SAR Compliance Test Report

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Statement of Compliance: RIM Testing Services declares under its sole responsibility that the product to which this declaration relates, is in conformity with the appropriate RF exposure standards, recommendations and guidelines. It also declares that the product was tested in accordance with the appropriate measurement standards, guidelines and recommended practices.

Device Category: This BlackBerry® Smartphone is a portable device, designed to be used in direct contact with the user's head, hand and to be carried in approved accessories when carried on the user's body.

RF exposure environment: This device has been shown to be in compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in OET Bulletin 65 Supplement C (Edition 01-01), FCC 96-326, IEEE Std. C95.1-2005, Health Canada's Safety Code 6, as reproduced in RSS-102 issue 4-2010 and has been tested in accordance with the measurement procedures specified in FCC OET Procedures, OET Bulletin 65 Supplement C (Edition 01-01), ANSI/IEEE Std. C95.3-2002, IEEE 1528-2003, IEC 62209-1-2005, IEC 62209 - 2-2010 and Health Canada's Safety Code 6.

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SCC Accredited LAB
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1.0 OPERATING CONFIGURATIONS AND TEST CONDITIONS

1.1 Picture of Device

Please refer to Appendix E.

Figure 1.1.1 BlackBerry Smartphone

1.2 Antenna description

Type	Internal fixed antenna
Location	Back bottom centre (main licensed transmitters)
Configuration	Internal fixed antenna

Table 1.2.1. Antenna description

1.3 Device description

Device Model	RFF91LW			
FCC ID	L6ARFF90LW			
PIN	Radiated: 2A20270D, 2A211C01, 2A8C7018 Conducted: 2A202C27, 2A8C7031			
Hardware Rev	Rev 1, Rev 2			
Software Version	127.0.1.871; 127.0.1.1192; 10.0.06.219; 10.0.9.299; 10.0.9.728; 127.0.1.1845, 127.0.1.1651			
Prototype or Production Unit	Production			
Mode(s) of Operation	1-slot GSM 850 GSM 1900	2-slots EDGE/GPRS 850/1900	3-slots EDGE/GPRS 850/1900	4-slots EDGE/GPRS 850/1900
Nominal Maximum conducted RF Output Power (dBm)	33.0 30.0	30.0 28.0	29.5 25.5	27.0 25.0
Tolerance in Power Setting on centre channel (dB)	± 0.5	± 0.5	± 0.5	± 0.5
Duty Cycle	1:8	2:8	3:8	4:8
Transmitting Frequency Range (MHz)	824.2 – 848.8 1850.2 – 1909.8	824.2 – 848.8 1850.2 – 1909.8	824.2 – 848.8 1850.2 – 1909.8	824.2 – 848.8 1850.2 – 1909.8
Mode(s) of Operation	HSPA+ WCDMA/UMTS FDD V (850)	HSPA+ WCDMA/UMTS FDD II (1900)	802.11b	802.11g
Nominal Maximum conducted RF Output Power (dBm)	24.5	23.5	18.50	16.5
Tolerance in Power Setting on centre channel (dB)	± 0.5	± 0.5	± 0.5	± 0.5

Duty Cycle	1:1	1:1	1:1	1:1
Transmitting Frequency Range (MHz)	824.6 – 846.6	1852.4 – 1907.6	2412-2462	2412-2462
Mode(s) of Operation	802.11n	802.11a/n (low band)	802.11a/n (middle band)	802.11a/n (upper band I)
Nominal Maximum conducted RF Output Power (dBm)	16.5	13.0	14.5	14.5
Tolerance in Power Setting on centre channel (dB)	± 0.5	± 0.5	± 0.5	± 0.5
Duty Cycle	1:1	1:1	1:1	1:1
Transmitting Frequency Range (MHz)	2412-2462	5180-5240	5260-5320	5500-5700
Mode(s) of Operation	802.11a/n (upper band II)	Bluetooth	NFC	
Nominal Maximum conducted RF Output Power (dBm)	13.0	8.00	N/A	
Tolerance in Power Setting on centre channel (dB)	± 0.5	N/A	N/A	
Duty Cycle	1:1	N/A	N/A	
Transmitting Frequency Range (MHz)	5749-5825	2402-2483	13.56	

Table 1.3.1a. Test device characterization non-LTE U.S. wireless operating modes/bands

Note 1: SAR measurements on NFC haven't been conducted, since it is very low power and frequency magnetic field transceiver. SAR probes measure higher frequency/power electric field.

Device Model	RFF91LW			
FCC ID	L6ARFF90LW			
PIN	Radiated: 2A20270D, 2A211C01, 2A8C7018 Conducted: 2A202C27, 2A8C7031			
Hardware Rev	Rev 1, Rev 2			
Software Version	127.0.1.871; 127.0.1.1192; 10.0.06.219; 10.0.9.299; 10.0.9.728; 127.0.1.1845, 127.0.1.1651			
Prototype or Production Unit	Production			
Transmission channel bandwidth	Band 17: 5 MHz, 10 MHz Band 5: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz Band 4: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz Band 2: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz			
Transmission channel number and frequencies				
	LTE band 17		**LTE band 5**	
	Chan.	**f (MHz)**	**Chan.**	**f (MHz)**
L	23730	704	20400	824
L[2]	23780	709	20450	829
M	23790	710	20525	836.5
H[2]	23800	711	20600	844.0
H	23849	715.9	20649	848.9

	LTE band 4		**LTE band 2**	
	Chan.	**f (MHz)**	**Chan.**	**f (MHz)**
L	19950	1710	18600	1850
L[2]	20050	1720	18700	1960
M	20175	1732.5	18900	1880
H[2]	20300	1745	19100	1900
H	20399	1754.9	19199	1909.9

UE Category	Category 3	
Modulation supported in uplink	QPSK, 16QAM	
Description of LTE antenna	1 Tx/Rx Ant, Sharing with GSM/UMTS; 1 Rx Diversity	
LTE voice available/supported	Third party VOIP application possible	
Hotspot with LTE+WiFi	Yes	
Hotspot with LTE+WiFi active with GSM//WCDMA voice	Yes	
LTE MPR permanently built-in by design	Yes	
LTE A-MPR	Disabled during SAR testing , by setting NV value to NV_01 on the CMW500	
LTE maximum average power (dBm)	Band 17: 24.5 dBm Band 5: 23.5 dBm Band 4: 23.0 dBm Band 2: 23.0 dBm	
Other non-LTE U.S. wireless operating modes/bands	GSM//WCDMA/HSPA+	835 MHz GSM 1900 MHz GSM 835 MHz WCDMA band V 1900 MHz WCDMA band II
	WiFi and BT	2.4 GHz Wi-Fi 5 GHz Wi-Fi 2.4 GHz BT
Simultaneous Tx conditions	Please refer to section 1.9: Highlights of the FCC OET SAR Evaluation Considerations for Handsets with Multiple Transmitters/ Antennas & GSM/GPRS/EDGE Procedure.	
Power reduction applied for SAR/HAC compliance	No	

Table 1.3.2a. Test device characterization all U.S. wireless operating modes/bands

Note 2: As per 3GPP TS 36.521-1 V10.0.0 (2011-12):

"The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively."…5.4.4

Example: Band 4, 20 MHz BW, Low Channel would be 19950+100=20050 and High Channel would be 20399-99 = 20300.

1.4 Body worn accessories (holsters)

The device has been tested with the first holster listed below. The holster has been designed with the intended device orientation being with the LCD facing the belt clip only. Proper positioning is vital for protection of the LCD display, and to help maximize the battery life of the device. The device can also be placed in the holster with the backside facing the belt clip. Body SAR measurements were carried out with the worst-case configuration front LCD side and backside towards the belt clip.

Number	Holster Type	Part Number	Separation distance (mm)
1	Vertical Holster	HDW-49270-001	19
2	Vertical Holster, Black Leather	HDW-49272-001	19

Table 1.4.1. Body worn holster

Note: both holsters have identical design, except for different leather material being used.

Please refer to Appendix E.
Figure 1.4.1. Body-worn holster

1.5 Headset

The device was tested with and without the following headset model numbers.

1) HDW-14322-003
2) HDW-15766-005
3) HDW-44306-001

1.6 Battery

The device was tested with the following Lithium Ion Battery pack.

1) BAT-47277-001

1.7 Procedure used to establish test signal

- The device was put into test mode for SAR measurements by placing a call from a Rohde & Schwarz CMU 200 or CMW 500 Communications Test Instrument. The power control level was set to command the device to transmit at full power at the specified frequency. Other parameters include: Channel type = full rate, discontinuous transmission off, frequency hopping off. For LTE specific bandwidths, number of resource blocks, and resource block offsets were set.
- Software Tool was used to set WiFi to transmit at maximum power and duty cycle for each band, channel, and modulation.

1.8 Highlights of the FCC OET SAR Measurement Requirements

1.8.1 SAR Measurement Procedures for 802.11 a/b/g/n Transmitter

• Maintained dielectric parameter uncertainty to ± 5.0% of the target values, (although it is very challenging to control/maintain both permittivity and conductivity for 5-6 GHz for all test channels within ± 5.0% of the target values, some conductivity values were measured slightly higher which resulted in more conservative SAR values.)
• Liquid depth from SAM ERP or flat phantom was kept at 15 cm.
• Probe Requirement: Used SPEAG probe model ET3DV6/ES3DV3 for 2.45 GHz and EX3DV4 for 5-6 GHz SAR testing specs are outlined below:

ET3DV6/ES3DV3	
Probe tip to sensor center	2.7 mm / 2.0 mm
Probe tip diameter is	6.8 mm / 4.0 mm
Probe calibration uncertainty	< 15 % for f = 2.45 GHz
Probe calibration range	± 100 MHz
EX3DV4	
Probe tip to sensor center	1.0 mm
Probe tip diameter is	2.5 mm
Probe calibration uncertainty	< 15 % for f = 2.45 to < 6.0 GHz
Probe calibration range	± 100 MHz

Table 1.8.1. Probe specification requirements

• Area scan resolution was maintained at 10mm (5-6 GHz).
• System accuracy validation was conducted within ± 100 MHz of device mid-band frequency and results were within ± 10 % of the manufacturers target value for each band.
• Zoom Scan: The following settings were used for the validation and measurement.

ET3DV6/ES3DV3	
Closet Measurement Point to Phantom	4.0 mm
Zoom Scan (x,y) Resolution	7.5 mm
Zoom Scan (z) Resolution	5.0 mm
Zoom Scan Volume	Minimum 30 x 30 x 30 mm[1]
EX3DV4	
Closet Measurement Point to Phantom	2.0 mm
Zoom Scan (x,y) Resolution	4.0 mm or 3 mm
Zoom Scan (z) Resolution	2.5 mm or 2 mm
Zoom Scan Volume	Minimum 24 x 24 x 20 mm[1]

Table 1.8.2. Zoom Scan requirement

Note 1: "Auto-extend zoom scan when maxima on boundary" is enabled, which can result in the zoom scan dimensions varying between 30x30x30 to 60x60x30 mm and 24x24x20 to 48x40x20 mm.

- Frequency Channel Configuration: 802.11 b/g modes are tested on "default test channels" 1, 6 and 11.
- 802.11a is tested for UNII operations on the highest output power channel of each sub band (low, mid, upper band I, and upper band II). If the highest output power channel has a SAR level that is not 3dB lower than the limit, then the low, mid, and high channels of each sub band must also be tested.
- For each frequency band, testing at higher rates and higher modulations is not required when the maximum average output power for each of these configurations is less than ¼ dB higher than those measured at the lowest data rate.
- SAR is not required for 802.11g/n channels when the maximum average output power is less than ¼ dB higher than that measured on the corresponding 802.11b channels.
- SAR test was conducted on each "default test channel" and each band with the worst case modulation and highest duty cycle, if the SAR level was within 3dB of the limit.
- Conducted power measurements:

802.11b @ 1Mbps		802.11g @ 6Mbps		802.11n @ 6.5 Mbps	
Chan	**Cond. Power (dBm)**	**Chan**	**Cond. Power (dBm)**	**Chan**	**Cond. Power (dBm)**
1	18.5	1	12.3	1	12.2
6	**18.6**	6	16.8	6	16.7
11	18.0	11	12.9	11	12.8

		802.11g			802.11b
Data Rate (Mbps)	**Mod.**	**Channel 6 Cond. Power (dBm)**	**Data Rate (Mbps)**	**Mod.**	**Channel 6 Cond. Power (dBm)**
6	BPSK	16.8	1	BPSK	18.6
9	BPSK	16.7	2	DQPSK	18.6
12	QPSK	16.7	5.5	CCK	18.3
18	QPSK	16.4	11	CCK	18.4
24	16-QAM	15.9	22	CCK	
36	16-QAM	15.6			
48	64-QAM	13.5			
54	64-QAM	13.3			

		802.11 n
Data Rate (Mbps)	**Mod.**	**Channel 6 Cond. Power (dBm)**
6.5	MCS0	16.7
13	MCS1	16.5
19.5	MCS2	16.4
26	MCS3	15.7
39	MCS4	15.5
52	MCS5	13.2
58.5	MCS6	13.2
65	MCS7	11.0

Table 1.8.3a. 802.11 b/g/n modulation type/data rate vs. conducted power with Mobile Hotspot mode enabled and disabled
Rev 1

802.11b @ 1Mbps		802.11g @ 6Mbps		802.11n @ 6.5 Mbps	
Chan	**Cond. Power (dBm)**	**Chan**	**Cond. Power (dBm)**	**Chan**	**Cond. Power (dBm)**
1	**19.70**	1	13.02	1	12.90
6	19.52	6	17.52	6	17.40
11	19.50	11	14.00	11	13.73

		802.11g			802.11b
Data Rate (Mbps)	**Mod.**	**Channel 6**	**Data Rate (Mbps)**	**Mod.**	**Channel 1**
		Cond. Power (dBm)			**Cond. Power (dBm)**
6	BPSK	17.52	1	BPSK	19.70
9	BPSK	17.46	2	DQPSK	19.70
12	QPSK	17.33	5.5	CCK	19.34
18	QPSK	17.28	11	CCK	19.20
24	16-QAM	16.62	22	CCK	
36	16-QAM	16.31			
48	64-QAM	14.16			
54	64-QAM	13.94			

		802.11 n
Data Rate (Mbps)	**Mod.**	**Channel 6**
		Cond. Power (dBm)
6.5	MCS0	17.40
13	MCS1	16.93
19.5	MCS2	16.84
26	MCS3	15.63
39	MCS4	15.40
52	MCS5	14.03
58.5	MCS6	13.72
65	MCS7	11.73

Table 1.8.3b. 802.11 b/g/n modulation type/data rate vs. conducted power with Mobile Hotspot mode enabled and disabled
Rev 2

802.11a (low band) 6Mbps			802.11a (mid band) 6Mbps			802.11a (upper band I) 6Mbps		
Chan	**f (MHz)**	**Cond. Power (dBm)**	**Chan**	**f (MHz)**	**Cond. Power (dBm)**	**Chan**	**f (MHz)**	**Cond. Power (dBm)**
36	5180	13.2	52	5260	14.5	**104**	**5520**	**15.0**
40	5200	13.1	56	5280	14.7	116	5580	14.9
44	5220	13.3	**60**	**5300**	**14.9**	124	5620	14.9
48	**5240**	**13.4**	64	5320	14.8	140	5700	14.4

802.11a (upper band II) 6Mbps		
Chan	**f (MHz)**	**Cond. Power (dBm)**
149	**5745**	**13.5**
153	5765	13.4
157	5785	13.2
161	5805	12.9
165	5825	10.2

		802.11a (lower band)	802.11a (middle band)	802.11a (upper band I)	802.11a (upper band II)
Data Rate (Mbits)	**Mod.**	**Channel 48**	**Channel 52**	**Channel 104**	**Channel 149**
		Cond. Power (dBm)	**Cond. Power (dBm)**	**Cond. Power (dBm)**	**Cond. Power (dBm)**
6	BPSK	13.4	14.5	15.0	13.5
9	BPSK	13.4	14.4	15.0	13.5
12	QPSK	13.2	14.2	14.9	13.4
18	QPSK	13.2	14.2	14.9	13.4
24	16-QAM	13.0	14.0	14.7	13.2
36	16-QAM	12.7	13.8	14.2	12.8
48	64-QAM	12.0	12.0	12.5	11.0
54	64-QAM	11.9	11.9	12.3	10.7

	802.11n (lower band)	802.11n (middle band)	802.11n (upper band I)	802.11n (upper band II)
Mod.	**Channel 48**	**Channel 52**	**Channel 104**	**Channel 149**
	Cond. Power (dBm)	**Cond. Power (dBm)**	**Cond. Power (dBm)**	**Cond. Power (dBm)**
MCS0	13.2	14.4	15.0	13.5
MCS1	13.1	14.2	14.8	13.3
MCS2	12.8	14.2	14.7	12.7
MCS3	12.9	13.9	14.5	13.0
MCS4	12.5	13.7	14.2	12.7
MCS5	11.7	11.8	12.4	10.9
MCS6	11.7	11.8	12.1	10.8
MCS7	8.1	8.1	8.4	7.1

Table 1.8.4a. 802.11 a/n modulation type/data rate vs. conducted power
Rev 1

802.11a (low band) 6Mbps			802.11a (mid band) 6Mbps			802.11a (upper band I) 6Mbps		
Chan	**f (MHz)**	**Cond. Power (dBm)**	**Chan**	**f (MHz)**	**Cond. Power (dBm)**	**Chan**	**f (MHz)**	**Cond. Power (dBm)**
36	5180	13.2	52	5260	14.5	**104**	**5520**	**15.7**
40	5200	13.1	56	5280	14.7	116	5580	15.7
44	5220	13.3	**60**	**5300**	**14.9**	124	5620	15.5
48	**5240**	**13.4**	64	5320	14.8	140	5700	15.0

802.11a (upper band II) 6Mbps		
Chan	**f (MHz)**	**Cond. Power (dBm)**
149	**5745**	**14.1**
153	5765	13.9
157	5785	13.7
161	5805	13.6
165	5825	10.8

		802.11a (lower band)	802.11a (middle band)	802.11a (upper band I)	802.11a (upper band II)
Data Rate (Mbits)	**Mod.**	**Channel 48**	**Channel 52**	**Channel 104**	**Channel 149**
		Cond. Power (dBm)	**Cond. Power (dBm)**	**Cond. Power (dBm)**	**Cond. Power (dBm)**
6	BPSK	13.4	14.5	15.7	14.1
9	BPSK	13.4	14.4	15.7	14.0
12	QPSK	13.2	14.2	15.6	13.9
18	QPSK	13.2	14.2	15.6	13.8
24	16-QAM	13.0	14.0	15.3	13.5
36	16-QAM	12.7	13.8	15.0	13.4
48	64-QAM	12.0	12.0	13.3	11.6
54	64-QAM	11.9	11.9	13.3	11.3

	802.11n (lower band)	802.11n (middle band)	802.11n (upper band I)	802.11n (upper band II)
Mod.	**Channel 48**	**Channel 52**	**Channel 104**	**Channel 149**
	Cond. Power (dBm)	**Cond. Power (dBm)**	**Cond. Power (dBm)**	**Cond. Power (dBm)**
MCS0	13.2	14.4	15.4	13.9
MCS1	13.1	14.2	13.2	11.6
MCS2	12.8	14.2	15.6	14.0
MCS3	12.9	13.9	15.3	13.8
MCS4	12.5	13.7	15.6	14.1
MCS5	11.7	11.8	15.6	14.0
MCS6	11.7	11.8	15.6	14.0
MCS7	8.1	8.1	15.3	13.8

Table 1.8.4b. 802.11 a/n modulation type/data rate vs. conducted power
Rev 2

1.8.2 SAR Measurement Requirements for Bluetooth

Channel	Freq (MHz)	Mode	Conducted Transmit Power (dBm)
0	2402	DH5	8.11
39	2441	DH5	7.68
78	2480	DH5	6.60

Table 1.8.5a. Bluetooth peak conducted power measurements with Mobile Hotspot mode enabled and disabled

1.8.3 SAR Measurement Procedures for 3G Devices

WCDMA Handsets

Output Power Verification

- Maximum output power is verified on the High, Middle and Low channels using 12.2 kbps RMC, 12.2 kbps AMR with a 3.4 kbps SRB (signal radio bearer) with TPC (transmit power control) set to all "1's" for WCDMA/HSPA or applying the required inner loop.
- For Release 6 HSPA/Release 7 HSDPA^{+}, output power is measured according to requirements for HS-DPCCH Sub-test 1-4/1-5

Head SAR Measurements

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all "1s". SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than ¼ dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signalling radio bearer) using the exposure configuration that results in the highest SAR for that RF channel in 12.2 RMC.

Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits configured to all "1s". SAR for other spreading codes and multiple $DPDCH_n$, when supported by the DUT, are not required when the maximum average outputs of each RF channel, for each spreading code and $DPDCH_n$ configuration, are less than ¼ dB higher than those measured in 12.2 RMC. Otherwise, SAR is measured on the maximum output channel with an applicable RMC configuration for the corresponding spreading code or $DPDCH_n$ using the exposure configuration that results in the highest SAR with 12.2 RMC.

Handsets with HSPA

Body SAR is not required for handsets with HSPA capabilities, when the maximum average output of each RF channel with HSPA active is less than ¼ dB higher than that measured in 12.2 kbps RMC without HSPA Otherwise, SAR for HSPA is measured using FRC (fixed reference channel) in the body exposure configuration that results in the highest SAR for that RF channel in 12.2kbps RMC.

	Band	FDD V (850)			FDD II (1900)		
	Channel	4132	4182	4233	9262	9400	9538
	Freq (MHz)	826.4	836.4	846.6	1852.4	1880.0	1907.6
Mode	**Subtest**	**Max burst averaged conducted power (dBm)**			**Max burst averaged conducted power (dBm)**		
Rel99	12.2 kbps RMC	24.6	24.7	24.1	23.7	23.8	23.6
Rel99	12.2 kbps, Voice, AMR, SRB 3.4 kbps	24.7	24.7	24.1	23.7	23.8	23.6
Rel6 HSUPA	1	23.1	23.1	22.6	21.9	22.3	22.1
Rel6 HSUPA	2	23.1	23.1	22.5	22.0	22.1	22.0
Rel6 HSUPA	3	23.6	23.7	23.0	22.5	22.6	22.5
Rel6 HSUPA	4	23.4	23.4	23.1	22.4	22.5	22.4
Rel6 HSUPA	5	22.0	22.1	21.5	21.1	21.1	21.0
Rel7 HSDPA^{+}	1	22.4	22.3	22.5	22.1	22.3	22.0
Rel7 HSDPA^{+}	2	22.0	22.0	21.9	21.3	21.5	21.6
Rel7 HSDPA^{+}	3	22.1	22.2	21.8	21.5	21.6	21.7
Rel7 HSDPA^{+}	4	21.6	21.8	21.3	21.1	21.2	21.3

Table 1.8.6a. WCDMA (Rel99) / HSPA/HSPA+ conducted power measurements with Mobile Hotspot mode enabled and disabled
Rev 1

	Band	**FDD V (850)**		
	Channel	4132	4182	4233
	Freq (MHz)	826.4	836.4	846.6
Mode	**Subtest**	**Max burst averaged conducted power (dBm)**		
Rel99	12.2 kbps RMC	24.4	24.6	24.4
Rel99	12.2 kbps, Voice, AMR, SRB 3.4 kbps			
Rel6 HSUPA	1			
Rel6 HSUPA	2			
Rel6 HSUPA	3			
Rel6 HSUPA	4			
Rel6 HSUPA	5			
Rel7 HSDPA+	1	23.5	23.4	23.3
Rel7 HSDPA+	2			
Rel7 HSDPA+	3			

Rel7 HSDPA+	4			
	Band	**FDD II (1900)**		
	Channel	9262	9400	9538
	Freq (MHz)	1852.4	1880.0	1907.6
Mode	**Subtest**	**Max burst averaged conducted power (dBm)**		
Rel99	12.2 kbps RMC	23.6	23.9	23.5
Rel99	12.2 kbps, Voice, AMR, SRB 3.4 kbps			
Rel6 HSUPA	1			
Rel6 HSUPA	2			
Rel6 HSUPA	3			
Rel6 HSUPA	4			
Rel6 HSUPA	5			
Rel7 HSDPA+	1	23.3	23.5	23.1
Rel7 HSDPA+	2			
Rel7 HSDPA+	3			
Rel7 HSDPA+	4			

Table 1.8.6b. WCDMA (Rel99) / HSPA/HSPA+ conducted power measurements with Mobile Hotspot mode disabled
Rev 2

	Band	**FDD II (1900)**		
	Channel	9262	9400	9538
	Freq (MHz)	1852.4	1880.0	1907.6
Mode	**Subtest**	**Max burst averaged conducted power (dBm)**		
Rel99	12.2 kbps RMC	21.6	21.9	21.5
Rel99	12.2 kbps, Voice, AMR, SRB 3.4 kbps			
Rel6 HSUPA	1			
Rel6 HSUPA	2			
Rel6 HSUPA	3			
Rel6 HSUPA	4			
Rel6 HSUPA	5			
Rel7 HSDPA+	1	20.5	20.7	20.2
Rel7 HSDPA+	2			
Rel7 HSDPA+	3			
Rel7 HSDPA+	4			

Table 1.8.6c. WCDMA (Rel99) / HSPA/HSPA+ conducted power measurements with Mobile Hotspot mode enabled
Rev 2

1.8.4 SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

Standalone personal wireless routers and handsets with hotspot mode capabilities must address hand-held and other near-body exposure conditions to show SAR compliance. 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 25 mm from that surface or edge, for the data modes, wireless technologies and frequency bands supporting hotspot mode. The standalone SAR results in each device test orientation must be analyzed for the applicable hotspot mode simultaneous transmission configurations to determine SAR test exclusion and volume scan requirements

1.8.5 SAR Evaluation Procedures for LTE

- QPSK with 50% RB is required for the highest bandwidth (10 MHz or 20 MHz).
- QPSK with 1 RB is required for both channel edges (offset 0 and 49 or offset 0 and 99) for the highest bandwidth (10 MHz or 20 MHz).
- 16QAM with 50% RB is required for the highest bandwidth (10 MHz or 20 MHz).
- 16QAM with 1 RB is required for both channel edges (offset 0 and 49 or offset 0 and 99) for the highest bandwidth (10 MHz or 20 MHz).
- If SAR is > 1.45 W/kg for the highest bandwidth (10 MH or 20 MHz), then 100% RB is required to be tested for the highest bandwidth (10 MHz or 20 MHz).
- If the smaller bandwidth output power is within +/- 0.5 dB of the largest bandwidth output power and the maximum SAR value is < 1.45 W/kg, then SAR test for smaller bandwidth is not required.
- MPR has been implemented permanently by the manufacturer as per 3GPP TS36.101
- A-MPR was disabled for all SAR measurements.
- LTE Head SAR was evaluated to cover third-party VoIP applications.
- Standalone LTE was tested with maximum transmitting power.
- According to "3GPP TS 36.521-1 V10.0.0 (2011-12)":
    - "The channel numbers that designate carrier frequencies so close to the operating band edges that the carrier extends beyond the operating band edge shall not be used. This implies that the first 7, 15, 25, 50, 75 and 100 channel numbers at the lower operating band edge and the last 6, 14, 24, 49, 74 and 99 channel numbers at the upper operating band edge shall not be used for channel bandwidths of 1.4, 3, 5, 10, 15 and 20 MHz respectively."…
    - Example: Band 4, 5 MHz BW, Low Channel will be 19950+25=19975. At the High band that would be 20399-24 = 20375.

Band	LTE Band 17					
Frequency (MHz)	Channel	BW	Modulation	RB Size	RB Offset	Maximum Avg. Power (dBm)
704	23730	10 MHz	QPSK	1	0	23.10
			QPSK	1	49	23.10
			QPSK	25	0	22.20
			QPSK	50	0	22.20
			16QAM	1	0	22.10

			16QAM	1	49	22.10
			16QAM	30	0	21.50
			16QAM	30	20	21.40
709.0	23780	10 MHz	QPSK	1	0	23.00
			QPSK	1	49	23.15
			QPSK	25	0	22.60
			QPSK	50	0	22.57
			16QAM	1	0	22.30
			16QAM	1	49	22.44
			16QAM	30	0	21.31
			16QAM	30	20	21.55
710	23790	10 MHz	QPSK	1	0	23.00
			QPSK	1	49	23.00
			QPSK	25	0	22.40
			QPSK	50	0	22.40
			16QAM	1	0	21.45
			16QAM	1	49	21.46
			16QAM	30	0	21.47
			16QAM	30	20	21.45
711	23800	10 MHz	QPSK	1	0	22.95
			QPSK	1	49	22.89
			QPSK	25	0	22.35
			QPSK	50	0	22.49
			16QAM	1	0	22.15
			16QAM	1	49	22.14
			16QAM	30	0	21.76
			16QAM	30	20	21.56
715.9	23849	10 MHz	QPSK	1	0	21.40
			QPSK	1	49	21.40
			QPSK	25	0	21.40
			QPSK	50	0	21.30
			16QAM	1	0	20.64
			16QAM	1	49	20.64
			16QAM	30	0	20.65
			16QAM	30	20	20.67
710	23790	5 MHz	QPSK	1	0	23.30
			QPSK	1	24	23.30
			QPSK	12	6	23.29
			QPSK	25	0	23.34
			16QAM	1	0	21.80
			16QAM	1	24	21.77
			16QAM	12	0	21.73
			16QAM	25	0	21.65

Table 1.8.7a. LTE band 17 conducted power measurements with Mobile Hotspot mode enabled and disabled Rev 1

Band	LTE Band 17					
Frequency (MHz)	Channel	BW	Modulation	RB Size	RB Offset	Maximum Avg. Power (dBm)
709.0	23780	10 MHz	QPSK	1	0	
			QPSK	1	49	24.8
			QPSK	25	0	
			QPSK	50	0	
			16QAM	1	0	
			16QAM	1	49	23.7
			16QAM	30	0	
			16QAM	30	20	
710	23790	10 MHz	QPSK	1	0	
			QPSK	1	49	24.9
			QPSK	25	0	
			QPSK	50	0	
			16QAM	1	0	
			16QAM	1	49	23.6
			16QAM	30	0	
			16QAM	30	20	
711	23800	10 MHz	QPSK	1	0	
			QPSK	1	49	24.5
			QPSK	25	0	
			QPSK	50	0	
			16QAM	1	0	
			16QAM	1	49	23.7
			16QAM	30	0	
			16QAM	30	20	

Table 1.8.7b. LTE band 17 conducted power measurements with Mobile Hotspot mode enabled and disabled (Rev 2 , BUNDLE 728)

Band	**LTE Band 5**					
Frequency (MHz)	**Channel**	**BW**	**Modulation**	**RB Size**	**RB Offset**	**Maximum Avg. Power (dBm)**
824	20400	10 MHz	QPSK	1	0	23.80
			QPSK	1	49	23.80
			QPSK	25	0	23.10
			QPSK	50	0	23.20
			16QAM	1	0	23.10
			16QAM	1	49	23.00
			16QAM	30	0	22.40
			16QAM	50	0	22.30
829	20450	10 MHz	QPSK	1	0	24.10
			QPSK	1	49	23.64
			QPSK	25	0	22.57
			QPSK	50	0	22.67
			16QAM	1	0	23.51
			16QAM	1	49	23.00
			16QAM	30	0	21.73
			16QAM	50	0	21.83
836.5	20525	10 MHz	QPSK	1	0	23.87
			QPSK	1	49	23.90
			QPSK	25	0	23.10
			QPSK	50	0	23.17
			16QAM	1	0	22.87
			16QAM	1	49	23.30
			16QAM	30	0	22.10
			16QAM	50	0	22.40
844.0	20600	10 MHz	QPSK	1	0	23.81
			QPSK	1	49	23.02
			QPSK	25	0	22.32
			QPSK	50	0	22.25
			16QAM	1	0	22.65
			16QAM	1	49	21.80
			16QAM	30	0	21.47
			16QAM	50	0	21.26
848.9	20649	10 MHz	QPSK	1	0	22.60
			QPSK	1	49	22.50
			QPSK	25	0	22.30
			QPSK	50	0	22.60
			16QAM	1	0	21.94
			16QAM	1	49	21.92
			16QAM	30	0	21.50
			16QAM	50	0	21.90
836.5	20525	5 MHz	QPSK	1	0	23.80
			QPSK	1	24	23.80
			QPSK	12	1	22.90
			QPSK	25	0	23.00
			16QAM	1	0	22.24
			16QAM	1	24	22.10
			16QAM	12	6	22.10
			16QAM	25	0	22.10
836.5	20525	3 MHz	QPSK	1	0	23.80
			QPSK	1	14	23.80
			QPSK	6	9	22.98
			QPSK	15	0	22.90

			16QAM	1	0	22.30
			16QAM	1	5	22.30
			16QAM	6	0	22.10
			16QAM	6	0	22.00
836.5	20525	1.4 MHz	QPSK	1	0	23.80
			QPSK	1	5	23.70
			QPSK	6	0	23.70
			16QAM	1	0	23.10
			16QAM	1	5	23.10
			16QAM	6	0	23.20

Table 1.8.8a. LTE band 5 conducted power measurements with Mobile Hotspot mode enabled and disabled (Rev 1)

Band	LTE Band 5					
Frequency (MHz)	Channel	BW	Modulation	RB Size	RB Offset	Maximum Avg. Power (dBm)
829	20450	10 MHz	QPSK	1	0	23.8
			QPSK	1	49	
			QPSK	25	0	
			QPSK	50	0	
			16QAM	1	0	22.9
			16QAM	1	49	
			16QAM	30	0	
			16QAM	50	0	
836.5	20525	10 MHz	QPSK	1	0	23.7
			QPSK	1	49	
			QPSK	25	0	
			QPSK	50	0	
			16QAM	1	0	21.7
			16QAM	1	49	
			16QAM	30	0	
			16QAM	50	0	
844.0	20600	10 MHz	QPSK	1	0	23.7
			QPSK	1	49	
			QPSK	25	0	
			QPSK	50	0	
			16QAM	1	0	22.7
			16QAM	1	49	
			16QAM	30	0	
			16QAM	50	0	

Table 1.8.8b. LTE band 5 conducted power measurements with Mobile Hotspot mode enabled and disabled (Rev 2, BUNDLE 728)

Band	LTE Band 4					
Frequency (MHz)	**Channel**	**BW**	**Modulation**	**RB Size**	**RB Offset**	**Maximum Avg. Power (dBm)**
1710	19950	20 MHz	QPSK	1	0	22.70
			QPSK	1	99	23.00
			QPSK	50	0	22.10
			QPSK	100	0	22.00
			16QAM	1	0	22.05
			16QAM	1	99	22.18
			16QAM	75	0	21.23
			16QAM	100	0	20.88
1720	20050	20 MHz	QPSK	1	0	22.65
			QPSK	1	99	22.91
			QPSK	50	0	22.34
			QPSK	100	0	21.75
			16QAM	1	0	22.13
			16QAM	1	99	22.19
			16QAM	75	0	21.32
			16QAM	100	0	21.03
1732.5	20175	20 MHz	QPSK	1	0	23.35
			QPSK	1	99	23.33
			QPSK	50	0	22.27
			QPSK	100	0	22.60
			16QAM	1	0	22.61
			16QAM	1	99	22.20
			16QAM	75	0	21.31
			16QAM	100	0	21.24
1745.0	20300	20 MHz	QPSK	1	0	22.76
			QPSK	1	99	21.40
			QPSK	50	0	22.00
			QPSK	100	0	21.85
			16QAM	1	0	22.36
			16QAM	1	99	20.96
			16QAM	75	0	21.20
			16QAM	100	0	21.10
1745.9	20399	20 MHz	QPSK	1	0	21.92
			QPSK	1	99	20.94
			QPSK	50	0	21.92
			QPSK	100	0	21.56
			16QAM	1	0	21.10
			16QAM	1	99	20.23
			16QAM	75	0	20.50
			16QAM	100	0	20.64
1732.5	20175	15 MHz	QPSK	1	0	22.79
			QPSK	1	74	22.64
			QPSK	36	0	22.35
			QPSK	75	0	22.45
			16QAM	1	0	22.22
			16QAM	1	74	22.01
			16QAM	16	0	22.41
			16QAM	75	0	21.18
			QPSK	1	0	22.96

1732.5	20175	10 MHz	QPSK	1	49	22.84
			QPSK	25	0	22.23
			QPSK	50	0	22.34
			16QAM	1	0	21.80
			16QAM	1	49	21.80
			16QAM	16	0	21.24
			16QAM	50	0	21.25
1732.5	20175	5 MHz	QPSK	1	0	22.86
			QPSK	1	24	22.80
			QPSK	25	0	22.04
			16QAM	1	0	22.85
			16QAM	1	24	22.83
			16QAM	25	0	21.16
1732.5	20175	3 MHz	QPSK	1	0	22.89
			QPSK	1	14	22.87
			QPSK	15	0	21.92
			16QAM	1	0	21.67
			16QAM	1	14	21.50
			16QAM	15	0	20.91
1732.5	20175	1.4 MHz	QPSK	1	0	22.74
			QPSK	1	5	22.75
			QPSK	6	0	21.77
			16QAM	1	0	22.02
			16QAM	1	5	22.12
			16QAM	6	0	21.00

Table 1.8.9a. LTE band 4 conducted power measurements with Mobile Hotspot mode enabled and disabled (Rev 1)

Band	LTE Band 4					
Frequency (MHz)	Channel	BW	Modulation	RB Size	RB Offset	Maximum Avg. Power (dBm)
1720	20050	20 MHz	QPSK	1	0	
			QPSK	1	99	23.6
			QPSK	50	0	
			QPSK	100	0	
			16QAM	1	0	22.2
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	
1732.5	20175	20 MHz	QPSK	1	0	
			QPSK	1	99	23.7
			QPSK	50	0	
			QPSK	100	0	
			16QAM	1	0	22.6
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	
1745.0	20300	20 MHz	QPSK	1	0	
			QPSK	1	99	23.3
			QPSK	50	0	
			QPSK	100	0	
			16QAM	1	0	22.7
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	

Table 1.8.9b. LTE band 4 conducted power measurements with Mobile Hotspot mode disabled (Rev 2, BUNDLE 728)

Band	LTE Band 4					
Frequency (MHz)	Channel	BW	Modulation	RB Size	RB Offset	Maximum Avg. Power (dBm)
1720	20050	20 MHz	QPSK	1	0	
			QPSK	1	99	21.8
			QPSK	50	0	
			QPSK	100	0	
			16QAM	1	0	21.9
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	
1732.5	20175	20 MHz	QPSK	1	0	
			QPSK	1	99	21.5
			QPSK	50	0	
			QPSK	100	0	
			16QAM	1	0	21.3
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	
		20 MHz	QPSK	1	0	
			QPSK	1	99	21.7
			QPSK	50	0	
			QPSK	100	0	

