This document was generated in response to a request for additional technical information by Joe Dichoso in regards to the type approval of the QCP-3035. The information included in related to the two specific topics discussed in the following email received by Jay Moulton on September 8, 2000:

>Date: Fri, 8 Sep 2000 16:53:06 -0400
>From: oetech@fccsun07w.fcc.gov (OET)
>To: jmoulton@qualcomm.com
>Subject: RF safety only.
>
>To: Jay Moulton, Kyocera Wireless Corp
>From: Joe Dichoso
> jdichoso@fcc.gov
> FCC Application Processing Branch
>
>Re: FCC ID OVFQCP-3035
>Applicant: Kyocera Wireless Corp
>Correspondence Reference Number: 15995
>731 Confirmation Number: EA98532
>Date of Original E-Mail: 09/08/2000
>
>
>Please place your reply in the RF exposure info folder. A technical review
>is pending.
>
>
>Kyocera, EA 98532 -
>
>1. Please submit a photo of the belt-clip tested with this device for
>body-worn SAR compliance and indicate the location where a separation
>distance of 23.5 mm was measured, as reported in the SAR report.
>
>2. Body-worn SAR plots have device illustrated with its antenna placed on
>the wrong side and plots for PCS band with antenna OUT are indicating peak
>SAR locations shifted and extended outside of the typical regions of the
>device and its belt-clip; please review results and clarify.
>
>3. Body-worn SAR was tested with a specific Kyocera belt-clip accessory.
>The proposed body-worn RF exposure info (in the manual) suggests use of
>other belt-clip or similar accessories with no metallic component is OK
>provided they can maintain 22.75 mm separation. The separation distance
>provided by the tested belt-clip and indicated in the SAR report is 23.5 mm.
> The use of other belt-clips with the proposed conditions will require
>separate body-worn SAR testing with the proposed separation distance
>(without any belt-clip). Existing body-worn SAR results using a specific
>belt-clip, if containing any metallic component in its assembly, would
>typically result in different SAR distributions than others with different
>separation distance or component assembly. Please revise the proposed
>statement to indicate other belt-clips, holsters or similar accessories that
>have not been tested for body-worn SAR may not comply with FCC RF exposure
>limit and should be avoided.
>
>Note: Output is 600 mW ERP for AMPS mode, 479 mW ERP for CDMA mode and 400
>mW EIRP for PCS/CDMA.
>
>Proposed Grant Conditions - Output is ERP for Part 22 and EIRP for Part 24.
> For AMPS mode operation, units produced must not exceed 501 mW conducted

>output, as tested for this filing, for satisfying RF exposure requirement.
>SAR compliance for body-worn operating configurations is limited to the
>specific belt-clip tested for this filing. End-users must be informed of
>the body-worn operating requirements for satisfying RF exposure compliance.
>The highest reported SAR values are -
>AMPS/CDMA modes (Part 22) - Head: 1.53 W/kg; Body-worn: 0.74 W/kg
>PCS/CDMA mode (Part 24) - Head: 1.29 W/kg; Body-worn: 0.37 W/kg
>
>Kwok Chan

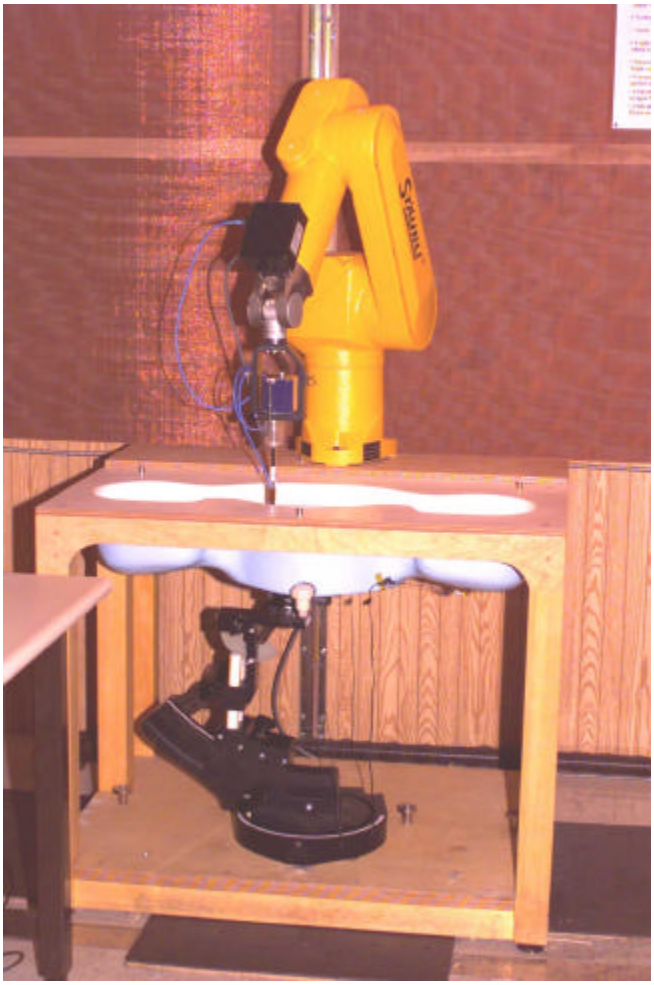
>Kyocera, EA 98452-

1. Please submit a photo of the belt-clip tested with this device for body

The 23.5mm distance was measured between the flat phantom and the back of the phone at the base of the antenna. This distance is shown in the photo below where the ruler is held next to the phone.

