
		Slot Average Power [dBm]		26.75	26.68	26.68	1.06	1.08	1.08
		Rear 12mm	1g SAR	0.654			0.69		
			10g SAR	0.368			0.39		
Deviation	0.04				0.04				
GPRS 4 Txslots SKU2	Rear 12mm	1g SAR	0.659			0.69			
		10g SAR	0.369			0.39			
		Deviation	-0.03			-0.03			

Table 14-6 PCS1900 #2 Body

PCS1900 #2 Body								
Ambient Temperature: 22.5					Liquid Temperature: 22.3			
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]		
			CH810 1909.8	CH661 1880 MHz	CH512 1850.2	CH810 1909.8	CH661 1880 MHz	CH512 1850.2
GPRS 3 Txslots	Tune-up		20.00	20.00	20.00	Scaling factor*		
	Slot Average Power [dBm]		19.17	19.08	19.02	1.21	1.24	1.25
	Rear 0mm	1g SAR	0.43	0.39	0.403	0.52	0.48	0.50
		10g SAR	0.212	0.218	0.202	0.26	0.27	0.25
		Deviation	0.07	0.06	0.09	0.07	0.06	0.09
	Left edge 0mm	1g SAR		0.114			0.14	
		10g SAR		0.059			0.07	
		Deviation		0.06			0.06	
	Bottom edge 0mm	1g SAR		0.201			0.25	
		10g SAR		0.089			0.11	
		Deviation		0.09			0.09	

Table 14-7 WCDMA1900-BII #1Head

WCDMA1900-BII #1Head									
Ambient Temperature: 22.5					Liquid Temperature: 22.3				
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]			
			CH9538 1907.6 MHz	CH9400 1880 MHz	CH9262 1852.4 MHz	CH9538 1907.6 MHz	CH9400 1880 MHz	CH9262 1852.4 MHz	
RMC	Tune-up		24.50	24.50	24.50	Scaling factor*			
	Slot Average Power [dBm]		24.04	24.27	24.07	1.11	1.05	1.10	
	Left Cheek	1g SAR	0.201	0.292	0.202	0.22	0.31	0.22	
		10g SAR	0.124	0.186	0.123	0.14	0.20	0.14	
		Deviation	0.09	0.01	0.02	0.09	0.01	0.02	
	Left Tilt	1g SAR		0.106			0.11		
		10g SAR		0.068			0.07		
		Deviation		-0.09			-0.09		
	Right Cheek	1g SAR		0.188			0.20		
		10g SAR		0.121			0.13		
		Deviation		0.07			0.07		
	Right Tilt	1g SAR		0.135			0.14		
		10g SAR		0.082			0.09		
		Deviation		-0.07			-0.07		
	RMC SKU2	Left Cheek	1g SAR		0.278			0.29	
			10g SAR		0.176			0.19	
			Deviation		0.03			0.03	

Table 14-8 WCDMA1900-BII #1Body

WCDMA1900-BII #1Body								
Ambient Temperature: 22.5					Liquid Temperature: 22.3			
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]		
			CH9538 1907.6 MHz	CH9400 1880 MHz	CH9262 1852.4 MHz	CH9538 1907.6 MHz	CH9400 1880 MHz	CH9262 1852.4 MHz
RMC	Tune-up		24.50	24.50	24.50	Scaling factor*		
	Slot Average Power [dBm]		24.04	24.27	24.07	1.11	1.05	1.10
	Rear 12mm	1g SAR	0.915	0.968	0.77	1.02	1.02	0.85
		10g SAR	0.501	0.537	0.436	0.56	0.57	0.48
		Deviation	-0.06	-0.06	0.01	-0.06	-0.06	0.01
	Left edge 5mm	1g SAR		0.42			0.44	
		10g SAR		0.245			0.26	
		Deviation		0.03			0.03	
	Bottom edge 12mm	1g SAR		0.359			0.38	
		10g SAR		0.208			0.22	
		Deviation		0.08			0.08	

Table 14-9 WCDMA1900-BII #2Body

WCDMA1900-BII #2Body									
Ambient Temperature:			22.5			Liquid Temperature:			22.3
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]			
			CH9538 1907.6 MHz	CH9400 1880 MHz	CH9262 1852.4 MHz	CH9538 1907.6 MHz	CH9400 1880 MHz	CH9262 1852.4 MHz	
RMC	Tune-up		17.50	17.50	17.50	Scaling factor*			
	Slot Average Power [dBm]		16.09	15.94	15.82	1.38	1.43	1.47	
	Rear 0mm	1g SAR	0.673	0.809	0.587	0.93	1.16	0.86	
		10g SAR	0.364	0.405	0.325	0.50	0.58	0.48	
		Deviation	0.06	-0.03	0.01	0.06	-0.03	0.01	
	Left edge 0mm	1g SAR		0.204			0.29		
		10g SAR		0.108			0.15		
		Deviation		0.04			0.04		
	Bottom edge 0mm	1g SAR		0.506			0.72		
		10g SAR		0.203			0.29		
		Deviation		0.05			0.05		
	RMC SKU2	Rear 0mm	1g SAR		0.798			1.14	
10g SAR				0.39			0.56		
Deviation				0.02			0.02		