1745.0	20300		16QAM	1	0	21.8
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	

Table 1.8.9c. LTE band 4 conducted power measurements with Mobile Hotspot mode enabled (Rev 2, BUNDLE 728)

Band	LTE Band 2					
Frequency (MHz)	Channel	BW	Modulation	RB Size	RB Offset	Maximum Avg. Power (dBm)
1850	18600	20 MHz	QPSK	1	0	20.90
			QPSK	1	99	23.10
			QPSK	50	0	22.40
			QPSK	100	0	22.35
			16QAM	1	0	20.00
			16QAM	1	99	22.00
			16QAM	75	0	21.50
			16QAM	100	0	21.65
1860	18700	20 MHz	QPSK	1	0	23.10
			QPSK	1	99	22.95
			QPSK	50	0	22.12
			QPSK	100	0	22.14
			16QAM	1	0	22.10
			16QAM	1	99	21.91
			16QAM	75	0	21.10
			16QAM	100	0	21.07
1880	18900	20 MHz	QPSK	1	0	23.30
			QPSK	1	99	23.20
			QPSK	50	0	22.60
			QPSK	100	0	22.50
			16QAM	1	0	22.70
			16QAM	1	99	22.60
			16QAM	75	0	21.50
			16QAM	100	0	21.50
1900	19100	20 MHz	QPSK	1	0	23.03
			QPSK	1	99	22.70
			QPSK	50	0	22.00
			QPSK	100	0	22.11
			16QAM	1	0	22.21
			16QAM	1	99	21.80
			16QAM	75	0	21.16
			16QAM	100	0	21.08
1909.9	19199	20 MHz	QPSK	1	0	22.85
			QPSK	1	99	10.36
			QPSK	50	0	21.96
			QPSK	100	0	21.85
			16QAM	1	0	22.50
			16QAM	1	99	22.40
			16QAM	75	0	21.33
			16QAM	100	0	21.40
		15 MHz	QPSK	1	0	22.92
			QPSK	1	74	23.00
			QPSK	36	0	22.42
			QPSK	75	0	22.44

1880	18900		16QAM	1	0	21.57
			16QAM	1	74	21.70
			16QAM	75	0	22.50
1880	18900	10 MHz	QPSK	1	0	23.17
			QPSK	1	49	23.18
			QPSK	25	0	22.40
			QPSK	50	0	22.50
			16QAM	1	0	21.96
			16QAM	1	49	21.92
			16QAM	50	0	21.75
1880	18900	5 MHz	QPSK	1	0	23.14
			QPSK	1	24	23.20
			QPSK	15	0	22.52
			QPSK	25	0	22.49
			16QAM	1	0	21.77
			16QAM	1	24	21.93
			16QAM	25	0	21.55
1880	18900	3 MHz	QPSK	1	0	23.19
			QPSK	1	14	23.25
			QPSK	6	0	22.30
			QPSK	15	0	22.41
			16QAM	1	0	22.00
			16QAM	1	14	22.16
			16QAM	15	0	21.41
1880	18900	1.4 MHz	QPSK	1	0	23.13
			QPSK	1	5	23.20
			QPSK	3	3	23.27
			QPSK	6	0	22.12
			16QAM	1	0	22.42
			16QAM	1	5	22.54
			16QAM	6	0	21.36

Table 1.8.10a. LTE band 2 conducted power measurements with Mobile Hotspot mode enabled and disabled (Rev 1)

Band	**LTE Band 2**					
Frequency (MHz)	**Channel**	**BW**	**Modulation**	**RB Size**	**RB Offset**	**Maximum Avg. Power (dBm)**
1860	18700	20 MHz	QPSK	1	0	23.5
			QPSK	1	99	
			QPSK	50	0	
			QPSK	100	0	
			16QAM	1	0	22.9
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	
1880	18900	20 MHz	QPSK	1	0	23.7
			QPSK	1	99	
			QPSK	50	0	
			QPSK	100	0	
			16QAM	1	0	22.4
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	

1900	19100	20 MHz	QPSK	1	0	23.9
			QPSK	1	99	
			QPSK	50	0	
			QPSK	100	0	
			16QAM	1	0	22.8
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	

Table 1.8.10b. LTE band 2 conducted power measurements with Mobile Hotspot mode disabled (Rev 2, BUNDLE 728)

Band	LTE Band 2					
Frequency (MHz)	Channel	BW	Modulation	RB Size	RB Offset	Maximum Avg. Power (dBm)
1860	18700	20 MHz	QPSK	1	0	20.6
			QPSK	1	99	
			QPSK	50	0	
			QPSK	100	0	
			16QAM	1	0	20.9
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	
1880	18900	20 MHz	QPSK	1	0	20.8
			QPSK	1	99	
			QPSK	50	0	
			QPSK	100	0	
			16QAM	1	0	20.6
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	
1900	19100	20 MHz	QPSK	1	0	20.8
			QPSK	1	99	
			QPSK	50	0	
			QPSK	100	0	
			16QAM	1	0	20.7
			16QAM	1	99	
			16QAM	75	0	
			16QAM	100	0	

Table 1.8.10c. LTE band 2 conducted power measurements with Mobile Hotspot mode enabled (Rev 2, BUNDLE 728)

1.9 Highlights of the FCC OET SAR Evaluation Considerations for Handsets with Multiple Transmitters/ Antennas & GSM/GPRS/EDGE Procedure

Unlicensed Transmitters

When there is simultaneous transmission –

Stand-alone SAR not required when

- output ≤ 2·PRef and antenna is > 5.0 cm from other antennas
- output ≤ PRef and antenna is > 2.5 cm from other antennas
- the other antenna(s), which are < 2.5 cm away, has an output ≤ PRef OR max 1g SAR < 1.2 W/kg

Otherwise stand-alone SAR is required

- test SAR on highest output channel for each wireless mode and exposure condition
- if SAR for highest output channel is > 50% of SAR limit, evaluate all channels according to normal procedure

Simultaneous Transmission SAR not required:

Unlicensed only

- when stand-alone 1-g SAR is not required and antenna is > 5 cm from other antennas
- when the other antenna(s), which are < 2.5 cm away, has an output ≤ PRef OR max 1g SAR < 1.2 W/kg

Licensed & Unlicensed

- when the sum of the 1-g SAR is < 1.6 W/kg for each pair of simultaneous transmitting antennas.

or

- when the ratio of SAR to peak SAR separation distance of simultaneous transmitting antenna pair is < 0.3

Simultaneous Transmission SAR required:

Licensed & Unlicensed

- antenna pairs with SAR to antenna separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in standalone configuration for each wireless mode and exposure condition.

	2.45	5.15 – 5.35	5.47 – 5.85	GHz
P_{Ref}	12	6	5	mW
P_{Ref}	10.8	7.8	7.0	dBm
$2 \cdot P_{Ref}$	13.8	10.8	10.0	dBm
Device output power should be rounded to the nearest mW to compare with values in this table.				

Table 1.9.1. Output Power Thresholds for Unlicensed Transmitters

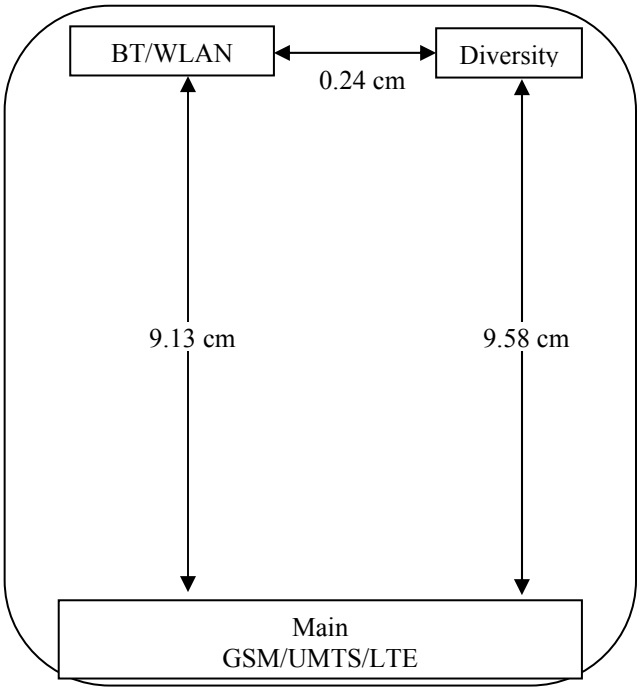

Figure 1.9.1. Back view of device showing closest distance between antenna pairs

1.9.1 Simultaneous Transmission Analysis

Simultaneous Transmission Combination	Head	Body-Worn Accessory	Mobile Hotspot
WCDMA/GSM voice + WiFi 2.4 GHz	Yes	Yes	Yes
WCDMA/GSM voice + WiFi 5.0 GHz	Yes	Yes	No
WCDMA/GSM voice + BT	Yes	Yes	Yes
LTE/HSPA/EDGE/GPRS data + WiFi 2.4 GHz	Yes	Yes	Yes
LTE/HSPA/EDGE/GPRS data + WiFi 5.0 GHz	Yes	Yes	No
LTE/HSPA/EDGE/GPRS data + BT	Yes	Yes	Yes

Table 1.9.2. Simultaneous Transmission Scenarios

Note 1: WCDMA/HSPA/GSM/LTE share the same transmitting antenna and cannot transmit simultaneously.
Note 2: WLAN 2.4 GHz/5.0 GHz/BT share the same transmitting antenna and cannot transmit simultaneously.
Note 3: BT Stand-alone SAR test is not required and value of zero is considered for SAR summation.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Head SAR	Right Cheek	LTE band 17	0.42	0.28	0.70
	Right Cheek	LTE band 5	0.59		0.87
	Right Cheek	GSM/EDGE 850	0.64		0.92
	Right Cheek	WCDMA band V	0.62		0.90
	Right Cheek	LTE band 4	0.67		0.95
	Right Cheek	LTE band 2	0.46		0.74
	Right Cheek	GSM/EDGE 1900	0.30		0.58
	Right Cheek	WCDMA band II	0.40		0.68
	Right Tilt	LTE band 17	0.21	0.28	0.49
	Right Tilt	LTE band 5	0.37		0.65
	Right Tilt	GSM/EDGE 850	0.28		0.56
	Right Tilt	WCDMA band V	0.37		0.65
	Right Tilt	LTE band 4	0.45		0.73
	Right Tilt	LTE band 2	0.16		0.44
	Right Tilt	GSM/EDGE 1900	0.11		0.39
	Right Tilt	WCDMA band II	0.17		0.45
	Left Cheek	LTE band 17	0.51	0.32	0.83
	Left Cheek	LTE band 5	0.58		0.90
	Left Cheek	GSM/EDGE 850	0.61		0.93
	Left Cheek	WCDMA band V	0.61		0.93
	Left Cheek	LTE band 4	0.81		1.13
	Left Cheek	LTE band 2	0.57		0.89
	Left Cheek	GSM/EDGE 1900	0.44		0.76
	Left Cheek	WCDMA band II	0.59		0.91
	Left Tilt	LTE band 17	0.29	0.30	0.59
	Left Tilt	LTE band 5	0.33		0.63
	Left Tilt	GSM/EDGE 850	0.32		0.62
	Left Tilt	WCDMA band V	0.38		0.68
	Left Tilt	LTE band 4	0.50		0.80
	Left Tilt	LTE band 2	0.22		0.52
	Left Tilt	GSM/EDGE 1900	0.16		0.46
	Left Tilt	WCDMA band II	0.19		0.49

Table 1.9.3a. Highest Head SAR values and summation
Rev 1 Main transmitter with Rev 1 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Head SAR	Right Cheek	LTE band 17	0.42	0.27	0.69
	Right Cheek	LTE band 5	0.59		0.86
	Right Cheek	GSM/EDGE 850	0.64		0.91
	Right Cheek	WCDMA band V	0.62		0.89
	Right Cheek	LTE band 4	0.67		0.94
	Right Cheek	LTE band 2	0.46		0.73
	Right Cheek	GSM/EDGE 1900	0.30		0.57
	Right Cheek	WCDMA band II	0.40		0.67
	Left Cheek	LTE band 17	0.51	0.32	0.83
	Left Cheek	LTE band 5	0.58		0.90
	Left Cheek	GSM/EDGE 850	0.61		0.93
	Left Cheek	WCDMA band V	0.61		0.93
	Left Cheek	LTE band 4	0.81		1.13
	Left Cheek	LTE band 2	0.57		0.89
	Left Cheek	GSM/EDGE 1900	0.44		0.76
	Left Cheek	WCDMA band II	0.59		0.91

Table 1.9.3b. Highest Head SAR values and summation
Rev 1 Main transmitter with Rev 2 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Head SAR	Right Cheek	LTE band 5	0.34	0.28	0.62
	Right Cheek	GSM/EDGE 850	0.63		0.91
	Right Cheek	WCDMA band V	0.54		0.82
	Left Cheek	LTE band 17	0.57	0.32	0.89
	Left Cheek	LTE band 2	0.73		1.05
	Left Cheek	GSM/EDGE 1900	0.41		0.73
	Left Cheek	WCDMA band II	0.85		1.17

Table 1.9.3c. Highest Head SAR values and summation
Rev 2 Main transmitter with Rev 1 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Head SAR	Right Cheek	LTE band 5	0.34	0.27	0.61
	Right Cheek	GSM/EDGE 850	0.63		0.90
	Right Cheek	WCDMA band V	0.54		0.81
	Left Cheek	LTE band 17	0.57	0.32	0.89
	Left Cheek	LTE band 4	0.97		1.29
	Left Cheek	LTE band 2	0.73		1.05
	Left Cheek	GSM/EDGE 1900	0.41		0.73
	Left Cheek	WCDMA band II	0.85		1.17

Table 1.9.3d. Highest Head SAR values and summation
Rev 2 Main transmitter with Rev 2 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G / 5.0 G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Body-Worn SAR	15 mm separation, device back	LTE band 17	0.50	0.18	0.68
		WCDMA band V	0.69		0.87
		LTE band 4	0.88		1.06
		LTE band 2	0.56		0.74
		GPRS/EDGE 1900	0.49		0.67
		WCDMA band II	0.62		0.80
	15 mm separation, device front	LTE band 5	0.63	0.01	0.64
		GPRS/EDGE 850	0.62		0.63
		WCDMA band V	0.70		0.71
	Holster, device back	LTE band 17	0.39	0.42	0.81
		LTE band 5	0.54		0.96
		GPRS/EDGE 850	0.55		0.97
		LTE band 4	0.53		0.95
		LTE band 2	0.39		0.81
		GPRS/EDGE 1900	0.28		0.70
		WCDMA band II	0.44		0.86
	Holster, device front	LTE band 17	0.36	0.02	0.38
		LTE band 5	0.58		0.60
		GPRS/EDGE 850	0.61		0.63
		WCDMA band V	0.67		0.69
		LTE band 4	0.43		0.45
		LTE band 2	0.24		0.26
		GPRS/EDGE 1900	0.16		0.18
		WCDMA band II	0.25		0.27

Table 1.9.4a. Highest Body-worn SAR values for the same configuration Rev 1 Main transmitter with Rev 1 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G / 5.0 G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Body-Worn SAR	15 mm separation, device back	LTE band 17	0.50	0.21	0.71
		WCDMA band V	0.69		0.90
		LTE band 4	0.88		1.09
		LTE band 2	0.56		0.77
		GPRS/EDGE 1900	0.49		0.70
		WCDMA band II	0.62		0.83
	Holster, device back	LTE band 17	0.39	0.19	0.58
		LTE band 5	0.54		0.73
		GPRS/EDGE 850	0.55		0.74
		LTE band 4	0.53		0.72
		LTE band 2	0.39		0.58
		GPRS/EDGE 1900	0.28		0.47
		WCDMA band II	0.44		0.63

Table 1.9.4b. Highest Body-worn SAR values for the same configuration Rev 1 Main transmitter with Rev 2 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G / 5.0 G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Body-Worn SAR	15 mm separation, device back	LTE band 17	0.63	0.18	0.81
		LTE band 4	0.95		1.13
		LTE band 2	0.77		0.95
		GPRS/EDGE 1900	0.54		0.72
		WCDMA band II	0.95		1.13

Table 1.9.4c. Highest Body-worn SAR values for the same configuration Rev 2 Main transmitter with Rev 1 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G 1 g avg. SAR (W/kg)	Maximum Summation 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Body-Worn SAR	15 mm separation, device back	LTE band 17	0.63	0.21	0.84
		LTE band 4	0.95		1.16
		LTE band 2	0.77		0.98
		GPRS/EDGE 1900	0.54		0.75
		WCDMA band II	0.95		1.16

Table 1.9.4d. Highest Body-worn SAR values for the same configuration Rev 2 Main transmitter with Rev 2 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G 1 g avg. SAR (W/kg)	Max Sum 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Mobile Hotspot SAR	10 mm separation, device back	LTE band 17	0.76	0.48	1.24
		LTE band 5	0.77		1.25
		GSM/GPRS/EDGE 850	0.73		1.21
		WCDMA band V	0.91		1.39
		LTE band 4	1.50		1.98
		LTE band 2	1.36		1.84
		GSM/GPRS/EDGE 1900	1.04		1.52
		WCDMA band II	1.43		1.91
	10 mm separation, device front	LTE band 17	0.67	0.07	0.74
		LTE band 5	0.78		0.85
		GSM/GPRS/EDGE 850	0.76		0.83
		WCDMA band V	0.87		0.94
		LTE band 4	1.07		1.14
		LTE band 2	0.54		0.61
		GSM/GPRS/EDGE 1900	0.43		0.50
	10 mm separation, device left	LTE band 17	0.40	0.02	0.42
		LTE band 5	0.58		0.60
		GSM/GPRS/EDGE 850	0.46		0.48
		WCDMA band V	0.58		0.60
		LTE band 4	0.53		0.55
		LTE band 2	0.34		0.36
		GSM/GPRS/EDGE 1900	0.23		0.25
		WCDMA band II	0.39		0.41
	10 mm separation, device right	LTE band 17	0.26	0.02	0.28
		LTE band 5	0.78		0.80
		GSM/GPRS/EDGE 850	0.68		0.70
		WCDMA band V	0.79		0.81
		LTE band 4	0.28		0.30
		LTE band 2	0.17		0.19
		GSM/GPRS/EDGE 1900	0.10		0.12
		WCDMA band II	0.15		0.17
	10 mm separation, device bottom	LTE band 17	0.15	0.00	0.15
		LTE band 5	0.20		0.20
		GSM/GPRS/EDGE 850	0.23		0.23
		WCDMA band V	0.20		0.20
		LTE band 4	0.56		0.56
		LTE band 2	0.90		0.90
		GSM/GPRS/EDGE 1900	0.60		0.60
		WCDMA band II	0.64		0.64

	10 mm separation, device top	LTE band 17	0.00	0.07	0.07
		LTE band 5	0.00		0.07
		GSM/GPRS/EDGE 850	0.00		0.07
		WCDMA band V	0.00		0.07
		LTE band 4	0.00		0.07
		LTE band 2	0.00		0.07
		GSM/GPRS/EDGE 1900	0.00		0.07
		WCDMA band II	0.00		0.07
	10 mm separation, device back with headset	LTE band 17	0.70	0.40	1.10
		WCDMA band V	0.80		1.20
		LTE band 4	1.41		1.81
		LTE band 2	1.36		1.76
		GSM/GPRS/EDGE 1900	1.02		1.42
		WCDMA band II	1.36		1.76

Table 1.9.5a. Highest Mobile Hotspot SAR values for the same configuration Rev 1 Main transmitter with Rev 1 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G 1 g avg. SAR (W/kg)	Max Sum 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Mobile Hotspot SAR	10 mm separation, device back	LTE band 17	0.76	0.82	1.58
		LTE band 5	0.77		1.59
		GSM/GPRS/EDGE 850	0.73		1.55
		WCDMA band V	0.91		1.73
		LTE band 4	1.50		2.32
		LTE band 2	1.36		2.18
		GSM/GPRS/EDGE 1900	1.04		1.86
		WCDMA band II	1.43		2.25

Table 1.9.5b. Highest Mobile Hotspot SAR values for the same configuration Rev 1 Main transmitter with Rev 2 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G 1 g avg. SAR (W/kg)	Max Sum 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Mobile Hotspot SAR	10 mm separation, device back	LTE band 17	0.88	0.48	1.36
		WCDMA band V	0.78		1.26
		LTE band 4	1.08		1.56
		LTE band 2	1.11		1.59
		GSM/GPRS/EDGE 1900	1.13		1.61
		WCDMA band II	1.34		1.82
	10 mm separation, device front	LTE band 5	0.67	0.07	0.74
		GSM/GPRS/EDGE 850	0.75		0.82
		LTE band 4	0.83		0.90
	10 mm separation, device left	LTE band 4	0.45	0.02	0.47
	10 mm separation, device right	LTE band 4	0.22	0.02	0.24
	10 mm separation, device bottom	LTE band 4	0.50	0.00	0.50
	10 mm separation, device back with headset	LTE band 4	1.11	0.40	1.51

Table 1.9.5c. Highest Mobile Hotspot SAR values for the same configuration Rev 2 Main transmitter with Rev 1 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		WiFi 2.4 G 1 g avg. SAR (W/kg)	Max Sum 1 g avg. SAR (W/kg)
		Band	1 g avg. SAR (w/kg)		
Mobile Hotspot SAR	10 mm separation, device back	LTE band 17	0.88	0.82	1.70
		WCDMA band V	0.78		1.60
		LTE band 4	1.08		1.90
		LTE band 2	1.11		1.93
		GSM/GPRS/EDGE 1900	1.13		1.95
		WCDMA band II	1.34		2.16

Table 1.9.5d. Highest Mobile Hotspot SAR values for the same configuration Rev 2 Main transmitter with Rev 2 802.11a/b SAR values

Note 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
Note 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
Note 3: If the ratio of SAR to peak separation distance is < 0.3, Simultaneous SAR measurement is not required.