1) SAR test set-up photos

Photo 1

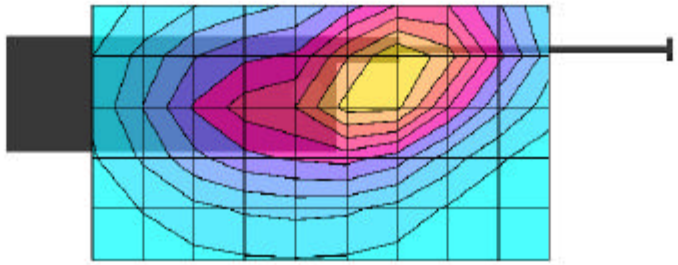


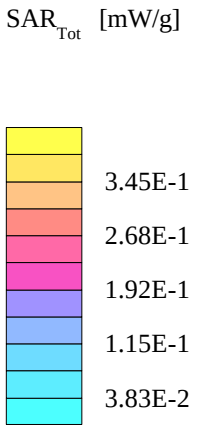
2. Body-worn SAR plots have device illustrated with it's antenna placed on the

The body-worn SAR plots for FM mode have been revised to show the antenna location on the correct side. The body-worn SAR plots for PCS mode have been redone showing the peak SAR location and the correct antenna location. The plots are below.

7GP P4B, #04, FM ch383, muscle, conducted power=27.0dBm (Hdet=790)

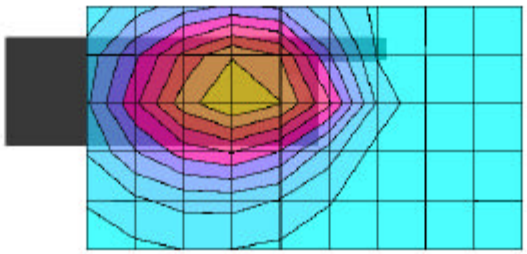
SAR (1g): 0.402 [mW/g] ± 0.02 dB, SAR (10g): 0.287 [mW/g] ± 0.00 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.90,5.90,5.90)
Muscle 900Mhz: σ = 0.94 [mho/m] ε_r = 55.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #04, FM ch383, muscle, 8-21-00.DA3
Powerdrift: -0.33 dB

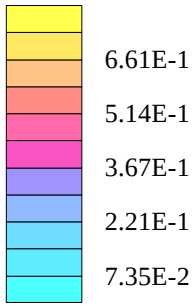




7GP P4B, #04, FM ch383, muscle, conducted power=27.0dBm (Hdet=790)

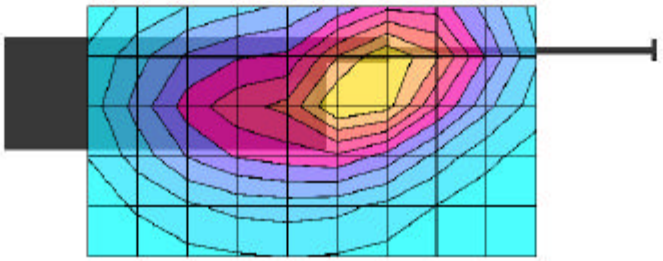
SAR (1g): 0.739 [mW/g] ± 0.13 dB, SAR (10g): 0.540 [mW/g] ± 0.15 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.90,5.90,5.90)
Muscle 900Mhz: σ = 0.94 [mho/m] ε_r = 55.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #04, FM ch383, muscle, 8-21-00.DA3
Powerdrift: 0.08 dB

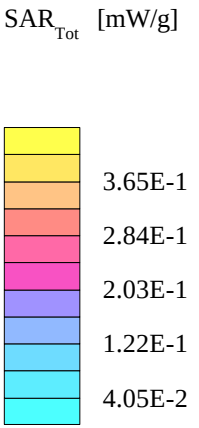




7GP P4B, #04, FM ch799, muscle, conducted power=27.0dBm (Hdet=770)

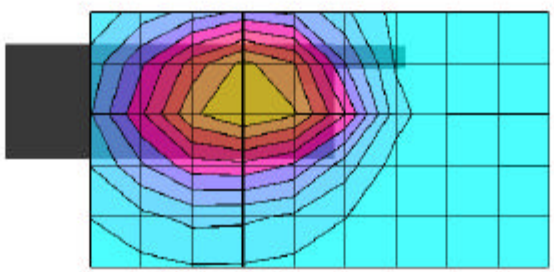
SAR (1g): 0.438 [mW/g] ± 0.05 dB, SAR (10g): 0.313 [mW/g] ± 0.04 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.90,5.90,5.90)
Muscle 900Mhz: σ = 0.94 [mho/m] ε_r = 55.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #04, FM ch799, muscle, 8-21-00.DA3
Powerdrift: -0.08 dB

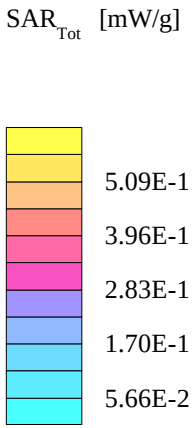




7GP P4B, #04, FM ch799, muscle, conducted power=27.0dBm (Hdet=770)