Table 14-10 WCDMA850-BV #1Head

WCDMA850-BV #1Head									
Ambient Temperature:			22.5			Liquid Temperature:			22.3
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]			
			CH4233 846.6 MHz	CH4182 835.4 MHz	CH4132 826.4 MHz	CH4233 846.6 MHz	CH4182 835.4 MHz	CH4132 826.4 MHz	
RMC	Tune-up		24.50	24.50	24.50	Scaling factor*			
	Slot Average Power [dBm]		24.12	24.11	24.09	1.09	1.09	1.10	
	Left Cheek	1g SAR		0.14			0.15		
		10g SAR		0.114			0.12		
		Deviation		0.06			0.06		
	Left Tilt	1g SAR		0.11			0.12		
		10g SAR		0.091			0.10		
		Deviation		-0.02			-0.02		
	Right Cheek	1g SAR	0.214	0.16	0.196	0.23	0.18	0.22	
		10g SAR	0.164	0.122	0.15	0.18	0.13	0.16	
		Deviation	0.12	0.05	0.01	0.12	0.05	0.01	
	Right Tilt	1g SAR		0.085			0.09		
10g SAR			0.068			0.07			
Deviation			0.04			0.04			
RMC SKU2	Right Cheek	1g SAR	0.206			0.22			
		10g SAR	0.157			0.17			
		Deviation	-0.02			-0.02			

Table 14-11 WCDMA850-BV #1Body

WCDMA850-BV #1Body								
Ambient Temperature: 22.5					Liquid Temperature: 22.3			
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]		
			CH4233 846.6 MHz	CH4182 835.4 MHz	CH4132 826.4 MHz	CH4233 846.6 MHz	CH4182 835.4 MHz	CH4132 826.4 MHz
RMC	Tune-up		24.50	24.50	24.50	Scaling factor*		
	Slot Average Power [dBm]		24.12	24.11	24.09	1.09	1.09	1.10
	Rear 12mm	1g SAR	0.672	0.663	0.648	0.73	0.73	0.71
		10g SAR	0.454	0.379	0.438	0.50	0.41	0.48
		Deviation	-0.08	0.08	0.09	-0.08	0.08	0.09
	Left edge 5mm	1g SAR		0.366			0.40	
		10g SAR		0.217			0.24	
		Deviation		0.08			0.08	
	Bottom edge 12mm	1g SAR		0.298			0.33	
		10g SAR		0.178			0.19	
Deviation			0.04			0.04		
RMC SKU2	Rear 12mm	1g SAR	0.663			0.72		
		10g SAR	0.45			0.49		
		Deviation	0.02			0.02		

Table 14-12 WCDMA850-BV #2Body

WCDMA850-BV #2Body								
Ambient Temperature: 22.5					Liquid Temperature: 22.3			
Mode	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]		
			CH4233 846.6 MHz	CH4182 835.4 MHz	CH4132 826.4 MHz	CH4233 846.6 MHz	CH4182 835.4 MHz	CH4132 826.4 MHz
RMC	Tune-up		17.50	17.50	17.50	Scaling factor*		
	Slot Average Power [dBm]		17.22	17.22	17.01	1.07	1.07	1.12
	Rear 0mm	1g SAR	0.422	0.409	0.304	0.45	0.44	0.34
		10g SAR	0.236	0.233	0.13	0.25	0.25	0.15
		Deviation	0.07	0.08	0.02	0.07	0.08	0.02
	Left edge 0mm	1g SAR		0.189			0.20	
		10g SAR		0.11			0.12	
		Deviation		0.01			0.01	
	Bottom edge 0mm	1g SAR		0.243			0.26	
		10g SAR		0.133			0.14	
Deviation			0.18			0.18		