Test	Configuration	Licensed Transmitters		SAR peak location (cm)			Closest Distance (cm)	Pair Sum (W/kg)	Ratio
		Band	1 g avg. SAR (w/kg)	X	Y	Z			
Mobile Hotspot SAR	10 mm separation, device back	WiFi 2.4G	0.48	-6.50	-40.0	-207.4	10.63	1.98	0.19
		LTE band 4 (20MHz BW, QPSK, RB1)	1.50	-39.5	61.0	-207.3			
		WiFi 2.4G	0.48	-6.50	-40.0	-207.4	10.64	1.98	0.19
		LTE band 4 (3MHz BW, QPSK, RB1)	1.50	-29.0	64.0	-207.3			
		WiFi 2.4G	0.48	-6.50	-40.0	-207.4	10.64	1.98	0.19
		LTE band 4 (1.4MHz BW, QPSK, RB1)	1.50	-29.0	64.0	-207.6			
		WiFi 2.4G	0.48	-6.50	-40.0	-207.4	9.43	1.84	0.20
		LTE band 2	1.36	-18.5	53.5	-208.1			
		WiFi 2.4G	0.48	-6.50	-40.0	-207.4	9.44	1.91	0.20
		UMTS band II	1.43	-27.5	52.0	-210.8			
	10 mm separation, device back, headset	WiFi 2.4G	0.40	-14.0	-56.5	-207.4	11.18	1.81	0.16
		LTE band 4 (20MHz BW, QPSK, RB1)	1.41	-41.0	52.0	-207.4			
		WiFi 2.4G	0.40	-14.0	-56.5	-207.4	11.10	1.76	0.16
		LTE band 2	1.36	-29.0	53.5	-208.0			
		WiFi 2.4G	0.40	-14.0	-56.5	-207.4	11.09	1.76	0.16
		UMTS band II	1.36	-27.5	53.5	-210.8			

Table 1.9.6a. Highest Mobile Hotspot SAR values and ratio of SAR to peak location
Rev 1 Main transmitter with Rev 1 802.11a/b SAR values

Note 4: Since the sum of 1 g SAR > 1.6 W/kg for the above pairs, the ratio of SAR to peak separation distance for each pair of transmitters is calculated.

Test	Configuration	Licensed Transmitters		SAR peak location (cm)			Closest Distance (cm)	Pair Sum (W/kg)	Ratio
		Band	1 g avg. SAR (w/kg)	X	Y	Z			
Mobile Hotspot SAR	10 mm separation, device back	WiFi 2.4G	0.82	-5.0	-41.5	-207.8	7.88	1.73	0.22
		UMTS band V	0.91	-27.5	34.0	-208.8			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	10.82	2.32	0.21
		LTE band 4 (20MHz BW, QPSK, RB1)	1.50	-39.5	61.0	-207.3			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	10.82	2.32	0.21
		LTE band 4 (3MHz BW, QPSK, RB1)	1.50	-29.0	64.0	-207.3			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	10.82	2.32	0.21
		LTE band 4 (1.4MHz BW, QPSK, RB1)	1.50	-29.0	64.0	-207.6			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	9.60	2.18	0.23
		LTE band 2	1.36	-18.5	53.5	-208.1			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	9.76	1.86	0.19
		GSM/GPRS/EDGE 1900	1.04	-27.5	53.5	-208.1			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	9.62	2.25	0.23
		UMTS band II	1.43	-27.5	52.0	-210.8			
	10 mm separation, device back, headset	WiFi 2.4G	0.82	-5.0	-41.5	-207.8	8.02	1.62	0.20
		UMTS band V	0.80	-27.5	35.5	-208.8			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	10.02	2.23	0.22
		LTE band 4 (20MHz BW, QPSK, RB1)	1.41	-41.0	52.0	-207.4			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	9.80	2.18	0.22
		LTE band 2	1.36	-29.0	53.5	-208.0			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	9.76	1.84	0.19
		GSM/GPRS/EDGE 1900	1.02	-27.5	53.5	-208.1			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	9.77	2.18	0.22
		UMTS band II	1.36	-27.5	53.5	-210.8			

Table 1.9.6b. Highest Mobile Hotspot SAR values and ratio of SAR to peak location
Rev 1 Main transmitter with Rev 2 802.11a/b SAR values

Note 4: Since the sum of 1 g SAR > 1.6 W/kg for the above pairs, the ratio of SAR to peak separation distance for each pair of transmitters is calculated.

Test	Configuration	Licensed Transmitters		SAR peak location (cm)			Closest Distance (cm)	Pair Sum (W/kg)	Ratio
		Band	1 g avg. SAR (w/kg)	X	Y	Z			
Mobile Hotspot SAR	10 mm separation, device back	WiFi 2.4G	0.48	-6.50	-40.0	-207.4	10.97	1.61	0.15
		GSM/GPRS/EDGE 1900	1.13	-30.5	67.0	-207.9			
		WiFi 2.4G	0.48	-6.50	-40.0	-207.4	10.94	1.82	0.17
		UMTS band II	1.34	-29.0	67.0	-207.7			
	10 mm separation, device back, headset	WiFi 2.4G	0.40	-14.0	-56.5	-207.4	12.44	1.74	0.14
		UMTS band II	1.34	-29.0	67.0	-207.7			

Table 1.9.6c. Highest Mobile Hotspot SAR values and ratio of SAR to peak location Rev 2 Main transmitter with Rev 1 802.11a/b SAR values

Note 4: Since the sum of 1 g SAR > 1.6 W/kg for the above pairs, the ratio of SAR to peak separation distance for each pair of transmitters is calculated.

Test	Configuration	Licensed Transmitters		SAR peak location (cm)			Closest Distance (cm)	Pair Sum (W/kg)	Ratio
		Band	1 g avg. SAR (w/kg)	X	Y	Z			
Mobile Hotspot SAR	10 mm separation, device back	WiFi 2.4G	0.82	-5.0	-41.5	-207.8	10.90	1.70	0.16
		LTE band 17	0.88	-32.5	64.0	-208.3			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	7.16	1.60	0.22
		UMTS band V	0.78	-27.5	26.5	-208.6			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	9.63	1.90	0.20
		LTE band 4	1.08	-33.5	50.5	-208.1			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	11.04	1.93	0.17
		LTE band 2	1.11	-32.0	65.5	-207.8			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	11.15	1.95	0.17
		GSM/GPRS/EDGE 1900	1.13	-30.5	67.0	-207.9			
		WiFi 2.4G	0.82	-5.0	-41.5	-207.8	11.14	2.16	0.19
		UMTS band II	1.34	-30.0	67.0	-207.7			
	10 mm separation, device back, Headset	WiFi 2.4G	0.82	-5.0	-41.5	-207.8	10.89	1.93	0.18
		LTE band 4	1.11	-32.0	64.0	-207.9			

Table 1.9.6d. Highest Mobile Hotspot SAR values and ratio of SAR to peak location Rev 2 Main transmitter with Rev 2 802.11a/b SAR values

Note 4: Since the sum of 1 g SAR > 1.6 W/kg for the above pairs, the ratio of SAR to peak separation distance for each pair of transmitters is calculated.

BT & GSM/WCDMA/LTE

- BT Stand-alone SAR is not required because the output ≤ 2·PRef and the antenna is > 5.0 cm from other antennas
- BT Simultaneous Transmission SAR is not required because BT Stand-alone SAR is not required.

GSM/WCDMA/LTE & WiFi:

- Head Configuration:
  - GSM/EDGE/GPRS & WCDMA & LTE Stand-alone SAR is required because they are licensed antennas.
  - Wifi Stand-alone SAR is required because the antenna is > 5.0 cm from other antennas, but the output power > 2·PRef.
  - Simultaneous Transmission is not required as the sum of the 1-g SAR is < 1.6 W/kg.
- Body Configuration:
  - GSM/EDGE/GPRS & WCDMA & LTE Stand-alone SAR is required because they are licensed antennas.
  - Wifi Stand-alone SAR is required because the antenna is > 5.0 cm from other antennas, but the output power > 2·PRef.
  - Simultaneous Transmission is not required as the sum of the 1-g SAR is < 1.6 W/kg, OR the ratio of SAR to peak separation distance is < 0.3.

- The device supports DTM, GPRS Category Class A/B, and Multi-Slot Class 11/12 with maximum 5-slots
(2/3/4-slots uplink and 3/2/1-slot downlink), but cannot connect radiated. DTM connected conducted and power levels are the same as EDGE/GPRS.
- For body SAR configurations, 2/3/4-slots GPRS (PD) mode was tested.
- In EDGE/GPRS mode, GMSK Modulation was used using CS1-CS4 or MCSI-MCS4.
- 8-PSK modulation or MCS5-MCS9 code scheme were avoided since maximum burst avg power was measured lower on those modulation schemes.
- Each slot is set to maximum power, but there is software power reduction of ~ 2 dB in multislot modes.
- Please refer to the conducted power measurements table below:

Mode	Freq. (MHz)	Max burst averaged conducted power (dBm) CS1	Max burst averaged conducted power (dBm) MCS1	Max burst averaged conducted power (dBm) MCS5
2-slots GPRS 850 MHz	824.2	30.3	N/A	N/A
	836.8	30.7	N/A	N/A
	848.8	29.8	N/A	N/A
3-slots GPRS 850 MHz	824.2	29.2	N/A	N/A
	836.8	29.3	N/A	N/A
	848.8	29.0	N/A	N/A
4-slots GPRS 850 MHz	824.2	26.9	N/A	N/A
	836.8	27.0	N/A	N/A
	848.8	26.7	N/A	N/A
2-slots EDGE 850 MHz	824.2	30.3	30.3	27.0
	836.8	30.3	30.3	27.1
	848.8	29.8	29.8	26.7
2-slots DTM 850 MHz	824.2	30.3	30.3	26.9 / 30.3
	836.8	30.3	30.3	27.0 / 30.3
	848.8	30.3	30.3	27.1 / 30.3
3-slots EDGE 850 MHz	824.2	29.5	29.5	25.5
	836.8	29.5	29.5	25.5
	848.8	29.0	28.9	25.0
4-slots EDGE 850 MHz	824.2	27.1	27.1	24.4
	836.8	27.2	27.1	24.5
	848.8	26.7	26.7	24.0
2-slots GPRS 1900 MHz	1850.2	28.3	N/A	N/A
	1880.0	28.2	N/A	N/A
	1909.8	28.2	N/A	N/A
3-slots GPRS 1900 MHz	1850.2	25.8	N/A	N/A
	1880.0	25.6	N/A	N/A
	1909.8	25.7	N/A	N/A
4-slots GPRS 1900 MHz	1850.2	25.3	N/A	N/A
	1880.0	25.4	N/A	N/A
	1909.8	25.1	N/A	N/A
2-slots EDGE 1900MHz	1850.2	28.4	28.3	24.9
	1880.0	28.3	28.0	24.8
	1909.8	28.1	28.1	24.8
2-slots DTM 1900 MHz	1850.2	28.2	28.2	25.1/28.2
	1880.0	28.2	28.2	24.9/27.9
	1909.8	28.1	28.1	24.9/28.0
3-slots	1850.2	25.8	25.8	24.0

EDGE 1900MHz	1880.0	25.5	25.5	23.9
	1909.8	25.7	25.7	23.9
3-slots DTM 1900 MHz	1850.2	25.7	25.6	24.0/25.6
	1880.0	25.5	25.4	24.0/25.4
	1909.8	25.6	25.6	24.0/25.6
4-slots EDGE 1900MHz	1850.2	25.3	25.2	23.1
	1880.0	25.4	25.3	23.1
	1909.8	25.1	25.1	23.1

Mode	**Max burst averaged conducted power (dBm)**
1-slot GSM (CS) 850 MHz	33.5
	33.5
	33.1
1-slot GSM (CS) 1900 MHz	29.8
	29.8
	29.8

1.9.7. GSM/EDGE/GPRS channel vs. conducted power with Mobile Hotspot mode enabled and disabled

2.0 DESCRIPTION OF THE TEST EQUIPMENT

2.1 SAR measurement system

SAR measurements were performed using a Dosimetric Assessment System (DASY52), an automated SAR measurement system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich, Switzerland.

The DASY 52 system for performing compliance tests consists of the following items:
· A standard high precision 6-axis robot (Stäubli RX family) with controller and software.
· An arm extension 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.
· A DAE module that performs the signal amplification, signal multiplexing, A/D 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 Electro-optical coupler (EOC).
· A unit to operate the optical surface detector that is connected to the EOC.
· The EOC performs the conversion from an optical signal into the digital electric signal of the DAE. The EOC is connected to the PC plug-in card.
· The functions of the PC plug-in card based on a DSP is to perform the time critical tasks such as signal filtering, surveillance of the robot operation fast movement interrupts.
· A computer operating Windows.
· DASY52 software version 52.6(2).
· 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 mobile phones.
· Tissue simulating liquid mixed according to the given recipes (see section 6.1).
· System validation dipoles allowing for the validation of proper functioning of the system.

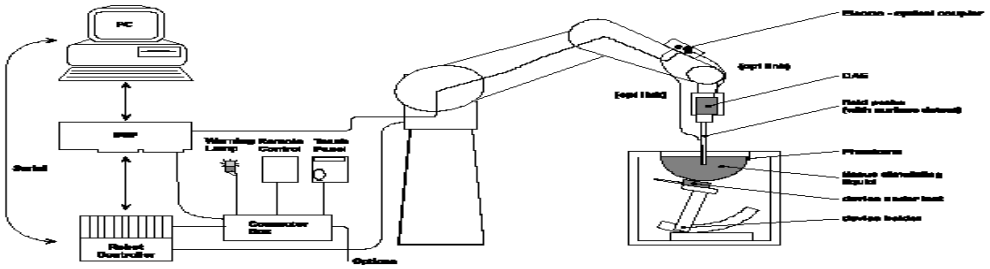

Figure 2.1.1. System Description

2.1.1 Equipment List

Manufacturer	Test Equipment	Model Number	Serial Number	Cal. Due Date (MM/DD/YY)
SCHMID & Partner Engineering AG	E-field probe	ES3DV3	3225	01/11/2013
SCHMID & Partner Engineering AG	E-field probe	EX3DV4	3592	11/16/2012
SCHMID & Partner Engineering AG	Data Acquisition Electronics (DAE3)	DAE3 V1	473	01/13/2013
SCHMID & Partner Engineering AG	Dipole Validation Kit	D750V3	1021	01/05/2013
SCHMID & Partner Engineering AG	Dipole Validation Kit	D835V2	446	01/21/2013
SCHMID & Partner Engineering AG	Dipole Validation Kit	D1800V2	2d020	01/13/2013
SCHMID & Partner Engineering AG	Dipole Validation Kit	D1900V2	545	01/13/2013
SCHMID & Partner Engineering AG	Dipole Validation Kit	D2450V2	747	11/09/2013
SCHMID & Partner Engineering AG	Dipole Validation Kit	D5GHzV2	1033	11/15/2013
Agilent Technologies	Signal generator	8648C	4037U03155	09/23/2013
Agilent Technologies	Power meter	E4419B	GB40202821	09/23/2013
Agilent Technologies	Power sensor	8481A	MY41095417	09/27/2012*
Amplifier Research	Amplifier	5S1G4M3	300986	CNR
Agilent Technologies	Power meter	N1911A	MY45100905	05/17/2013
Agilent Technologies	Power sensor	N1921A	SG45240281	06/12/2013
Agilent Technologies	Power sensor	N1921A	MY45241383	08/30/2012*
Weinschel Corp	20dB Attenuator	33-20-34	BMO697	CNR
Agilent Technologies	Network analyzer	8753ES	US39174857	09/20/2013
Rohde & Schwarz	Base Station Simulator	CMU 200	109747	11/20/2012
Rohde & Schwarz	Base Station Simulator	CMU 200	118277	11/30/2012
Rohde & Schwarz	Base Station Simulator	CMU 200	112394	11/21/2012
CPI Wireless Solutions	Amplifier	VZC-6961K4	SK4310E5	CNR
Rohde & Schwarz	Signal generator	SMA 100A	102106	12/02/2013
Rohde & Schwarz	Wideband Base Station Simulator	CMW 500	109949	01/12/2013
Rohde & Schwarz	Wideband Base Station Simulator	CMW 500	101169	01/12/2013

Table 2.1.1. Equipment list

* This equipment was sent out for calibration before due date.

2.2 Description of the test setup

Before SAR measurements are conducted, the device and the DASY equipment are setup as follows:

2.2.1 Device and base station simulator setup

• Power up the device.
• Turn on the base station simulator and set the radio channel and power to the appropriate values.
• Connect an antenna to the RF IN/OUT of the communication test set and place it close to the device.