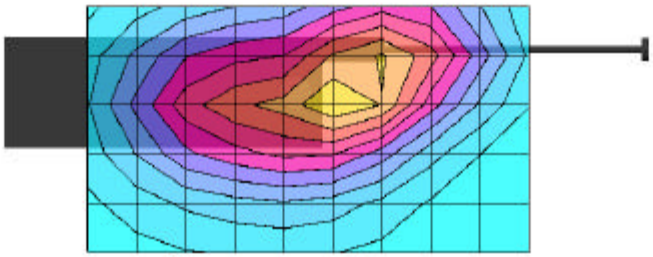
SAR (1g): 0.560 [mW/g] ± 0.12 dB, SAR (10g): 0.408 [mW/g] ± 0.17 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.90,5.90,5.90)
Muscle 900Mhz: σ = 0.94 [mho/m] ε_r = 55.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #04, FM ch799, muscle, 8-21-00.DA3
Powerdrift: -0.07 dB

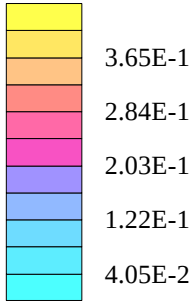




7GP P4B, #04, FM ch991, muscle, conducted power=27.0dBm (Hdet=820)

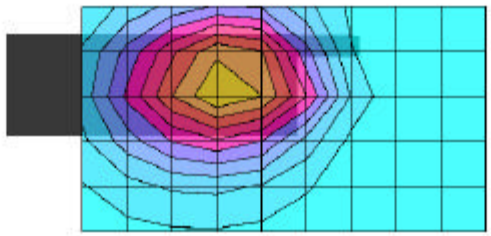
SAR (1g): 0.414 [mW/g] ± 0.09 dB, SAR (10g): 0.299 [mW/g] ± 0.06 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.90,5.90,5.90)
Muscle 900Mhz: σ = 0.94 [mho/m] ε_r = 55.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #04, FM ch991, muscle, 8-21-00.DA3
Powerdrift: 0.02 dB

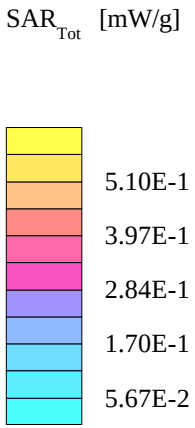




7GP P4B, #04, FM ch991, muscle, conducted power=27.0dBm (Hdet=820)

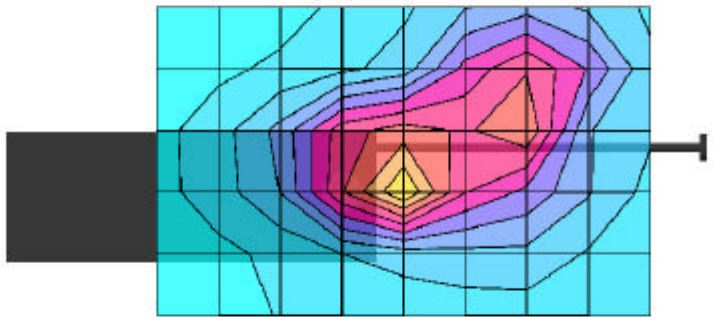
SAR (1g): 0.534 [mW/g] ± 0.16 dB, SAR (10g): 0.390 [mW/g] ± 0.16 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.90,5.90,5.90)
Muscle 900Mhz: σ = 0.94 [mho/m] ε_r = 55.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #04, FM ch991, muscle, 8-21-00.DA3
Powerdrift: -0.32 dB

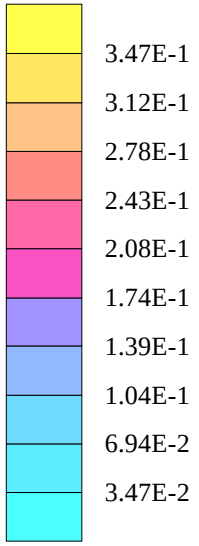




7GP P4B #4, PCS ch25, conducted power=24.2dBm (hdet=380)

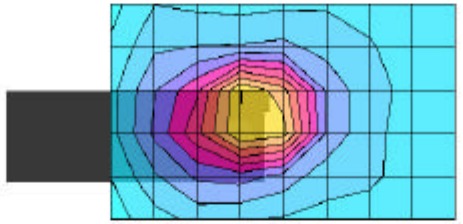
SAR (1g): 0.341 [mW/g] ± 1.24 dB, SAR (10g): 0.186 [mW/g] ± 1.19 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.61 [mho/m] ε_r = 53.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4, PCS ch25, muscle re-test, 24.2dBm, 9-19-00.DA3
Powerdrift: -0.10 dB

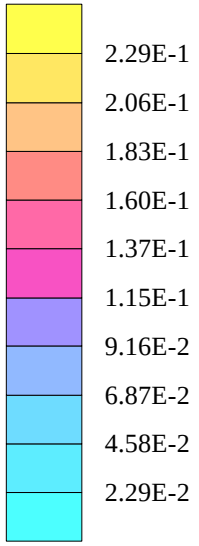




7GP P4B #4, PCS ch25, conducted power=24.2dBm (hdet=380)