14.2 Full SAR

Test Band	Channel	Frequency	Tune-Up	Measured Power	Test Position	Measured 10g SAR	Measured 1g SAR	Reported 10g SAR	Reported 1g SAR	Power Drift	Figure
GSM850	251	848.8 MHz	34	33.10	Right Cheek	0.189	0.248	0.23	0.31	0.06	Fig A.1
GSM850	128	824.2 MHz	30	29.49	Rear 12mm	0.545	0.8	0.61	0.90	0.05	Fig A.2
PCS1900	661	1880 MHz	30.5	30.23	Left Cheek	0.043	0.071	0.05	0.08	0.04	Fig A.3
PCS1900	810	1909.8 MHz	27	26.79	Rear 12mm	0.372	0.667	0.39	0.70	-0.12	Fig A.4
WCDMA1900-BII	9400	1880 MHz	24.5	24.27	Left Cheek	0.186	0.292	0.20	0.31	0.01	Fig A.5
WCDMA1900-BII	9400	1880 MHz	17.5	15.94	Rear 0mm	0.405	0.809	0.58	1.16	-0.03	Fig A.6
WCDMA850-BV	4233	846.6 MHz	24.5	24.12	Right Cheek	0.164	0.214	0.18	0.23	0.12	Fig A.7
WCDMA850-BV	4233	846.6 MHz	24.5	24.12	Rear 12mm	0.454	0.672	0.50	0.73	-0.08	Fig A.8

14.3 WLAN Evaluation

According to the KDB248227 D01, SAR is measured for 802.11b DSSS using the initial test position procedure.

Note1: When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest estimated 1-g SAR conditions determined by area scans, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg.

Note2: For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

Note3: According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

Table 14-13 WLAN2450 #1 Body Fast SAR

WLAN2450 #1 Body Fast SAR								
Ambient Temperature: 22.5				Liquid Temperature: 22.3				
Rate	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]		
			11 2462 MHz	6 2437 MHz	1 2412 MHz	11	6	1
802.11b 5.5Mbps	Tune up		17	17	17	Scaling factor*		
	Slot Average Power [dBm]		16.19	16.24	16.31	1.21	1.19	1.17
	Rear 5mm	1g Fast SAR			0.419			0.49
		10g SAR			0.189			0.22
		Deviation			0.03			0.03
	Left edge 0mm	1g Fast SAR			0.424			0.50
		10g SAR			0.186			0.22
		Deviation			-0.07			-0.07
	Top edge 4mm	1g Fast SAR			0.27			0.32
		10g SAR			0.122			0.14
Deviation				0.09			0.09	
802.11b 5.5Mbps SKU2	Left edge 0mm	1g Fast SAR			0.413			0.48
		10g SAR			0.173			0.20
		Deviation			0.14			0.14

Table 14-14 WLAN2450 #1 Body Full SAR

WLAN2450 #1 Body Full SAR								
Ambient Temperature: 22.5				Liquid Temperature: 22.3				
Rate	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]		
			11 2462 MHz	6 2437 MHz	1 2412 MHz	11	6	1
802.11b 5.5Mbps	Tune up		17	17	17	Scaling factor*		
	Slot Average Power [dBm]		16.19	16.24	16.31	1.21	1.19	1.17
	Rear 5mm	1g Full SAR			0.409			0.48
		10g SAR			0.187			0.22
		Deviation			0.03			0.03
	Left edge 0mm	1g Full SAR			0.436			0.51
		10g SAR			0.198			0.23
		Deviation			-0.07			-0.07

Table 14-15 WLAN2450 #2 Head Fast SAR

WLAN2450 #2 Head Fast SAR								
Ambient Temperature: 22.5						Liquid Temperature: 22.3		
Rate	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]		
			11 2462 MHz	6 2437 MHz	1 2412 MHz	11	6	1
802.11b 1Mbps	Tune up		11	11	11	Scaling factor*		
	Slot Average Power [dBm]		10.33	10.50	10.64	1.17	1.12	1.09
	Left Cheek	1g Fast SAR			0.038			0.04
		10g SAR			0.023			0.02
		Deviation			0.02			0.02
	Left Tilt	1g Fast SAR			0.041			0.04
		10g SAR			0.023			0.02
		Deviation			-0.03			-0.03
	Right Cheek	1g Fast SAR			0.173			0.19
		10g SAR			0.089			0.10
		Deviation			0.07			0.07
	Right Tilt	1g Fast SAR			0.104			0.11
10g SAR				0.057			0.06	
Deviation				-0.02			-0.02	
802.11b 1Mbps SKU2	Right Cheek	1g Fast SAR			0.169		0.18	
		10g SAR			0.085		0.09	
		Deviation			0.06		0.06	

Table 14-16 WLAN2450 #2 Head Full SAR

WLAN2450 #2 Head Full SAR								
Ambient Temperature: 22.5						Liquid Temperature: 22.3		
Rate	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]		
			11 2462 MHz	6 2437 MHz	1 2412 MHz	11	6	1
802.11b 1Mbps	Tune up		11	11	11	Scaling factor*		
	Slot Average Power [dBm]		10.33	10.50	10.64	1.17	1.12	1.09
	Right Cheek	1g Full SAR			0.182			0.20
		10g SAR			0.086			0.09
		Deviation			0.07			0.07