2.2.2 DASY setup

- Turn the computer on and log on to Windows.
- Start the DASY software by clicking on the icon located on the Windows desktop.
- Mount the DAE unit and the probe. Turn on the DAE unit.
- Turn the Robot Controller on by turning the main power switch to the horizontal position
- Align the probe by clicking the 'Align probe in light beam' button.
- Open a file and configure the proper parameters - probe, medium, communications system etc.
- Establish a connection between the Device and the communications test instrument. Place the Device on the stand and adjust it under the phantom.
- Start SAR measurements.

3.0 ELECTRIC FIELD PROBE CALIBRATION

3.1 Probe Specifications

SAR measurements were conducted using the dosimetric probes ES3DV3/ET3DV6 and EX3DV4, designed by Schmid & Partner Engineering AG for the measurement of SAR. The probe is constructed using the thin film technique, with printed resistive lines on ceramic substrates. It has a symmetrical design with triangular core, built-in optical fibre for the surface detection system and built-in shielding against static discharge. The probe is sensitive to E-fields and thus incorporates three small dipoles arranged so that the overall response is close to isotropic. The table below summarizes the technical data for the probe.

Property	Data
Frequency range	30 MHz – 3 GHz
Linearity	±0.1 dB
Directivity (rotation around probe axis)	≤ ±0.2 dB
Directivity (rotation normal to probe axis)	±0.4 dB
Dynamic Range	5 mW/kg – 100 W/kg
Probe positioning repeatability	±0.2 mm
Spatial resolution	< 0.125 mm ³
Probe model EX3DV4 for 2.4 – 6 GHz	
Probe tip to sensor center	1.0 mm
Probe tip diameter is	2.5 mm
Probe calibration uncertainty	< 15 % for f = 2.45 to < 6.0 GHz
Probe calibration range	± 100 MHz

Table 3.1.1. Probe specifications

3.2 Probe calibration and measurement uncertainty

The probe had been calibrated with accuracy better than ±12% . The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe were tested. The probe calibration parameters are shown on Appendix D and below:

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.42	6.42	6.42	0.27	2.04	± 12.0 %
900	41.5	0.97	6.06	6.06	6.06	0.35	1.74	± 12.0 %
1810	40.0	1.40	5.23	5.23	5.23	0.73	1.21	± 12.0 %
1950	40.0	1.40	4.98	4.98	4.98	0.58	1.41	± 12.0 %
2450	39.2	1.80	4.50	4.50	4.50	0.79	1.26	± 12.0 %
2600	39.0	1.96	4.32	4.32	4.32	0.77	1.32	± 12.0 %

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.27	6.27	6.27	0.36	1.74	± 12.0 %
900	55.0	1.05	6.07	6.07	6.07	0.29	2.02	± 12.0 %
1810	53.3	1.52	4.92	4.92	4.92	0.50	1.57	± 12.0 %
1950	53.3	1.52	4.87	4.87	4.87	0.59	1.49	± 12.0 %
2450	52.7	1.95	4.30	4.30	4.30	0.68	1.16	± 12.0 %
2600	52.5	2.16	4.12	4.12	4.12	0.80	0.99	± 12.0 %

Table 3.2.1. Probe ES3DV3 SN: 3225

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz] [C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
5200	± 50 / ± 100	36.0 ± 5%	4.66 ± 5%	4.50	4.50	4.50	0.45	1.90 ± 13.1%
5500	± 50 / ± 100	35.6 ± 5%	4.96 ± 5%	4.25	4.25	4.25	0.50	1.90 ± 13.1%
5800	± 50 / ± 100	35.3 ± 5%	5.27 ± 5%	3.98	3.98	3.98	0.52	1.90 ± 13.1%

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz] [C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
5200	± 50 / ± 100	49.0 ± 5%	5.30 ± 5%	3.95	3.95	3.95	0.52	1.95 ± 13.1%
5500	± 50 / ± 100	48.6 ± 5%	5.65 ± 5%	3.73	3.73	3.73	0.55	1.95 ± 13.1%
5800	± 50 / ± 100	48.2 ± 5%	6.00 ± 5%	3.40	3.40	3.40	0.63	1.95 ± 13.1%

Table 3.2.2. Probe EX3DV4 SN: 3592

C The validity of ± 100 MHz only applies for DASY v4.4 and higher.
DASY 52 has been used for measurements, therefore ± 100 MHz tolerance is valid.

Measured dielectric parameters are within +/- 5% of the probe calibration values and target values.
Expanded probe calibration uncertainty (k=2) is < 15 %

4.0 SAR MEASUREMENT SYSTEM VERIFICATION

Prior to conducting SAR measurements, the system was validated using the dipole validation kit and the flat section of the SAM phantom. A power level of 1.0W was applied to the dipole antenna. The verification results are in the table below with a comparison to reference values. Printouts are shown in Appendix A. All the measured parameters are within the allowed tolerances.

At above 1.5 – 2 GHz, dipoles maintain good return loss of -15 dB to -20 dB, therefore SAR measurements are limited to approximately +/- 100 MHz of the probe/dipole calibration frequency.

4.1 System accuracy verification for head adjacent use

f (MHz)	Limits / Measured (MM/DD/YYYY)	SAR 1 g/10 g (W/kg)	Dielectric Parameters		Liquid Temp. (°C)
			ε_r	σ [S/m]	
750	Measured (06/15/2012)	8.07/5.27	42.1	0.90	22.7
	Measured (06/18/2012)	7.80/5.09	43.2	0.88	21.6
	Measured (10/29/2012)	7.79/5.08	41.2	0.91	22.9
	Recommended Limits	8.36/5.45	41.9	0.89	N/A
835	Measured (06/04/2012)	9.33/6.12	39.9	0.88	21.9
	Measured (06/06/2012)	9.32/6.11	42.6	0.89	21.5
	Measured (06/14/2012)	9.24/6.06	41.2	0.90	22.0
	Measured (09/21/2012)	9.66/6.35	40.1	0.91	22.6
	Measured (09/24/2012)	9.54/6.26	42.1	0.89	22.0
	Recommended Limits	9.63/6.27	41.5	0.90	N/A
1800	Measured (06/13/2012)	37.0/19.2	38.1	1.45	22.0
	Measured (06/18/2012)	37.4/19.5	38.1	1.44	22.2
	Measured (09/12/2012)	36.2/19.0	38.5	1.46	22.9
	Measured (10/25/2012)	35.8/18.6	38.8	1.43	22.7
	Recommended Limits	39.2/20.5	40.0	1.40	N/A
1900	Measured (06/10/2012)	39.2/20.4	38.4	1.38	21.4
	Measured (06/12/2012)	39.8/21.0	38.7	1.40	21.3
	Measured (09/27/2012)	40.0/21.0	38.1	1.40	22.5
	Measured (10/22/2012)	37.8/19.8	38.3	1.37	21.6
	Recommended Limits	40.0/20.8	40.0	1.40	N/A
2450	Measured (06/20/2012)	52.8/25.1	38.2	1.77	22.6
	Measured (09/13/2012)	52.5/24.7	37.7	1.76	22.2
	Recommended Limits	54.1/25.3	39.2	1.80	N/A
5200	Measured (06/22/2012)	79.3/22.9	34.5	4.64	21.5
	Measured (06/25/2012)	83.8/24.3	35.5	4.65	21.8
	Measured (09/17/2012)	85.4/24.6	34.4	4.75	22.3
	Recommended Limits	80.8/23.0	36.0	4.66	N/A
5500	Measured (06/22/2012)	81.1/23.0	34.4	4.97	21.7

	Measured (06/25/2012)	89.3/25.2	34.4	4.97	21.8
	Measured (09/17/2012)	89.6/25.5	34.5	5.01	22.3
	Recommended Limits	87.3/24.7	35.6	4.96	N/A
5800	Measured (06/22/2012)	80.1/22.8	33.7	5.32	21.6
	Measured (06/25/2012)	85.6/24.3	34.2	5.35	21.8
	Measured (09/17/2012)	85.7/24.4	34.1	5.30	22.4
	Recommended Limits	79.4/22.5	35.3	5.27	N/A

Table 4.1.1. System accuracy (validation for head adjacent use)

5.0 PHANTOM DESCRIPTION

The SAM Twin Phantom, manufactured by SPEAG, was used during the SAR measurements. The phantom is made of a fibreglass shell integrated with a wooden table.

The SAM Twin Phantom is a fibreglass shell phantom with 2 mm shell thickness. It has three measurement areas:
Left side head
Right side head
Flat phantom

The phantom table dimensions are: 100x50x85 cm (LxWxH). The table is intended for use with freestanding robots.

The bottom shelf contains three pair of bolts for locking the device holder in place. The device holder positions are adjusted to the standard measurement positions in the three sections. Only one device holder is
necessary if two phantoms are used (e.g., for different solutions).

A white cover is provided to top the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on the cover are possible; however the optical surface detector does not work properly at the cover surface. Place a sheet of white paper on the cover when using optical surface detection.

Liquid depth of ≥ 15 cm is maintained in the phantom for all the measurements.

Figure 5.0.1. SAM Twin Phantom

6.0 TISSUE DIELECTRIC PROPERTIES

6.1 Composition of tissue simulant

The composition of the brain and muscle simulating liquids are shown in the table below.

INGREDIENT	MIXTURE 800–900MHz		MIXTURE 1800–1900MHz		MIXTURE 2450 MHz		MIXTURE 5 – 6 GHz	
	Brain %	Muscle %	Brain %	Muscle %	Brain %	Muscle %	Brain %	Muscle %
Water	40.29	65.45	55.24	69.91	55.0	68.75	64	64-78
Sugar	57.90	34.31	0	0	0	0	0	0
Salt	1.38	0.62	0.31	0.13	0	0	0	0
HEC	0.24	0	0	0	0	0	0	0
Bactericide	0.18	0.10	0	0	0	0	0	0
DGBE	0	0	44.45	29.96	40.0	31.25	0	0
Triton X-100	0	0	0	0	5.0	0	0	0
Additives and Salt	0	0	0	0	0	0	3	2-3
Emulsifiers	0	0	0	0	0	0	15	9-15
Mineral Oil	0	0	0	0	0	0	18	11-18

Table 6.1.1. Tissue simulant recipe

6.1.1 Equipment

Manufacturer	Test Equipment	Model Number	Serial Number	Cal. Due Date (MM/DD/YY)
Pyrex, England	Graduated Cylinder	N/A	N/A	N/A
Pyrex, USA	Beaker	N/A	N/A	N/A
Acculab	Weight Scale	V1-1200	018WB2003	N/A
IKA Works Inc.	Hot Plate	RC Basic	3.107433	N/A
Dell	PC using GPIB card	GX110	347	N/A
Agilent Technologies	Dielectric probe kit	HP 85070C	US9936135	CNR
Agilent Technologies	Network Analyzer	8753ES	US39174857	09/20/2013
Control Company	Digital Thermometer	23609-234	21352860	09/26/2013

Table 6.1.2. Tissue simulant preparation equipment

6.1.2 Preparation procedure

800-900 MHz liquids

• Fill the container with **water**. Begin heating and stirring.
• Add the **Cellulose,** the **preservative substance** and the **salt**. After several hours, the liquid will become more transparent again. The container must be covered to prevent evaporation.
• Add **Sugar**. Stir it well until the sugar is sufficiently dissolved.
• Keep the liquid hot but below the boiling point for at least an hour. The container must be covered to prevent evaporation.
• Remove the container from, and turn the hotplate off and allow the liquid to cool off to room temperature prior to performing dielectric measurements.

1800-2450 MHz liquid

• Fill the container with water and place it on hotplate. Begin heating and stirring.
• Add the salt, Glycol/Triton X-100. The container must be covered to prevent evaporation.
• Keep the liquid hot enough to dissolve sugar for at least an hour. The container must be covered to prevent evaporation.
• Remove the container from, and turn the hotplate off and allow the liquid to cool off to room temperature prior to performing dielectric measurements.

6.2 Electrical parameters of the tissue simulating liquid

The tissue dielectric parameters shall be measured before a batch can be used for SAR measurements to ensure that the simulated tissue was properly made and will simulate the desired human characteristic. Limits and measured electrical parameters are shown in the table below.
Recommended limits are adopted from IEEE P1528-2003:
" Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", DASY manual and from FCC Tissue Dielectric Properties web page at http://www.fcc.gov/fcc-bin/dielec.sh

Band (MHz)	Tissue Type	Limits / Measured (MM/DD/YYYY)	f (MHz)	Dielectric Parameters		Liquid Temp (°C)
				ε_r	σ [S/m]	
750	Head	Measured (06/15/12)	705	42.6	0.86	22.7
			715	42.6	0.87	
			750	42.1	0.90	
		Measured (06/17/12)	705	43.2	0.85	21.6
			715	43.1	0.85	
			750	43.2	0.88	
		Measured (10/29/12)	705	41.9	0.88	22.9
			715	41.8	0.88	
			750	41.2	0.91	
		Recommended Limits	750	41.9	0.89	N/A
	Muscle	Measured (06/15/12)	705	54.0	0.92	22.7
			715	53.9	0.92	
			750	53.5	0.96	

		Measured (06/17/12)	705	55.8	0.91	21.6
			715	55.7	0.92	
			750	55.3	0.96	
		Measured (10/29/12)	705	54.7	0.91	22.9
			715	54.6	0.92	
			750	54.3	0.94	
		Recommended Limits	750	55.5	0.96	N/A
835	Head	Measured (06/04/12)	825	40.0	0.87	21.9
			835	39.9	0.88	
			850	39.8	0.90	
		Measured (06/06/12)	825	40.0	0.86	21.5
			835	42.6	0.89	
			850	42.6	0.89	
		Measured (06/14/12)	825	41.2	0.89	22.0
			835	41.2	0.90	
			850	41.0	0.91	
		Measured (09/21/12)	825	40.3	0.90	22.6
			835	40.1	0.91	
			850	39.9	0.92	
		Measured (09/24/2012)	825	42.2	0.88	22.0
			835	42.1	0.89	
			850	41.9	0.91	
		Recommended Limits	835	41.5	0.90	N/A
	Muscle	Measured (06/04/12)	825	53.2	0.96	21.9
			835	53.2	0.96	
			850	53.0	0.98	
		Measured (06/06/12)	825	52.9	0.97	21.5
			835	52.8	0.98	
			850	52.6	0.99	
		Measured (09/21/12)	825	54.3	0.96	22.6
			835	54.2	0.97	
			850	54.1	0.99	
		Measured (09/24/12)	825	53.0	0.94.	22.1
			835	53.0	0.95	
			850	52.9	0.96	
		Recommended Limits	835	55.2	0.97	N/A
1800	Head	Measured (06/13/12)	1710	38.6	1.37	22.0
			1750	38.7	1.40	
			1800	38.1	1.45	
		Measured (06/18/12)	1710	38.6	1.35	22.2
			1750	38.4	1.38	
			1800	38.1	1.44	
		Measured (09/12/2012)	1710	38.9	1.38	22.9
			1750	38.7	1.42	
			1800	38.5	1.46	

		Measured (10/25/2012)	1710	39.0	1.33	22.7
			1750	38.9	1.37	
			1800	38.8	1.43	
		Recommended Limits	1800	40.0	1.40	N/A
	Muscle	Measured (06/13/12)	1710	51.4	1.48	22.0
			1750	51.2	1.52	
			1800	51.1	1.58	
		Measured (06/18/12)	1710	51.1	1.46	22.2
			1750	51.1	1.50	
			1800	50.7	1.56	
		Measured (09/12/2012)	1710	51.9	1.49	22.8
			1750	51.8	1.54	
			1800	51.6	1.59	
		Measured (10/25/2012)	1710	51.3	1.48	22.6
			1750	51.3	1.52	
			1800	51.2	1.58	
		Recommended Limits	1800	53.3	1.52	N/A
1900	Head	Measured (06/10/12)	1850	38.6	1.33	21.4
			1900	38.4	1.38	
			1910	38.4	1.39	
			1980	38.1	1.47	
		Measured (06/12/12)	1850	38.9	1.35	21.3
			1900	38.7	1.40	
			1910	38.6	1.41	
			1980	38.3	1.48	
		Measured (09/27/12)	1850	38.3	1.36	22.5
			1900	38.1	1.40	
			1910	38.1	1.48	
		Measured (10/22/12)	1850	38.5	1.33	21.6
			1900	38.3	1.37	
			1910	38.3	1.38	
		Recommended Limits	1900	40.0	1.40	N/A
	Muscle	Measured (06/10/12)	1850	51.2	1.48	21.3
			1900	51.0	1.52	
			1910	51.0	1.54	
		Measured (06/12/12)	1850	51.0	1.51	21.1
			1900	50.7	1.57	
			1910	50.7	1.57	
		Measured (09/27/12)	1850	51.2	1.54	22.5
			1900	51.0	1.58	
			1910	50.9	1.59	
		Measured (10/22/12)	1850	51.6	1.46	21.5
			1900	51.6	1.51	
			1910	51.6	1.52	
		Recommended Limits	1900	53.3	1.52	N/A

2450	Head	Measured (06/20/2012)	2410	38.4	1.73	22.6
			2450	38.2	1.77	
			2480	38.2	1.80	
		Measured (09/13/2012)	2410	37.9	1.72	22.2
			2450	37.7	1.76	
			2480	37.6	1.79	
		Recommended Limits	2450	39.2	1.80	N/A
	Muscle	Measured (06/20/2012)	2410	52.1	1.87	22.3
			2450	52.0	1.92	
			2480	51.9	1.96	
		Measured (09/13/2012)	2410	52.9	1.86	22.2
			2450	52.8	1.91	
			2480	52.7	1.95	
		Recommended Limits	2450	52.7	1.95	N/A
5200	Head	Measured (06/22/2012)	5180	35.5	4.62	21.5
			5200	35.5	4.64	
			5280	35.4	4.72	
		Measured (06/25/2012)	5180	35.6	4.64	21.8
			5200	35.5	4.65	
			5280	35.4	4.76	
		Measured (09/17/2012)	5180	34.5	4.72	22.3
			5200	34.4	4.75	
			5280	34.3	4.83	
		Recommended Limits	5200	36.0	4.66	N/A
	Muscle	Measured (06/25/2012)	5180	47.2	5.16	21.4
			5200	47.2	5.18	
			5280	47.1	5.32	
		Measured (09/17/2012)	5180	47.3	5.17	22.3
			5200	47.2	5.20	
			5280	47.0	5.31	
		Recommended Limits	5200	49.0	5.30	N/A
5500	Head	Measured (06/22/2012)	5500	34.4	4.97	21.7
			5620	34.2	5.10	
		Measured (06/25/2012)	5500	34.4	4.97	21.8
			5620	34.2	5.10	
		Measured (09/17/2012)	5500	34.5	5.01	22.3
			5620	34.3	5.13	
		Recommended Limits	5500	35.6	4.96	N/A
	Muscle	Measured (06/25/2012)	5500	46.4	5.64	21.4
			5620	46.3	5.80	
		Measured (09/17/2012)	5500	46.7	5.50	22.3
			5620	46.5	5.66	
		Recommended Limits	5500	48.6	5.65	N/A
5800	Head	Measured (06/22/2012)	5745	33.8	5.25	21.6
			5800	33.7	5.32	

		Measured (06/25/2012)	5745	34.4	5.33	21.8
			5800	34.2	5.35	
		Measured (09/17/2012)	5745	34.0	5.27	22.4
			5800	34.1	5.30	
		Recommended Limits	5800	35.3	5.27	N/A
	Muscle	Measured (06/25/2012)	5745	46.2	6.01	21.4
			5800	45.9	6.05	
		Measured (09/17/2012)	5745	46.3	5.84	22.4
			5800	46.4	5.87	
		Recommended Limits	5800	48.2	6.00	N/A

Table 6.2.1. Electrical parameters of tissue simulating liquid

6.2.2 Test Configuration

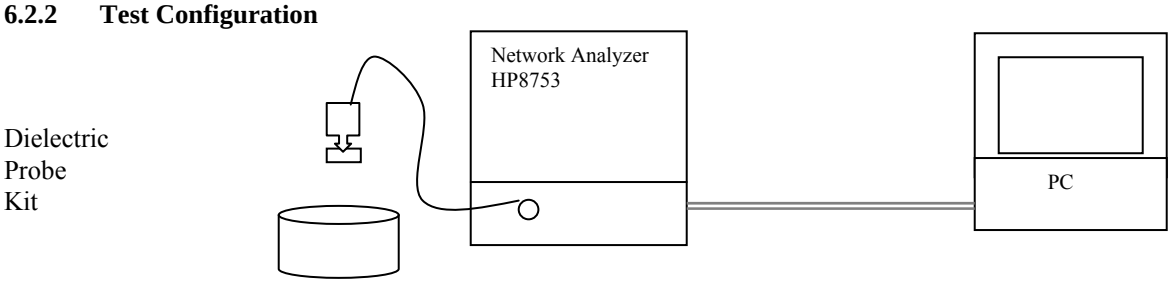

Figure 6.2.1. Test configuration

6.2.3 Procedure

1. Turn NWA on and allow at least 30 minutes for warm up.
2. Mount dielectric probe kit so that interconnecting cable to NWA will not be moved during measurements or calibration.
3. Pour de-ionized water and measure water temperature (±1°).
4. Set water temperature in HP-Software (Calibration Setup).
5. Perform calibration.
6. Relative permittivity $\varepsilon r = \varepsilon'$ and conductivity can be calculated from ε''
   $\sigma = \omega \varepsilon_0 \varepsilon''$
7. Measure liquid shortly after calibration.
8. Stir the liquid to be measured. Take a sample (~50ml) with a syringe from the center of the liquid container.
9. Pour the liquid into a small glass flask. Hold the syringe at the bottom of the flask to avoid air bubbles.
10. Put the dielectric probe in the glass flask. Check that there are no air bubbles in front of the opening in the dielectric probe kit.
11. Perform measurements.
12. Adjust medium parameters in DASY software for the frequencies necessary for the measurements ('Setup Config', select medium (e.g. Head 835 MHz) and press 'Option'-button.
13. Select the current medium for the frequency of the validation (e.g. Setup Medium Brain 835 MHz).