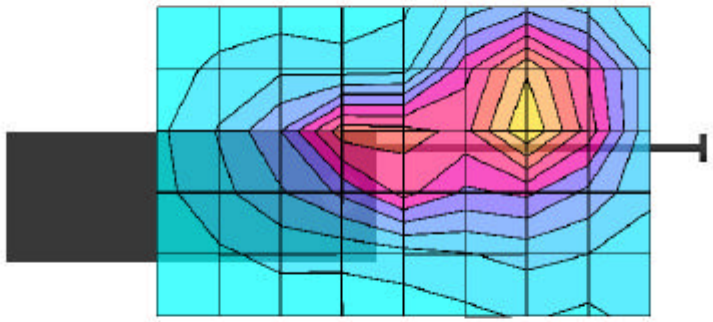
SAR (1g): 0.346 [mW/g] ± 0.61 dB, SAR (10g): 0.216 [mW/g] ± 0.55 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.61 [mho/m] ε_r = 53.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4, PCS ch25, muscle re-test, 24.2dBm, 9-19-00.DA3
Powerdrift: -0.14 dB

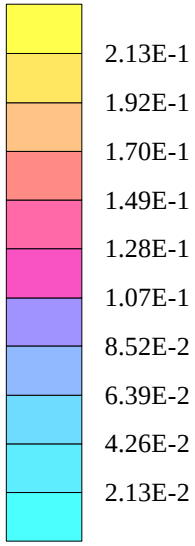




7GP P4B #4, PCS ch600, conducted power=24.2dBm (hdet=350)

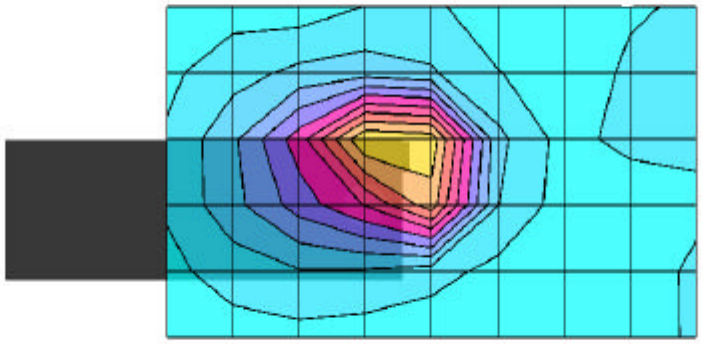
SAR (1g): 0.199 [mW/g] ± 0.05 dB, SAR (10g): 0.134 [mW/g] ± 0.04 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.61 [mho/m] ε_r = 53.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4, PCS ch600, muscle re-test, 24.2dBm, 9-19-00.DA3
Powerdrift: 0.07 dB

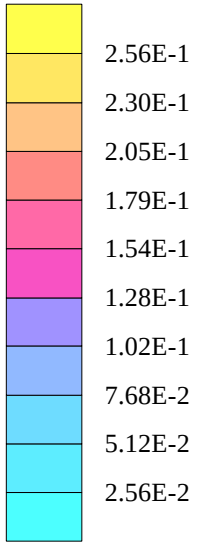




7GP P4B #4, PCS ch600, conducted power=24.2dBm (hdet=350)

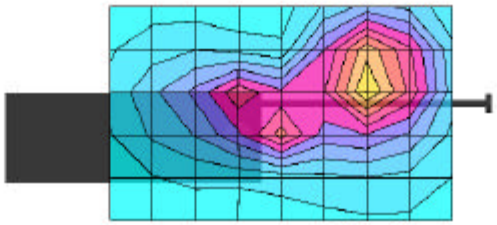
SAR (1g): 0.294 [mW/g] ± 0.82 dB, SAR (10g): 0.179 [mW/g] ± 0.75 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.61 [mho/m] ε_r = 53.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4, PCS ch600, muscle re-test, 24.2dBm, 9-19-00.DA3
Powerdrift: 0.04 dB

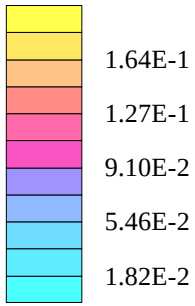




7GP P4B #4, PCS ch1175, conducted power=24.2dBm (hdet=425)

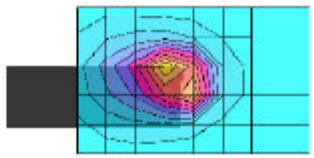
SAR (1g): 0.200 [mW/g] ± 0.31 dB, SAR (10g): 0.120 [mW/g] ± 0.31 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.61 [mho/m] ε_r = 53.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4, PCS ch1175, muscle re-test, 24.2dBm, 9-19-00.DA3
Powerdrift: -3.00 dB

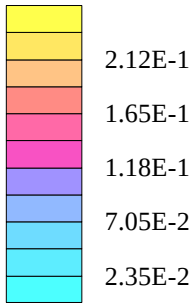




7GP P4B #4, PCS ch1175, conducted power=24.2dBm (hdet=425)

SAR (1g): 0.292 [mW/g] ± 0.15 dB, SAR (10g): 0.165 [mW/g] ± 0.14 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.61 [mho/m] ε_r = 53.9 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4, PCS ch1175, muscle re-test, 24.2dBm, 9-19-00.DA3
Powerdrift: -5.80 dB





3. Body-worn SAR with 23.5 mm separation when phone is worn on torso

To verify that the QCP-3035 is indeed SAR compliant with 23.5 mm separation between the closet point of the handset and the phantom, waist SAR testing was re-performed without a belt clip for both FM and PCS modes. HP85070B dielectric measurement system was used to calibrate muscle tissue. The dielectric data sheets of muscle are attached at the end of this report. SAR plots are attached in the proceeding pages.