Table 14-17 WLAN2450 #2 Body Fast SAR

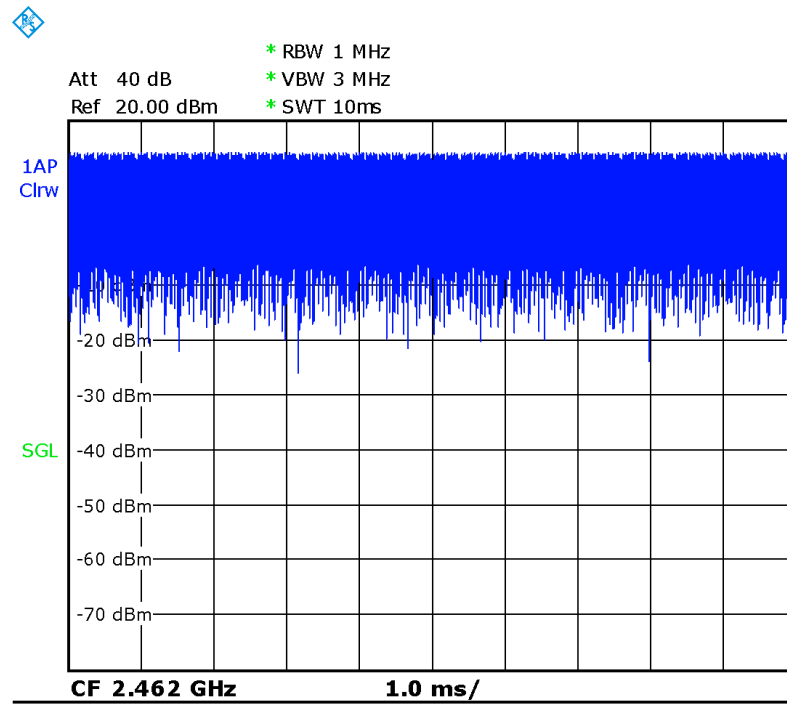
WLAN2450 #2 Body Fast SAR								
Ambient Temperature: 22.5						Liquid Temperature: 22.3		
Rate	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]		
			11 2462 MHz	6 2437 MHz	1 2412 MHz	11	6	1
802.11b 1Mbps	Tune up		11	11	11	Scaling factor*		
	Slot Average Power [dBm]		10.33	10.50	10.64	1.17	1.12	1.09
	Rear 0mm	1g Fast SAR			0.31			0.34
		10g SAR			0.135			0.15
		Deviation			0.09			0.09
	Top edge 0mm	1g Fast SAR			0.075			0.08
		10g SAR			0.035			0.04
		Deviation			-0.01			-0.01



Table 14-18 WLAN2450 #2 Body Full SAR

WLAN2450 #2 Body Full SAR								
Ambient Temperature: 22.5				Liquid Temperature: 22.3				
Rate	Device orientation	SAR measurement	Measured SAR [W/kg]			Reported SAR [W/kg]		
			11 2462 MHz	6 2437 MHz	1 2412 MHz	11	6	1
802.11b 1Mbps	Tune up		11	11	11	Scaling factor*		
	Slot Average Power [dBm]		10.33	10.50	10.64	1.17	1.12	1.09
	Rear 0mm	1g Full SAR			0.382			0.42
		10g SAR			0.142			0.15
		Deviation			0.09			0.09
	Top edge 0mm	1g Full SAR			0.084			0.09
		10g SAR			0.041			0.04
		Deviation			-0.01			-0.01

SAR is not required for OFDM because the 802.11b adjusted SAR \leq 1.2 W/kg.



Picture 14.1 Duty factor plot

15 SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

Mode	CH	Freq	Test Position	Original SAR (W/kg)	First Repeated SAR(W/kg)	The Ratio
WCDMA1900-BII	9400	1880 MHz	Rear 0mm	0.809	0.804	1.01

16 Measurement Uncertainty

16.1 Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.0	N	1	1	1	6.0	6.0	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	N	1	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521

Combined standard uncertainty	$u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						9.55	9.43	257
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$						19.1	18.9	

16.2 Measurement Uncertainty for Normal SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.55	N	1	1	1	6.55	6.55	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	∞
13	Post-processing	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞

	(target)									
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						10.7	10.6	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						21.4	21.1	

16.3 Measurement Uncertainty for Fast SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.0	N	1	1	1	6.0	6.0	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RF ambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. Restrictions	B	0.4	R	$\sqrt{3}$	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	$\sqrt{3}$	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	7.0	R	$\sqrt{3}$	1	1	4.0	4.0	∞
Test sample related										
15	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
16	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
17	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
18	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