7.0 SAR SAFETY LIMITS

Standards/Guideline	Localized SAR Limit (W/kg) General public (uncontrolled)	Localized SAR Limits (W/kg) Workers (controlled)
ICNIRP Standard	2.0 (10g)	10.0 (10g)
IEEE C95.1 Standard	1.6 (1g)	8.0 (1g)

Table 7.0.1. SAR safety limits for Controlled / Uncontrolled environment

Human Exposure	Localized SAR Limits (W/kg) 10g, ICNIRP Standard	Localized SAR Limits (W/kg) 1g, IEEE C95.1 Standard
Spatial Average (averaged over the whole body)	0.08	0.08
Spatial Peak (averaged over any X g of tissue)	2.00	1.60
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.00	4.00 (10g)

Table 7.0.2. SAR safety limits

Uncontrolled Environments are defined as locations where there is exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

8.0 DEVICE POSITIONING

8.1 Device holder for SAM Twin Phantom

The Device was positioned for all test configurations using the DASY5 holder. The device holder facilitates the rotation of the mounted transmitter in spherical coordinates whereby the rotation point is the ear opening. The devices can be easily, accurately and with repeatability positioned according to FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

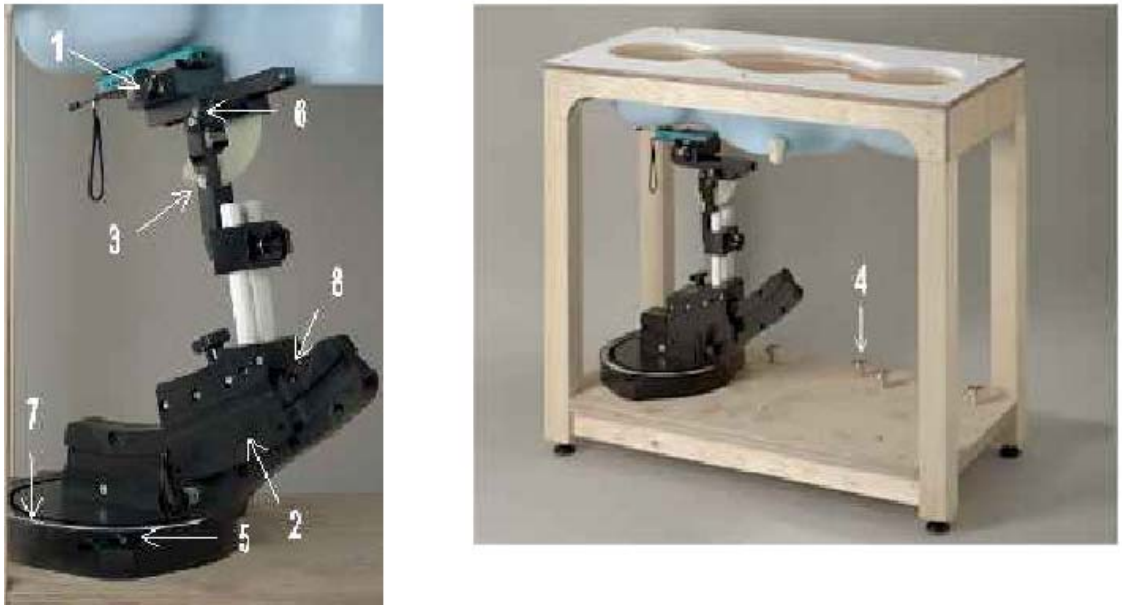

Figure 8.1.1. Device Holder

1. Put the phone in the clamp mechanism (1) and hold it straight while tightening. (Curved phones or phones with asymmetrical ear pieces should be positioned so that the earpiece is in the symmetry plane of the clamp).
2. Adjust the sliding carriage (2) to 90°. Then adjust the phone holder angle (3) until the reference line of the phone is horizontal (parallel to the flat phantom bottom). The phone reference line is defined as the front tangential line between the earpiece and the center of the device bottom (or the center of the flip hinge). For devices with parallel front and backsides, the phone holder angle (3) is 0°.
3. Place the device holder at the desired phantom section and move it securely against the positioning pins (4). The screw in front of the turning plate can be applied for correct positioning (5). (Do not tighten it too strongly).
4. Shift the phone clamp (6) so that the earpiece is exactly below the ear marking of the phantom. The phone is now correctly positioned in the holder for all standard phantom measurements, even after changing the phantom or phantom section.
5. Adjust the device position angles to the desired measurement position.
6. After fixing the device angles, move the phone fixture up until the phone touches the ear marking. (The point of contact depends on the design of the device and the positioning angle).

8.2 Description of the test positioning

8.2.1 Test Positions of Device Relative to Head

The handset was tested in two test positions against the head phantom, the "cheek" position and the "tilted" position, on both left and right sides of the phantom.

The handset was tested in the above positions according to IEEE 1528- 2003 "Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques".

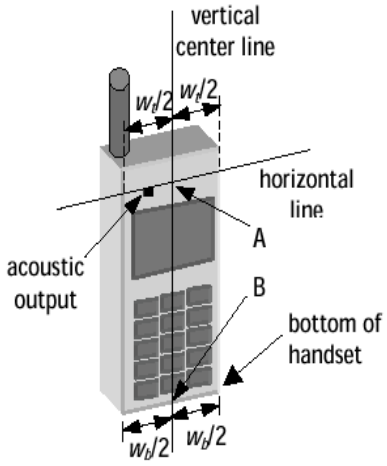

Figure 8.2.1a. Handset vertical and horizontal reference lines – fixed case

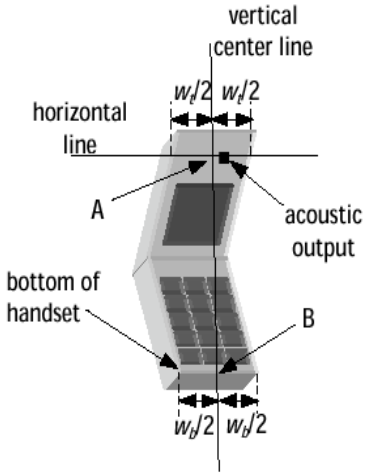

Figure 8.2.1b. Handset vertical and horizontal reference lines – "clam-shell"

8.2.1.1 Definition of the "cheek" position

1) Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece, open the cover.
2) Define two imaginary lines on the handset: the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset: the midpoint of the width *wt* of the handset at the level of the acoustic output (point A on Figures 8.2.1a and 8.2.1b), and the midpoint of the width *wb* of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 8.2.1a). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output. However, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 8.2.1b), especially for clamshell handsets, handsets with flip pieces, and other irregularly shaped handsets.
3) Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 8.2.1), such that the plane defined by the vertical center line and the horizontal center line is in a plane approximately parallel to the sagittal plane of the phantom.
4) Translate the handset towards the phantom along the line passing through RE and LE until the handset touches the ear.
5) While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is the plane normal to MB ("*mouth-back*") - NF ("*neck-front*") including the line MB (reference plane).
6) Rotate the phone around the vertical centerline until the phone (horizontal line) is symmetrical with respect to the line NF.
7) While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, rotate the handset about the line NF until any point on the handset is in contact with a phantom point below the ear (cheek).

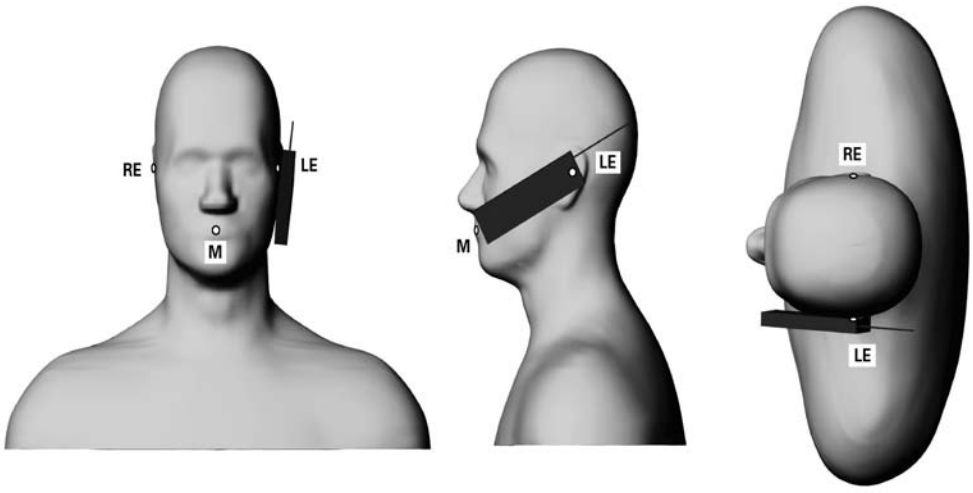

Figure 8.2.2. Phone position 1, "cheek" or "touch" position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated. The shoulders are shown for illustration purposes only.

8.2.1.2 Definition of the "Tilted" Position

1) Repeat steps 1 to 7 of 5.4.1 (in this report 8.2.1.1) to replace the device in the "cheek position."
2) While maintaining the device in the reference plane (described above) and pivoting against the ear, move the device outward away from the mouth by an angle of 15 degrees, or until the antenna touches the phantom**.**

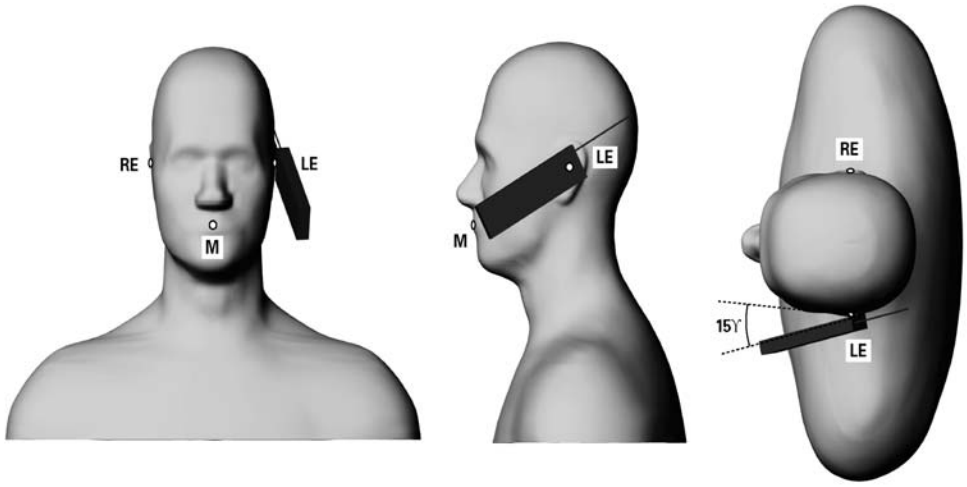

Figure 8.2.3. Phone position 2, "tilted position." The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated. The shoulders are shown for illustration purposes only.

8.2.2 Body-worn Configuration

Body-worn holsters, as shown on Figure 1.4.1, have been test with the device for FCC RF exposure compliance. The EUT was positioned in each holster case and the belt clip was placed against the flat section of the phantom. A headset was then connected to the device to simulate hands-free operation in a body worn holster configuration.

In addition, device was tested with 15 mm RIM recommended separation distance to allow typical after-market holster to be used. RIM body-worn holsters with belt-clip have been designed to maintain ~ 19 mm separation distance from body.

8.2.3 Limb/Hand Configuration

BlackBerry device is not a limb-worn device and hasn't been tested for such a configuration.

As per Clause 6.1.4.9 in the IEC/EN 62209-2 standard:

"Additional studies remain needed for devising a representative method for evaluating SAR in the hand of hand-held devices. Future versions of this standard are intended to contain a test method based on scientific data and rationale. Annex J presents the currently available test procedure."

Clause J.2 of the IEC/EN 62209-2 states that testing for compliance for the exposure of the hand is not applicable for devices that are intended to being hand-held to enable use at the ear (see EN 62209-1) or worn on the body when transmitting.

In addition, BlackBerry device is not intended to be held in hand at a distance of larger than 200 mm from the head and body during normal use.

9.0 HIGH LEVEL EVALUATION

9.1 Maximum search

The maximum search is automatically performed after each coarse scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the coarse scan 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.

9.2 Extrapolation

The extrapolation can be used in z-axis scans with automatic surface detection. The SAR values can be extrapolated to the inner phantom surface. The extrapolation distance is the sum of the probe sensor offset, the surface detection distance and the grid offset. The extrapolation is based on fourth order polynomial functions. The extrapolation is only available for SAR values.

9.3 Boundary correction

The correction of the probe boundary effect in the vicinity of the phantom surface is done in the standard (worst case) evaluation; the boundary effect is reduced by different weights for the lowest measured points in the extrapolation routine. The result is a slight overestimation of the extrapolated SAR values (2% to 8%) depending on the SAR distribution and gradient. The advanced evaluation makes a full compensation of the boundary effect before doing the extrapolation. This is only possible for probes with specifications on the boundary effect.

9.4 Peak search for 1g and 10g cube averaged SAR

The 1g and 10g peak evaluations are only available for the predefined cube 5x5x7 / 7x7x9 scan. The routines are verified and optimized for the grid dimensions used in these cube measurements.
The measured volume of 30x30x30mm / 24x24x20 with 7.5mm / 4.0 resolution in (x,y) and 5mm / 2.5mm resolution in z axis amounts to 175 / 693 measurement points. 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 a 1mm grid. In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is then moved around until the highest averaged SAR is found. This last procedure is repeated for a 10 g cube. 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.

10.0 MEASUREMENT UNCERTAINTY

DASY5 Uncertainty Budget
According to IEEE 1528/2003 [1]

Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±5.5 %	N	1	1	1	±5.5 %	±5.5 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.4 %	R	$\sqrt{3}$	1	1	±0.2 %	±0.2 %	∞
Probe Positioning	±2.9 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Max. SAR Eval.	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Phantom and Setup								
Phantom Uncertainty	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Liquid Conductivity (target)	±5.0 %	R	$\sqrt{3}$	0.64	0.43	±1.8 %	±1.2 %	∞
Liquid Conductivity (meas.)	±2.5 %	N	1	0.64	0.43	±1.6 %	±1.1 %	∞
Liquid Permittivity (target)	±5.0 %	R	$\sqrt{3}$	0.6	0.49	±1.7 %	±1.4 %	∞
Liquid Permittivity (meas.)	±2.5 %	N	1	0.6	0.49	±1.5 %	±1.2 %	∞
Combined Std. Uncertainty						±10.7 %	±10.5 %	387
Expanded STD Uncertainty						**±21.4 %**	**±21.0 %**	

Table 10.0.1. Worst-Case uncertainty budget for DASY52 assessed according to IEEE P1528. Source: Schmid & Partner Engineering AG.

[1] The budget is valid for the frequency range 300MHz - 3 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerably smaller.

DASY5 Uncertainty Budget
for the 3 - 6 GHz range

Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.55 %	N	1	1	1	±6.55 %	±6.55 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±2.0 %	R	$\sqrt{3}$	1	1	±1.2 %	±1.2 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Probe Positioning	±9.9 %	R	$\sqrt{3}$	1	1	±5.7 %	±5.7 %	∞
Max. SAR Eval.	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Phantom and Setup								
Phantom Uncertainty	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Liquid Conductivity (target)	±5.0 %	R	$\sqrt{3}$	0.64	0.43	±1.8 %	±1.2 %	∞
Liquid Conductivity (meas.)	±2.5 %	N	1	0.64	0.43	±1.6 %	±1.1 %	∞
Liquid Permittivity (target)	±5.0 %	R	$\sqrt{3}$	0.6	0.49	±1.7 %	±1.4 %	∞
Liquid Permittivity (meas.)	±2.5 %	N	1	0.6	0.49	±1.5 %	±1.2 %	∞
Combined Std. Uncertainty						±12.8 %	±12.6 %	330
Expanded STD Uncertainty						**±25.6 %**	**±25.2 %**	

Table 10.0.2. Worst-Case uncertainty budget for DASY52 assessed according to IEEE P1528. Source: Schmid & Partner Engineering AG.

11.0 TEST RESULTS

11.1 SAR Measurement results at highest power measured against the head

Test Position	Mode	f (MHz)	Channel	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
								Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	LTE Band 17	710	23790	QPSK	1	0	23.00	0.37	0.04	0.37
		710	23790	QPSK	1	49	23.00	0.42	0.13	0.42
		710	23790	QPSK	25	0	22.40	0.29	0.22	0.29
		710	23790	16QAM	1	0	21.45	0.30	0.43	0.30
		710	23790	16QAM	1	49	21.46	0.33	0.17	0.33
		710	23790	16QAM	30	0	21.47	0.23	0.04	0.23
Right Head 15° Tilt	LTE Band 17	710	23790	QPSK	1	0	23.00	0.21	-0.11	0.21
		710	23790	16QAM	1	0	21.45	0.17	0.16	0.17
Left Head Cheek	LTE Band 17	710	23790	QPSK	1	0	23.00	0.48	-0.27	0.51
		710	23790	QPSK	1	49	23.00	0.50	0.06	0.50
		710	23790	QPSK	25	0	22.40	0.36	0.07	0.36
		710	23790	16QAM	1	0	21.45	0.41	0.10	0.41
		710	23790	16QAM	1	49	21.46	0.37	0.00	0.37
		710	23790	16QAM	30	0	21.47	0.29	0.01	0.29
Left Head 15° Tilt	LTE Band 17	710	23790	QPSK	1	0	23.00	0.27	-0.30	0.29
		710	23790	16QAM	1	0	21.45	0.23	-0.08	0.23

Table 11.1.1a. Rev 1 SAR results for LTE Band 17 (10MHz BW) head configuration

Note 1: If the power drift is ≤ – 0.200 dB, the extrapolated SAR is calculated using the formula:

Extrapolated SAR = (Measured SAR) * 10^(|Power Drift (dB)| / 10)

Note 2: Only Middle channel was tested when 1g Average SAR <0.8 W/Kg or 3dB lower than the limit.