The table below shows the parameters of muscle tissue specified in OET bulletin 65.

Parameters of brain and muscle tissue

	Frequency	Permittivity	Conductivity (S/m)	Notes
Muscle	900 MHz	56.1	0.95	specified by OET bulletin 65, supplemental C
Muscle	1800 MHz	54	1.45	specified by OET bulletin 65, supplemental C.

The test results are summarized in the table below.

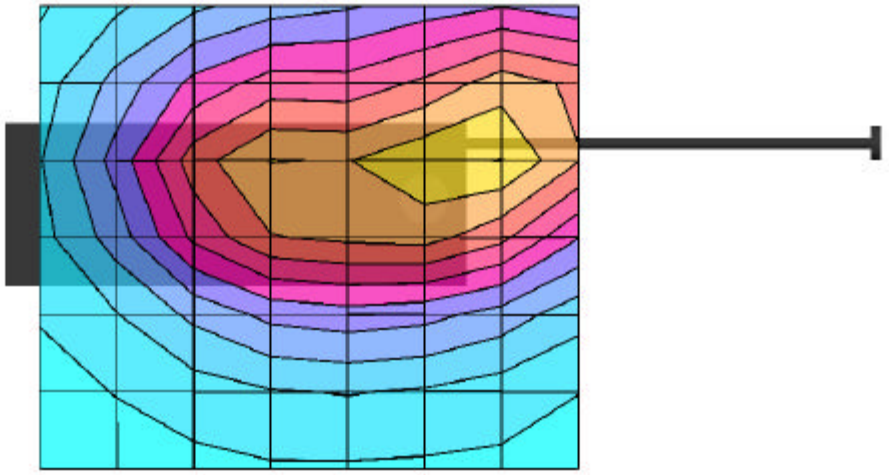
Body-worn SAR measurement results with 23.5 mm air separetion

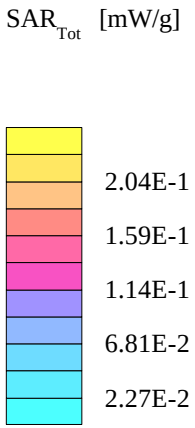
Channel/Mode	SAR (mW/g) (antenna retracted)	SAR (mW/g) (antenna extended)
CH 383 - FM	0.509	0.236
CH 799 - FM	0.354	0.238
CH 991 - FM	0.395	0.295
CH 25 - PCS	0.399	0.364
CH 600 - PCS	0.241	0.208
CH 1175 - PCS	0.220	0.204

The plots are as follows.

7GP P4B #4, FM ch383, conducted power=27.0dBm (hdet=790)

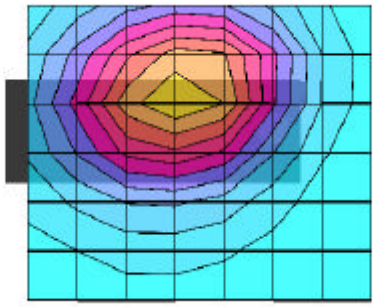
SAR (1g): 0.236 [mW/g] ± 0.24 dB, SAR (10g): 0.174 [mW/g] ± 0.21 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.72,5.72,5.72)
Muscle 900 MHz: σ = 0.94 [mho/m] ε_r = 56.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #4, FM ch383, 27.0dBm, 9-14-00.DA3
Powerdrift: -0.42 dB

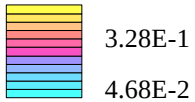




7GP P4B #4, FM ch383, conducted power=27.0dBm (hdet=790)

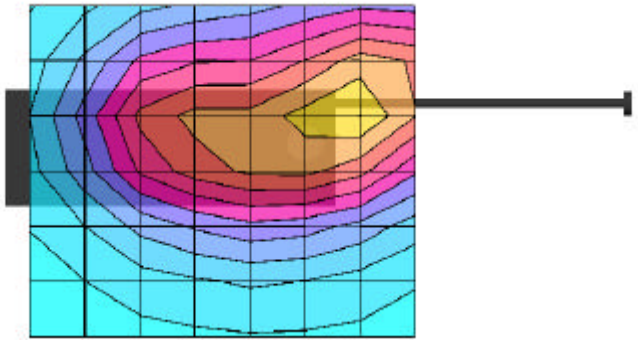
SAR (1g): 0.509 [mW/g] ± 0.29 dB, SAR (10g): 0.336 [mW/g] ± 0.17 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.72,5.72,5.72)
Muscle 900 MHz: σ = 0.94 [mho/m] ε_r = 56.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #4, FM ch383, 27.0dBm, 9-14-00.DA3
Powerdrift: -23.18 dB

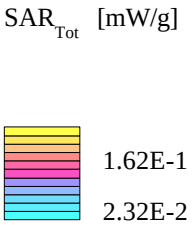




7GP P4B #4, FM ch799, conducted power=27.0dBm (hdet=760)