Note 3: For LTE if SAR > 1.45, then SAR tests for the smaller bandwidths and 100% RB for the highest bandwidth (10 MHz or 20 MHz) are required.

Test Position	Mode	f (MHz)	Channel	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
								Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Left Head Cheek	LTE Band 17	710	23790	QPSK	1	49	24.9	0.57	0.21	0.57

Table 11.1.1b. Rev 2 SAR results for LTE Band 17 (10MHz BW) head configuration

Test Position	Mode	f (MHz)	Channel	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
								Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	LTE Band 5	836.5	20525	QPSK	1	0	23.87	0.59	-0.10	0.59
		836.5	20525	QPSK	1	49	23.90	0.59	0.01	0.59
		836.5	20525	QPSK	25	0	23.10	0.47	-0.12	0.47
		836.5	20525	16QAM	1	0	22.87	0.32	0.07	0.32
		836.5	20525	16QAM	1	49	23.30	0.43	-0.07	0.43
		836.5	20525	16QAM	30	0	22.10	0.39	-0.03	0.39
Right Head 15° Tilt	LTE Band 5	836.5	20525	QPSK	1	0	23.87	0.37	-0.17	0.37
		836.5	20525	16QAM	1	49	23.30	0.24	-0.12	0.24
Left Head Cheek	LTE Band 5	836.5	20525	QPSK	1	0	23.87	0.58	-0.04	0.58
		836.5	20525	QPSK	1	49	23.90	0.57	0.02	0.57
		836.5	20525	QPSK	25	0	23.10	0.46	0.00	0.46
		836.5	20525	16QAM	1	0	22.87	0.47	-0.13	0.47
		836.5	20525	16QAM	1	49	23.30	0.46	0.04	0.46
		836.5	20525	16QAM	30	0	22.10	0.37	-0.14	0.37
Left Head 15° Tilt	LTE Band 5	836.5	20525	QPSK	1	0	23.87	0.33	0.14	0.33
		836.5	20525	16QAM	1	0	22.87	0.17	-0.22	0.18

Table 11.1.2a. Rev 1 SAR results for LTE Band 5 (10MHz BW) head configuration

Test Position	Mode	f (MHz)	Channel	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
								Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	LTE Band 5	836.5	20525	QPSK	1	0	23.7	0.34	0.67	0.34

Table 11.1.2b. Rev 2 SAR results for LTE Band 5 (10MHz BW) head configuration

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	2-slots GSM/EDGE 850 MHz	824.2					
		836.8	190	30.3	0.50	-0.16	0.50
		848.8					
Right Head Cheek	3-slots GSM/EDGE 850 MHz	824.2					
		836.8	190	29.5	0.47	0.10	0.47
		848.8					
Right Head Cheek	4-slots GSM/EDGE 850 MHz	824.2					
		836.8	190	27.2	0.40	-0.09	0.40
		848.8					
Right Head 15° Tilt	2-slots GSM/EDGE 850 MHz	824.2					
		836.8	190	30.3	0.28	0.02	0.28
		848.8					
Right Head Cheek	1-slot GSM 850 MHz	824.2					
		836.8	190	33.5	0.64	0.05	0.64
		848.8					
Left Head Cheek	2-slots GSM/EDGE 850 MHz	824.2					
		836.8	190	30.3	0.49	0.36	0.49
		848.8					
Left Head 15° Tilt	2-slots GSM/EDGE 850 MHz	824.2					
		836.8	190	30.3	0.32	-0.03	0.32
		848.8					
Left Head Cheek	1-slot GSM 850 MHz	824.2					
		836.8	190	33.5	0.61	-0.05	0.61
		848.8					

Table 11.1.3a. Rev 1 SAR results for GSM/EDGE 850 head configuration

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	1-slot GSM 850 MHz	824.2					
		836.8	190	33.5	0.59	-0.28	0.63
		848.8					

Table 11.1.3b. Rev 2 SAR results for GSM/EDGE 850 head configuration

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	WCDMA FDD V 850 MHz	826.4					
		836.4	4182	24.7	0.62	0.12	0.62
		846.6					
Right Head 15° Tilt	WCDMA FDD V 850 MHz	826.4					
		836.4	4182	24.7	0.37	0.13	0.37
		846.6					
Left Head Cheek	WCDMA FDD V 850 MHz	826.4					
		836.4	4182	24.7	0.61	0.03	0.61
		846.6					
Left Head 15° Tilt	WCDMA FDD V 850 MHz	826.4					
		836.4	4182	24.7	0.38	0.07	0.38
		846.6					

Table 11.1.4a. Rev 1 SAR results for WCDMA FDD V head configuration

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	WCDMA FDD V 850 MHz	826.4					
		836.4	4182	24.6	0.54	0.01	0.54
		846.6					

Table 11.1.4b. Rev 2 SAR results for WCDMA FDD V head configuration

Test Position	Mode	f (MHz)	Channel	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
								Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	LTE Band 4	1732.5	20175	QPSK	1	0	23.35	0.67	0.03	0.67
		1732.5	20175	QPSK	1	99	23.33	0.62	0.04	0.62
		1732.5	20175	QPSK	50	0	22.27	0.54	0.03	0.54
		1732.5	20175	16QAM	1	0	22.61	0.54	0.13	0.54
		1732.5	20175	16QAM	1	99	22.20	0.49	0.03	0.49
		1732.5	20175	16QAM	75	0	21.31	0.44	0.04	0.44
Right Head 15° Tilt	LTE Band 4	1732.5	20175	QPSK	1	0	23.35	0.45	-0.04	0.45
		1732.5	20175	16QAM	1	0	22.61	0.38	-0.01	0.38
Left Head Cheek	LTE Band 4	1732.5	20175	QPSK	1	0	23.35	0.81	-0.13	0.81
		1732.5	20175	QPSK	1	99	23.33	0.72	-0.03	0.72
		1732.5	20175	QPSK	50	0	22.27	0.63	-0.03	0.63
		1732.5	20175	16QAM	1	0	22.61	0.67	-0.10	0.67
		1732.5	20175	16QAM	1	99	22.20	0.59	-0.10	0.59
		1732.5	20175	16QAM	75	0	21.31	0.51	-0.23	0.54
		1720.0	20050	QPSK	1	0	22.65	0.79	-0.07	0.79
		1745.0	20300	QPSK	1	0	22.76	0.74	-0.06	0.74
Left Head 15° Tilt	LTE Band 4	1732.5	20175	QPSK	1	0	23.35	0.50	0.03	0.50
		1732.5	20175	16QAM	1	0	22.61	0.42	0.19	0.42

Table 11.1.5a. Rev 1 SAR results for LTE Band 4 (20MHz BW) head configuration

Test Position	Mode	f (MHz)	Channel	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
								Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Left Head Cheek	LTE Band 4	1732.5	20175	QPSK	1	0	23.8	**0.97**	**0.01**	**0.97**
		1732.5	20175	QPSK	1	99				
		1732.5	20175	QPSK	50	0				
		1732.5	20175	16QAM	1	0				
		1732.5	20175	16QAM	1	99				
		1732.5	20175	16QAM	75	0				

Table 11.1.5b. Rev 2 SAR results for LTE Band 4 (20MHz BW) head configuration

Test Position	Mode	f (MHz)	Channel	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
								Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	LTE Band 2	1880	18900	QPSK	1	0	23.30	0.46	-0.15	0.46
		1880	18900	QPSK	1	99	23.20	0.46	0.00	0.46
		1880	18900	QPSK	50	0	22.60	0.42	-0.07	0.42
		1880	18900	16QAM	1	0	22.70	0.41	0.03	0.41
		1880	18900	16QAM	1	99	22.60	0.42	0.04	0.42
		1880	18900	16QAM	75	25	21.50	0.34	-0.04	0.34
Right Head 15° Tilt	LTE Band 2	1880	18900	QPSK	1	0	23.30	0.16	0.01	0.16
				16QAM	1	99	22.60	0.14	-0.06	0.14
Left Head Cheek	LTE Band 2	1880	18900	QPSK	1	0	23.30	0.57	-0.11	0.57
		1880	18900	QPSK	1	99	23.20	0.51	-0.05	0.51
		1880	18900	QPSK	50	0	22.60	0.48	-0.18	0.48
		1880	18900	16QAM	1	0	22.70	0.39	0.06	0.39
		1880	18900	16QAM	1	99	22.60	0.38	-0.14	0.38
		1880	18900	16QAM	75	25	21.50	0.40	0.07	0.40
Left Head 15° Tilt	LTE Band 2	1880	18900	QPSK	1	0	23.30	0.22	-0.10	0.22
				16QAM	75	25	21.50	0.19	-0.25	0.20

Table 11.1.7a. Rev 1 SAR results for LTE Band 2 (20MHz BW) head configuration

Test Position	Mode	f (MHz)	Channel	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
								Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Left Head Cheek	LTE Band 2	1880	18900	QPSK	1	0	23.50	0.73	-0.17	0.73

Table 11.1.7b. Rev 2 SAR results for LTE Band 2 (20MHz BW) head configuration

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	2-slots GSM/EDGE 1900 MHz	1850.2					
		1880.0	661	28.3	0.28	-0.28	0.30
		1909.8					
Right Head Cheek	3-slots GSM/EDGE 1900 MHz	1850.2					
		1880.0	661	25.5	0.25	0.07	0.25
		1909.8					
Right Head Cheek	4-slots GSM/EDGE 1900 MHz	1850.2					
		1880.0	661	25.4	0.29	-0.07	0.29
		1909.8					
Right Head 15° Tilt	2-slots GSM/EDGE 1900 MHz	1850.2					
		1880.0	661	28.3	0.11	0.04	0.11
		1909.8					
Right Head Cheek	1-slot GSM 1900 MHz	1850.2					
		1880.0	661	29.8	0.21	0.25	0.21
		1909.8					
Left Head Cheek	2-slots GSM/EDGE 1900 MHz	1850.2					
		1880.0	661	28.3	0.44	-0.09	0.44
		1909.8					
Left Head Cheek	3-slots GSM/EDGE 1900 MHz	1850.2					
		1880.0	661	25.5	0.37	-0.14	0.37
		1909.8					
Left Head Cheek	4-slots GSM/EDGE 1900 MHz	1850.2					
		1880.0	661	25.4	0.43	-0.10	0.43
		1909.8					
Left Head 15° Tilt	2-slots GSM/EDGE 1900 MHz	1850.2					
		1880.0	661	28.3	0.15	-0.22	0.16
		1909.8					
Left Head Cheek	1-slot GSM 1900 MHz	1850.2					
		1880.0	661	29.8	0.33	0.00	0.33
		1909.8					

Table 11.1.8a. Rev 1 SAR results for GSM/EDGE 1900 head configuration

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Left Head Cheek	2-slots GSM/EDGE 1900 MHz	1850.2					
		1880.0	661	28.3	0.41	-0.19	0.41
		1909.8					

Table 11.1.8b. Rev 2 SAR results for GSM/EDGE 1900 head configuration

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Right Head Cheek	WCDMA FDD II 1900 MHz	1852.4					
		1880.0	9400	23.8	0.40	0.19	0.40
		1907.6					
Right Head 15° Tilt	WCDMA FDD II 1900 MHz	1852.4					
		1880.0	9400	23.8	0.17	0.06	0.17
		1907.6					
Left Head Cheek	WCDMA FDD II 1900 MHz	1852.4					
		1880.0	9400	23.8	0.59	-0.19	0.59
		1907.6					
Left Head 15° Tilt	WCDMA FDD II 1900 MHz	1852.4					
		1880.0	9400	23.8	0.19	-0.04	0.19
		1907.6					

Table 11.1.9a. Rev 1 SAR results for WCDMA FDD II head configuration

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	SAR, averaged over 1 g		
					Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
Left Head Cheek	WCDMA FDD II 1900 MHz	1852.4	9262	23.6	0.85	-0.09	0.85
		1880.0	9400	23.9	0.84	-0.09	0.84
		1907.6	9538	23.5	0.71	0.30	0.71

Table 11.1.9b. Rev 2 SAR results for WCDMA FDD II head configuration

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dB)	Extrapolated SAR Averaged over 1 g	Extrapolated SAR Averaged over 10 g
Right Head Cheek	802.11 b 2450 MHz	2412	1				
		2437	6	18.6	0.21	0.28	0.12
		2462	11				
Right Head 15° Tilt	802.11 b 2450 MHz	2412	1				
		2437	6	18.6	0.04	0.28	0.12
		2462	11				
Left Head Cheek	802.11 b 2450 MHz	2412	1				
		2437	6	18.6	0.04	0.32	0.15
		2462	11				
Left Head 15° Tilt	802.11 b 2450 MHz	2412	1				
		2437	6	18.6	0.02	0.30	0.14
		2462	11				

Table 11.1.10a. Rev 1 SAR results for WiFi/WLAN/802.11b head configuration

Note 4: Only the highest output power channel was tested

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dB)	Extrapolated SAR Averaged over 1 g	Extrapolated SAR Averaged over 10 g
Right Head Cheek	802.11 b 2450 MHz	2412	1	19.7	0.52	0.27	0.12
		2437	6				
		2462	11				
Right Head 15° Tilt	802.11 b 2450 MHz	2412	1				
		2437	6				
		2462	11				
Left Head Cheek	802.11 b 2450 MHz	2412	1	19.7	-0.05	0.32	0.14
		2437	6				
		2462	11				
Left Head 15° Tilt	802.11 b 2450 MHz	2412	1				
		2437	6				
		2462	11				

Table 11.1.10b. Rev 2 SAR results for WiFi/WLAN/802.11b head configuration

Note 4: Only the highest output power channel was tested

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dB)	Extrapolated SAR Averaged over 1 g	Extrapolated SAR Averaged over 10 g
Right Head Cheek	802.11 a 5180-5825 MHz	5240	48	13.4	0.10	0.03	0.01
		5300	60	14.9	0.07	0.02	0.01
		5520	104	15.0	-0.07	0.02	0.01
		5745	149	13.5	-0.12	0.02	0.01
Right Head 15° Tilt	802.11 a 5180-5825 MHz	5240	48	13.4	0.83	0.01	0.00
Left Head Cheek	802.11 a 5180-5825 MHz	5240	48	13.4	0.37	0.02	0.01
		5300	60	14.9	-0.19	0.03	0.01
		5520	104	15.0	0.91	0.02	0.01
		5745	149	13.5	0.22	0.02	0.01
Left Head 15° Tilt	802.11 a 5180-5825 MHz	5520	104	15.0	-0.11	0.02	0.01

Table 11.1.11a. Rev 1 SAR results for 802.11a head configuration

Note 5: Only the highest output power channel per sub band was tested

Test Position	Mode	f (MHz)	Channel	Cond. Output Power (dBm)	Measured SAR (W/kg)		
					Power Drift (dB)	Extrapolated SAR Averaged over 1 g	Extrapolated SAR Averaged over 10 g
Right Head Cheek	802.11 a 5180-5825 MHz	5240	48				
		5300	60				
		5520	104	15.7	-0.07	0.04	0.02
		5745	149				
Right Head 15° Tilt	802.11 a 5180-5825 MHz	5240	48				
Left Head Cheek	802.11 a 5180-5825 MHz	5240	48				
		5300	60				
		5520	104	15.7	0.68	0.05	0.02
		5745	149				
Left Head 15° Tilt	802.11 a 5180-5825 MHz	5520	104				

Table 11.1.11b. Rev 2 SAR results for 802.11a head configuration

Note 5: Only the highest output power channel per sub band was tested

11.2 SAR measurement results at highest power measured against the body using accessories

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
										Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
LTE Band 17	23790	710	Body Mobile Hotspot Mode	1.0	Back	QPSK	1	0	23.0	0.74	0.01	0.74
	23790	710		1.0	Back	QPSK	1	49	23.0	0.76	-0.04	0.76
	23790	710		1.0	Back	QPSK	25	0	22.4	0.58	0.03	0.58
	23790	710		1.0	Back	16QAM	1	0	21.4	0.54	-0.16	0.54
	23790	710		1.0	Back	16QAM	1	49	21.5	0.64	-0.03	0.64
	23790	710		1.0	Back	16QAM	30	20	21.4	0.47	-0.01	0.47
	23790	710		1.0	Front	QPSK	1	49	23.0	0.67	0.03	0.67
	23790	710		1.0	Left	QPSK	1	49	23.0	0.40	0.00	0.40
	23790	710		1.0	Right	QPSK	1	49	23.0	0.24	-0.29	0.26
	23790	710		1.0	Bottom	QPSK	1	49	23.0	0.15	0.03	0.15
	23790	710		1.0	Back+HS	QPSK	1	49	23.0	0.70	-0.01	0.70
LTE Band 17	23790	710	Body-worn	1.5	Back	QPSK	1	49	23.0	0.50	0.00	0.50
	23790	710		Holster	Back	QPSK	1	49	23.0	0.39	-0.05	0.39
	23790	710		Holster	Front	QPSK	1	49	23.0	0.36	-0.01	0.36

Table 11.2.1a. Rev 1 SAR results for LTE Band 17 (10MHz BW) body-worn and Mobile Hotspot configurations

Note 1: If the power drift is ≤ – 0.200 dB, the extrapolated SAR is calculated using the formula:

Extrapolated SAR = (Measured SAR) * 10^(|Power Drift (dB)| / 10)

Note 2: Only Middle channel was tested when 1g Average SAR <0.8 W/Kg or 3dB lower than the limit.

Note 3: Device was tested with 15 mm RIM recommended separation distance to allow typical after-market holster to be used. RIM body-worn holsters with belt-clip have been designed to maintain ~ 19 mm separation distance from body.

Note 4: For Mobile Hotspot mode any side of the phone that is further than 2.5 cm away from the transmitting antenna can be exempted from testing.

Note 5: For LTE if SAR > 1.45, then SAR tests for the smaller bandwidths and 100% RB for the highest bandwidth (10 MHz or 20 MHz) are required.