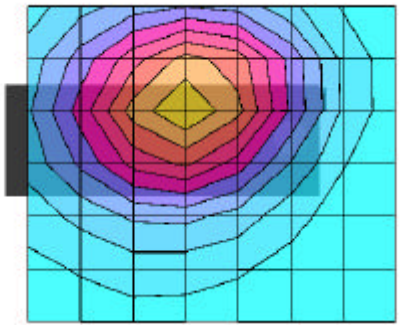
SAR (1g): 0.238 [mW/g] ± 0.21 dB, SAR (10g): 0.175 [mW/g] ± 0.19 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.72,5.72,5.72)
Muscle 900 MHz: σ = 0.94 [mho/m] ε_r = 56.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #4, FM ch799, 27.0dBm, 9-14-00.DA3
Powerdrift: -0.02 dB





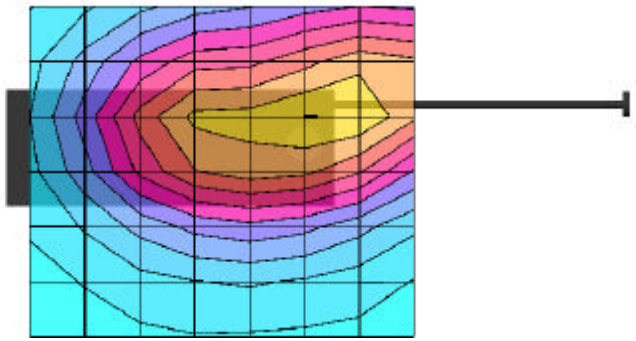
7GP P4B #4, FM ch799, conducted power=27.0dBm (hdet=760)

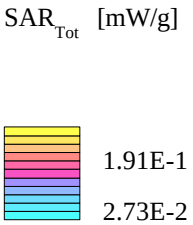
SAR (1g): 0.354 [mW/g] ± 0.22 dB, SAR (10g): 0.259 [mW/g] ± 0.23 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.72,5.72,5.72)
Muscle 900 MHz: σ = 0.94 [mho/m] ε_r = 56.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #4, FM ch799, 27.0dBm, 9-14-00.DA3
Powerdrift: 0.03 dB



7GP P4B #4, FM ch991, conducted power=27.0dBm (hdet=830)

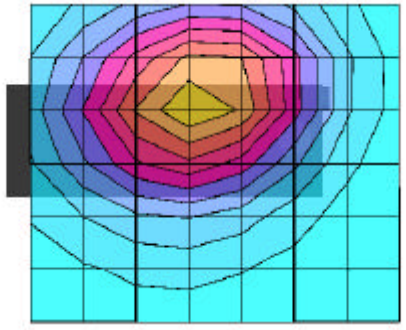
SAR (1g): 0.295 [mW/g] ± 0.30 dB, SAR (10g): 0.218 [mW/g] ± 0.25 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.72,5.72,5.72)
Muscle 900 MHz: σ = 0.94 [mho/m] ε_r = 56.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #4, FM ch991, 27.0dBm, 9-14-00.DA3
Powerdrift: -0.01 dB

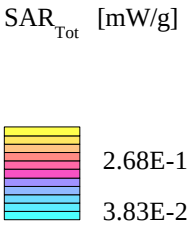




7GP P4B #4, FM ch991, conducted power=27.0dBm (hdet=830)

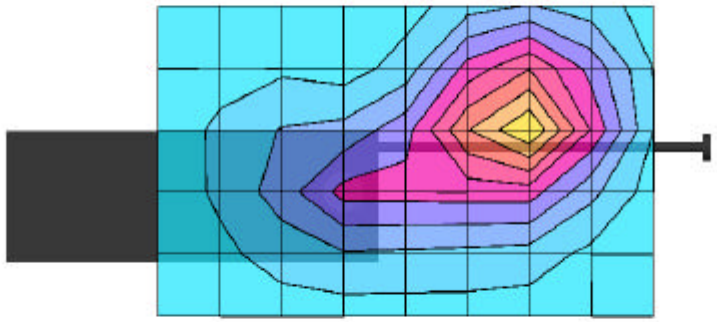
SAR (1g): 0.395 [mW/g] ± 0.21 dB, SAR (10g): 0.291 [mW/g] ± 0.21 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(5.72,5.72,5.72)
Muscle 900 MHz: σ = 0.94 [mho/m] ε_r = 56.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B #4, FM ch991, 27.0dBm, 9-14-00.DA3
Powerdrift: -0.34 dB

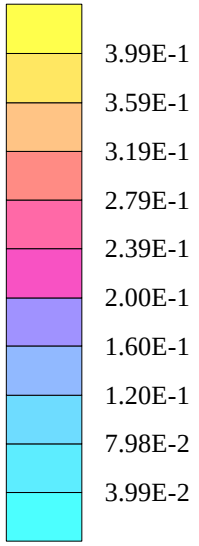




7GP P4B #4, PCS ch25, 23.5cm from phantom, conducted power=24.22dBm (hdet=370)

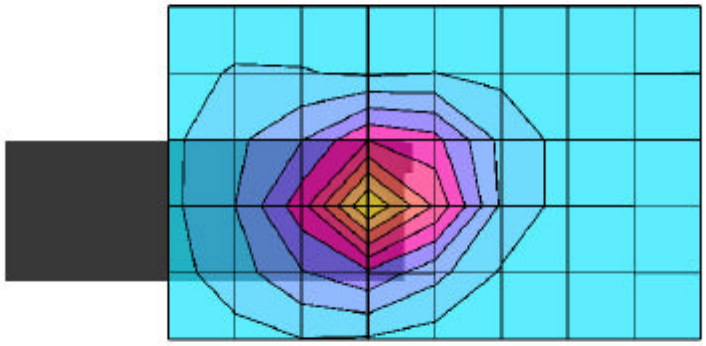
SAR (1g): 0.364 [mW/g] ± 0.47 dB, SAR (10g): 0.233 [mW/g] ± 0.46 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.57 [mho/m] ε_r = 54.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4 PCS ch25, muscle re-test 23.5cm, 9-22-00.DA3
Powerdrift: -0.03 dB

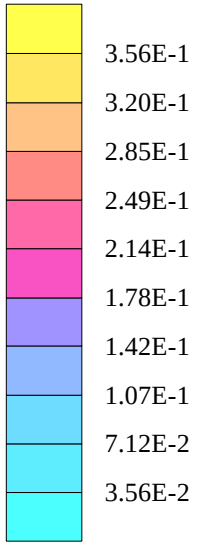




7GP P4B #4, PCS ch25, 23.5cm from phantom, conducted power=24.22dBm (hdet=370)

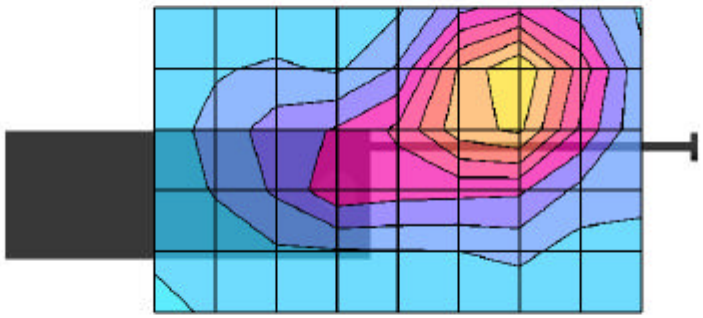
SAR (1g): 0.399 [mW/g] ± 0.57 dB, SAR (10g): 0.248 [mW/g] ± 0.53 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.57 [mho/m] ε_r = 54.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4 PCS ch25, muscle re-test 23.5cm, 9-22-00.DA3
Powerdrift: -0.01 dB

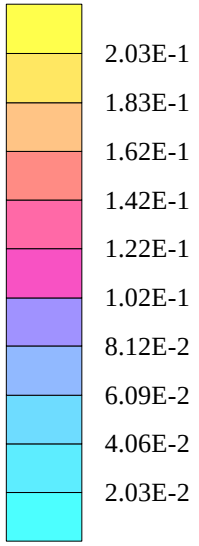




7GP P4B #4, PCS ch600, 23.5cm from phantom, conducted power=24.21dBm (hdet=345)

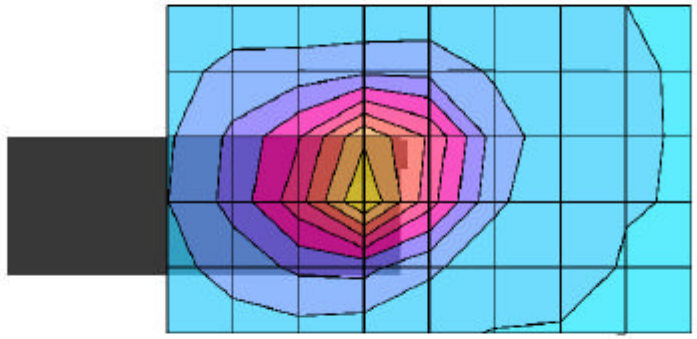
SAR (1g): 0.208 [mW/g] ± 0.20 dB, SAR (10g): 0.140 [mW/g] ± 0.22 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.57 [mho/m] ε_r = 54.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4 PCS ch600, muscle re-test 23.5cm, 9-22-00.DA3
Powerdrift: -0.06 dB

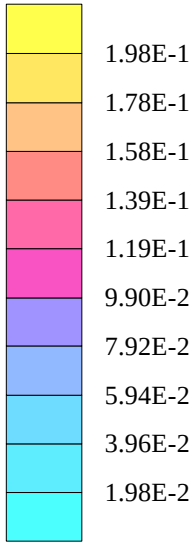




7GP P4B #4, PCS ch600, 23.5cm from phantom, conducted power=24.21dBm (hdet=345)

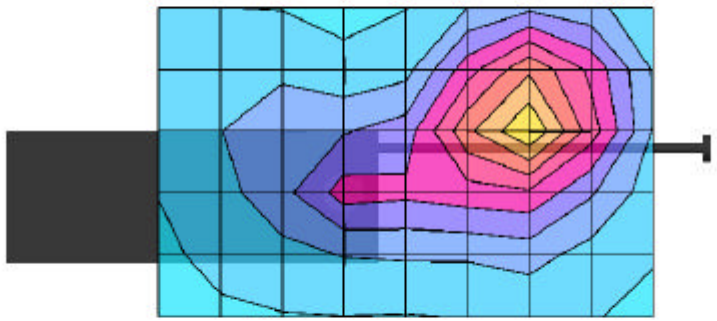
SAR (1g): 0.241 [mW/g] ± 0.65 dB, SAR (10g): 0.155 [mW/g] ± 0.53 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.57 [mho/m] ε_r = 54.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4 PCS ch600, muscle re-test 23.5cm, 9-22-00.DA3
Powerdrift: -0.19 dB