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
										Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
LTE Band 17	704	23730	Body Mobile Hotspot Mode	1.0	Back	QPSK	1	49	24.8	0.64	0.06	0.64
	710	23790		1.0	Back	QPSK	1	49	24.9	0.88	-0.10	0.88
	716	23849		1.0	Back	QPSK	1	49	24.5	0.48	0.05	0.48
LTE Band 17	710	23790	Body-worn	1.5	Back	QPSK	1	49	24.9	0.63	-0.18	0.63

Table 11.2.1b. Rev 2 SAR results for LTE Band 17 (10MHz BW) body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
										Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
LTE Band 5	836.5	20525	Body Mobile Hotspot Mode	1.0	Back	QPSK	1	0	23.9	0.77	-0.17	0.77
	836.5	20525		1.0	Back	QPSK	1	49	23.9	0.77	0.08	0.77
	836.5	20525		1.0	Back	QPSK	25	0	23.1	0.68	-0.01	0.68
	836.5	20525		1.0	Back	16QAM	1	0	22.9	0.59	-0.01	0.59
	836.5	20525		1.0	Back	16QAM	1	49	23.3	0.61	-0.03	0.61
	836.5	20525		1.0	Back	16QAM	30	0	22.1	0.55	0.05	0.55
	836.5	20525		1.0	Front	QPSK	1	49	23.9	0.78	0.05	0.78
	836.5	20525		1.0	Left	QPSK	1	49	23.9	0.58	-0.17	0.58
	836.5	20525		1.0	Right	QPSK	1	49	23.9	0.78	0.03	0.78
	836.5	20525		1.0	Bottom	QPSK	1	49	23.9	0.20	-0.07	0.20
	836.5	20525		1.0	Front+HS	QPSK	1	49	23.9	0.71	-0.18	0.71
LTE Band 5	836.5	20525	Body-worn	1.5	Front	QPSK	1	49	23.9	0.63	-0.08	0.63
	836.5	20525		Holster	Back	QPSK	1	49	23.9	0.54	0.08	0.54
	836.5	20525		Holster	Front	QPSK	1	49	23.9	0.58	0.09	0.58

Table 11.2.2a. Rev 1 SAR results for LTE Band 5 (10MHz BW) body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
										Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
LTE Band 5	836.5	20525	Body Mobile Hotspot Mode	1.0	Front	QPSK	1	49	23.9	0.67	-0.15	0.67

Table 11.2.2b. Rev 2 SAR results for LTE Band 5 (10MHz BW) body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
2-slots GPRS/ EDGE 850 MHz	824.2	128	Body Mobile Hotspot Mode	1.0	Back				
	836.8	190		1.0	Back	30.7	0.73	-0.12	0.73
	848.8	251		1.0	Back				
	836.8	190		1.0	Front	30.7	0.76	0.04	0.76
	836.8	190		1.0	Left	30.7	0.46	0.02	0.46
	836.8	190		1.0	Right	30.7	0.68	-0.05	0.68
	836.8	190		1.0	Bottom	30.7	0.21	-0.40	0.23
	836.8	190		1.0	Front+HS	30.7	0.66	0.00	0.66
3-slots GPRS/ EDGE 850 MHz	836.8	190		1.0	Back	29.3	0.71	-0.16	0.71
4-slots GPRS/ EDGE 850 MHz	836.8	190		1.0	Back	27.0	0.59	-0.13	0.59
2-slots GPRS 850 MHz	836.8	190	Body-worn	1.5	Front	30.7	0.58	-0.30	0.62
	836.8	190		Holster	Back	30.7	0.55	-0.13	0.55
	836.8	190		Holster	Front	30.7	0.57	-0.29	0.61

Table 11.2.3a. Rev 1 SAR results for GSM/EDGE 850 body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
2-slots GPRS/ EDGE 850 MHz	836.8	190	Body Mobile Hotspot Mode	1.0	Front	30.7	0.75	0.18	0.75

Table 11.2.3b. Rev 2 SAR results for GSM/EDGE 850 body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
WCDMA FDD V 850 MHz	826.4	4132	Body Mobile Hotspot Mode	1.0	Back	24.6	0.87	0.04	0.87
	836.4	4182		1.0	Back	24.7	0.91	-0.01	0.91
	846.6	4233		1.0	Back	24.1	0.67	-0.06	0.67
	826.4	4132		1.0	Front	24.6	0.83	-0.10	0.83
	836.4	4182		1.0	Front	24.7	0.87	0.05	0.87
	846.6	4233		1.0	Front	24.1	0.65	-0.06	0.65
	836.4	4182		1.0	Left	24.7	0.58	0.06	0.58
	836.4	4182		1.0	Right	24.7	0.79	0.01	0.79
	836.4	4182		1.0	Bottom	24.7	0.20	-0.13	0.20
	836.4	4182		1.0	Back+HS	24.7	0.80	0.03	0.80
WCDMA FDD V 850 MHz	836.4	4182	Body-worn	1.5	Back	24.7	0.69	0.06	0.69
	836.4	4182		1.5	Front	24.7	0.70	0.05	0.70
	836.4	4182		Holster	Front	24.7	0.67	-0.08	0.67

Table 11.2.4a. Rev 1 SAR results for WCDMA FDD V body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
WCDMA FDD V 850 MHz	836.4	4182	Body Mobile Hotspot Mode	1.0	Back	24.6	0.78	-0.07	0.78

Table 11.2.4b. Rev 2 SAR results for WCDMA FDD V body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
										Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
LTE Band 4	1732.5	20175	Body Mobile Hotspot Mode	1.0	Back	QPSK	1	0	23.35	**1.50**	**-0.13**	**1.50**
	1732.5	20175		1.0	Back	QPSK	1	99	23.33	1.36	-0.03	0.36
	1732.5	20175		1.0	Back	QPSK	50	0	22.27	1.14	-0.16	1.14
	1732.5	20175		1.0	Back	16QAM	1	0	22.61	1.04	-0.28	1.11
	1732.5	20175		1.0	Back	16QAM	1	99	22.20	1.16	-0.29	1.24
	1732.5	20175		1.0	Back	16QAM	75	0	21.31	1.00	0.01	1.00
	1732.5	20175		1.0	Front	QPSK	1	0	23.35	1.02	-0.21	1.07
	1732.5	20175		1.0	Left	QPSK	1	0	23.35	0.53	0.22	0.53
	1732.5	20175		1.0	Right	QPSK	1	0	23.35	0.28	-0.11	0.28
	1732.5	20175		1.0	Bottom	QPSK	1	0	23.35	0.56	-0.10	0.56
	1720.0	20050		1.0	Back	QPSK	1	0	22.65	1.42	0.02	1.42
	1745.0	20300		1.0	Back	QPSK	1	0	22.76	1.38	-0.04	1.38
	1732.5	20175		1.0	Back+HS	QPSK	1	0	23.35	1.41	-0.06	1.41
LTE Band 4	1720.0	20050	Body-worn	1.5	Back	QPSK	1	0	22.65	0.84	0.00	0.84
	1732.5	20175		1.5	Back	QPSK	1	0	23.35	0.88	-0.10	0.88
	1745.0	20300		1.5	Back	QPSK	1	0	22.76	0.81	0.00	0.81
	1732.5	20175		Holster	Back	QPSK	1	0	23.35	0.53	0.13	0.53
	1732.5	20175		Holster	Front	QPSK	1	0	23.35	0.43	-0.12	0.43

Table 11.2.5a. SAR results for LTE Band 4 (20MHz BW) body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power	BW (MHz)	SAR, averaged over 1 g		
											Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
LTE Band 4	1732.5	20175	Body Mobile Hotspot Mode	1.0	Back	QPSK	1	0	22.79	15	1.48	-0.04	1.48
	1732.5	20175		1.0	Back	QPSK	1	0	22.96	10	1.49	-0.14	1.49
	1732.5	20175		1.0	Back	QPSK	1	0	22.86	5	1.49	0.03	1.49
	1732.5	20175		1.0	Back	QPSK	1	0	22.89	3	1.50	-0.07	1.50
	1732.5	20175		1.0	Back	QPSK	1	0	22.74	1.4	1.50	0.04	1.50
	1732.5	20175		1.0	Back	QPSK	100	0	22.60	20	1.29	-0.12	1.29

Table 11.2.5b. SAR results for LTE Band 4 (various BW) Mobile Hotspot configuration due to worst case 1 g avg. SAR being > 1.45 W/kg

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
										Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
LTE Band 4	1732.5	20175	Body Mobile Hotspot Mode	1.0	Back	QPSK	1	0	22.0	1.04	-0.01	1.04
	1732.5	20175		1.0	Back	QPSK	1	99	21.7	0.98	-0.02	0.98
	1732.5	20175		1.0	Back	QPSK	50	0	22.0	1.05	0.02	1.05
	1732.5	20175		1.0	Back	16QAM	1	0	21.8	1.08	0.09	1.08
	1732.5	20175		1.0	Back	16QAM	1	99	21.7	1.06	0.03	1.06
	1732.5	20175		1.0	Back	16QAM	75	0	21.9	1.04	-0.06	1.04
	1720.0	20050		1.0	Back	16QAM	1	0	21.9	1.06	-0.04	1.06
	1749.0	20300		1.0	Back	16QAM	1	0	21.8	0.94	-0.01	0.94
	1732.5	20175		1.0	Front	16QAM	1	0	21.3	0.83	0.05	0.83
	1732.5	20175		1.0	Left	16QAM	1	0	21.3	0.45	0.19	0.45
	1732.5	20175		1.0	Right	16QAM	1	0	21.3	0.22	-0.03	0.22
	1732.5	20175		1.0	Bottom	16QAM	1	0	21.3	0.50	0.07	0.50
	1732.5	20175		1.0	Back+HS	16QAM	1	0	21.3	1.11	0.06	1.11
LTE Band 4	1720.0	20050	Body-worn	1.5	Back	QPSK	1	0				
	1732.5	20175		1.5	Back	QPSK	1	0	22.0	**0.95**	**-0.10**	**0.95**
	1745.0	20300		1.5	Back	QPSK	1	0				
	1732.5	20175		Holster	Back	QPSK	1	0				
	1732.5	20175		Holster	Front	QPSK	1	0				

Table 11.2.5c. Rev 2 SAR results for LTE Band 4 (20MHz BW) body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
										Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
LTE Band 2	1880	18900	Body Mobile Hotspot Mode	1.0	Back	QPSK	1	0	23.3	1.36	-0.10	1.36
	1880	18900		1.0	Back	QPSK	1	99	23.2	1.33	-0.08	1.33
	1880	18900		1.0	Back	QPSK	50	0	22.6	1.16	-0.07	1.16
	1880	18900		1.0	Back	16QAM	1	0	22.7	0.97	-0.07	0.97
	1880	18900		1.0	Back	16QAM	1	99	22.6	1.10	0.12	1.10
	1880	18900		1.0	Back	16QAM	75	0	21.5	0.80	0.00	0.80
	1860	18700		1.0	Back	QPSK	1	0	23.1	1.11	-0.23	1.17
	1900	19100		1.0	Back	QPSK	1	0	23.0	1.26	-0.11	1.26
	1880	18900		1.0	Front	QPSK	1	0	23.3	0.54	0.04	0.54
	1880	18900		1.0	Left	QPSK	1	0	23.3	0.34	-0.10	0.34
	1880	18900		1.0	Right	QPSK	1	0	23.3	0.17	-0.06	0.17
	1860	18700		1.0	Bottom	QPSK	1	0	23.1	0.84	-0.08	0.84
	1880	18900		1.0	Bottom	QPSK	1	0	23.3	0.83	-0.03	0.83
	1900	19100		1.0	Bottom	QPSK	1	0	23.0	0.90	0.00	0.90
	1880	18900		1.0	Back+HS	QPSK	1	0	23.3	1.28	-0.27	1.36
LTE Band 2	1880	18900	Body-worn	1.5	Back	QPSK	1	0	23.3	0.56	-0.02	0.56
	1880	18900		Holster	Back	QPSK	1	0	23.3	0.39	-0.13	0.39
	1880	18900		Holster	Front	QPSK	1	0	23.3	0.24	-0.10	0.24

Table 11.2.7a. Rev 1 SAR results for LTE Band 2 (20MHz BW) body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Modulation	# of Resource Blocks	RB Offset	Conducted Output Power (dBm)	SAR, averaged over 1 g		
										Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
LTE Band 2	1880	18900	Body Mobile Hotspot Mode	1.0	Back	QPSK	1	0	20.8	1.11	-0.12	1.11
LTE Band 2	1880	18900	Body-worn	1.5	Back	QPSK	1	0	23.7	0.77	0.05	0.77

Table 11.2.7b. Rev 2 SAR results for LTE Band 2 (20MHz BW) body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
2-slots GPRS 1900MHz	1850.2	512	Body Mobile Hotspot Mode	1.0	Back	28.3	0.98	-0.04	0.98
	1880.0	661		1.0	Back	28.2	0.97	-0.22	1.02
	1909.8	810		1.0	Back	28.2	1.04	0.04	1.04
	1880.0	661		1.0	Front	28.2	0.43	-0.03	0.43
	1880.0	661		1.0	Left	28.2	0.23	0.09	0.23
	1880.0	661		1.0	Right	28.2	0.10	-0.14	0.10
	1880.0	661		1.0	Bottom	28.2	0.60	-0.09	0.60
	1909.8	810		1.0	Back+HS	28.2	1.02	0.02	1.02
3-slots GPRS 1900MHz	1909.8	810		1.0	Back	25.7	0.73	0.01	0.73
4-slots GPRS 1900MHz	1909.8	810		1.0	Back	25.1	0.84	-0.04	0.84
2-slots GPRS 1900MHz	1880.0	661	Body-worn	1.5	Back	28.2	0.49	-0.06	0.49
	1880.0	661		Holster	Back	28.2	0.28	-0.02	0.28
	1880.0	661		Holster	Front	28.2	0.16	-0.07	0.16

Table 11.2.8a. Rev 1 SAR results for GSM/EDGE 1900 body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
2-slots GPRS 1900MHz	1850.2	512	Body Mobile Hotspot Mode	1.0	Back				
	1880.0	661		1.0	Back				
	1909.8	810		1.0	Back	28.2	1.13	0.09	1.13
2-slots GPRS 1900MHz	1880.0	661	Body-worn	1.5	Back	28.2	0.54	0.16	0.54
	1880.0	661		Holster	Back				
	1880.0	661		Holster	Front				

Table 11.2.8b. Rev 2 SAR results for GSM/EDGE 1900 body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
WCDMA FDD II 1900 MHz	1852.4	9262	Body Mobile Hotspot Mode	1.0	Back	23.7	1.37	-0.04	1.37
	1880.0	9400		1.0	Back	23.8	1.27	-0.03	1.27
	1907.6	9538		1.0	Back	23.6	1.43	-0.06	1.43
	1880.0	9400		1.0	Left	23.8	0.39	0.08	0.39
	1880.0	9400		1.0	Right	23.8	0.15	-0.08	0.15
	1880.0	9400		1.0	Bottom	23.8	0.64	-0.01	0.64
	1907.6	9538		1.0	Back+HS	23.6	1.36	-0.10	1.36
WCDMA FDD II 1900 MHz	1880.0	9400	Body-worn	1.5	Back	23.8	0.62	-0.09	0.62
	1880.0	9400		Holster	Back	23.8	0.44	-0.02	0.44
	1880.0	9400		Holster	Front	23.8	0.25	-0.02	0.25

Table 11.2.9a. Rev 1 SAR results for WCDMA FDD II body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Channel	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	SAR, averaged over 1 g		
							Measured (W/kg)	Power Drift (dB)	*Extrapolated (W/kg)
WCDMA FDD II 1900 MHz	1852.4	9262	Body Mobile Hotspot Mode	1.0	Back				
	1880.0	9400		1.0	Back				
	1907.6	9538		1.0	Back	21.5	1.34	0.04	1.34
WCDMA FDD II 1900 MHz	1852.4	9262	Body-worn	1.5	Back	23.6	0.91	-0.03	0.91
	1880.0	9400		1.5	Back	23.9	0.90	-0.04	0.90
	1907.6	9538		1.5	Back	23.5	0.95	0.10	0.95

Table 11.2.9b. Rev 2 SAR results for WCDMA FDD II body-worn and Mobile Hotspot configurations

Mode	f (MHz)	Ch.	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	Measured SAR (W/kg)		
							Power Drift (dB)	Extrapolated SAR Averaged over 1 g	Extrapolated SAR Averaged over 10 g
802.11b/ WLAN 2450 MHz	2437	6	Body Mobile Hotspot Mode	1.0	Back	18.6	-0.04	0.48	0.20
	2437	6		1.0	Front	18.6	0.08	0.07	0.04
	2437	6		1.0	Left	18.6	0.36	0.02	0.01
	2437	6		1.0	Right	18.6	0.19	0.02	0.01
	2437	6		1.0	Top	18.6	0.07	0.07	0.04
	2437	6		1.0	Back+HS	18.6	0.21	0.40	0.17
802.11b/ WLAN 2450 MHz	2437	6	Body-worn	1.5	Back	18.6	-0.19	0.18	0.09
	2437	6		Holster	Back	18.6	0.48	0.07	0.04
	2437	6		Holster	Front	18.6	0.24	0.02	0.01

Table 11.2.10a. Rev 1 SAR results for WiFi/WLAN/802.11b body-worn and Mobile Hotspot configurations

Note 6: Only the highest output power channel was tested.

Mode	f (MHz)	Ch.	Test Position	Spacing (cm)/ Holster	Side	Conducted Output Power (dBm)	Measured SAR (W/kg)		
							Power Drift (dB)	Extrapolated SAR Averaged over 1 g	Extrapolated SAR Averaged over 10 g
802.11b/ WLAN 2450 MHz	2412	1	Body Mobile Hotspot Mode	1.0	Back	19.7	0.01	0.82	0.32
	2437	6		1.0	Back	19.5	0.26	0.82	0.32
	2462	11		1.0	Back	19.5	-0.06	0.80	0.32
	2437	6		1.0	Front				
	2437	6		1.0	Left				
	2437	6		1.0	Right				
	2437	6		1.0	Top				
	2437	6		1.0	Back+HS				
802.11b/ WLAN 2450 MHz	2412	1	Body-worn	1.5	Back	19.7	0.75	0.21	0.09
	2437	6		Holster	Back				
	2437	6		Holster	Front				

Table 11.2.10b. Rev 2 SAR results for WiFi/WLAN/802.11b body-worn and Mobile Hotspot configurations

Note 6: Only the highest output power channel was tested.

Mode	Freq. (MHz)	Channel	Holster type / device configuration	Conducted Output Power (dBm	Measured SAR (W/kg)		
					Power Drift (dB)	Extrapolated SAR Averaged over 1 g	Extrapolated SAR Averaged over 10 g
802.11a 5180 - 5805 MHz	5240	48	No Holster, back side 15 mm away	13.4	-0.19	0.08	0.03
	5300	60	No Holster, back side 15 mm away	14.9	-0.28	0.10	0.04
	5520	104	No Holster, back side 15 mm away	15.0	0.11	0.05	0.02
	5745	149	No Holster, back side 15 mm away	13.5	0.02	0.07	0.03
	5240	48	No Holster, front side 15mm away	13.4	0.32	0.01	0.00
	5240	48	Vertical Holster, back side facing	13.4	-0.27	0.42	0.11
	5240	48	No Holster, HS, back side 15mm away	13.4	0.13	0.08	0.03

Table 11.2.11a. Rev 1 SAR results for 802.11a body-worn configurations

Note 7: Only the highest output power channel per sub band was tested.

Mode	Freq. (MHz)	Channel	Holster type / device configuration	Conducted Output Power (dBm	Measured SAR (W/kg)		
					Power Drift (dB)	Extrapolated SAR Averaged over 1 g	Extrapolated SAR Averaged over 10 g
802.11a 5180 - 5805 MHz	5240	48	No Holster, back side 15 mm away				
	5300	60	No Holster, back side 15 mm away				
	5520	104	No Holster, back side 15 mm away				
	5745	149	No Holster, back side 15 mm away				
	5520	104	No Holster, front side 15mm away				
	5520	104	Vertical Holster, back side facing	15.7	-0.43	0.19	0.06
	5520	104	No Holster, HS, back side 15mm away				

Table 11.2.11b. Rev 2 SAR results for 802.11a body-worn configurations

Note 7: Only the highest output power channel per sub band was tested.

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