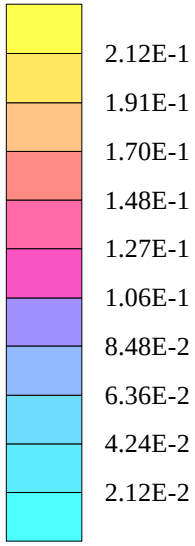




7GP P4B #4, PCS ch1175, 23.5cm from phantom, conducted power=24.21dBm (hdet=420)

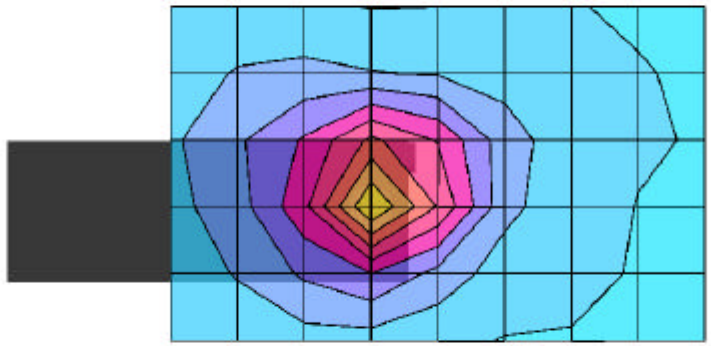
SAR (1g): 0.204 [mW/g] ± 0.22 dB, SAR (10g): 0.135 [mW/g] ± 0.21 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.57 [mho/m] ε_r = 54.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4 PCS ch1175, muscle re-test 23.5cm, 9-22-00.DA3
Powerdrift: -0.01 dB

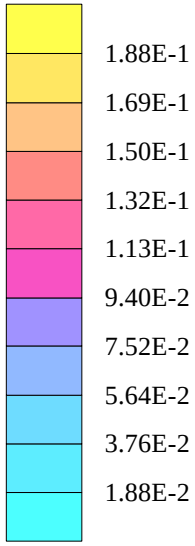




7GP P4B #4, PCS ch1175, 23.5cm from phantom, conducted power=24.21dBm (hdet=420)

SAR (1g): 0.220 [mW/g] ± 0.73 dB, SAR (10g): 0.142 [mW/g] ± 0.65 dB
Cubes (2) (Worst-case extrapolation)
Generic Twin Phantom; Flat Section
Probe: ET3DV5 - SN1348; ConvF(4.50,4.50,4.50)
Muscle 1800 MHz: σ = 1.57 [mho/m] ε_r = 54.1 ρ = 1.00 [g/cm^3]
File Name: 7GP P4B, #4 PCS ch1175, muscle re-test 23.5cm, 9-22-00.DA3
Powerdrift: 0.33 dB





3. Revised User's Manual

The QCP-3035's user guide has been revised to include a statement that other belt-clips, holsters or similar accessories that have not been tested for body-worn SAR may not comply with FCC RF exposure limit and should be avoided.

The following caption is incorporated into the user's guide:

To comply with FCC radiation exposure requirements, use of this device for body-worn operational configurations is limited to accessories tested and approved by Kyocera Wireless Corp. Other accessories used with this device for body-worn operations must not contain any metallic components and must provide at least 23.5mm separation distance including the antenna and the user's body. Other accessories that have not been tested for body-worn SAR may not comply with FCC RF exposure limit and should be avoided.

Dielectric parameters of muscle tissue for 900 MHz

Reference math : OFF Title: 9-14-00

Pt#	Frequency (GHz)	Data real	Data imag
1	0.100000000	66.19	63.09
2	0.114500000	65.56	55.43
3	0.129000000	65.29	50.24
4	0.143500000	65.07	45.94
5	0.158000000	65.00	42.39
6	0.172500000	64.41	39.84
7	0.187000000	64.17	37.18
8	0.201500000	63.74	35.24
9	0.216000000	63.50	33.42
10	0.230500000	63.25	31.77
11	0.245000000	63.14	30.79
12	0.259500000	62.98	29.53
13	0.274000000	62.68	28.43
14	0.288500000	62.41	27.52
15	0.303000000	62.04	26.73
16	0.317500000	61.85	26.07
17	0.332000000	61.75	25.40
18	0.346500000	61.67	24.76
19	0.361000000	61.45	24.29
20	0.375500000	61.28	23.84
21	0.390000000	61.04	23.39
22	0.404500000	60.88	22.91
23	0.419000000	60.70	22.71
24	0.433500000	60.59	22.30
25	0.448000000	60.54	22.02
26	0.462500000	60.23	21.70
27	0.477000000	60.10	21.39
28	0.491500000	59.85	21.13
29	0.506000000	59.76	20.93
30	0.520500000	59.67	20.81
31	0.535000000	59.49	20.55
32	0.549500000	59.40	20.47
33	0.564000000	59.17	20.28
34	0.578500000	58.97	20.09
35	0.593000000	58.82	20.01
36	0.607500000	58.74	19.89
37	0.622000000	58.57	19.80
38	0.636500000	58.39	19.70
39	0.651000000	58.35	19.59
40	0.665500000	58.15	19.42
41	0.680000000	57.99	19.32
42	0.694500000	57.82	19.31
43	0.709000000	57.71	19.25
44	0.723500000	57.62	19.23
45	0.738000000	57.49	19.13
46	0.752500000	57.36	19.02
47	0.767000000	57.24	19.00
48	0.781500000	57.09	18.97
49	0.796000000	57.00	18.93
50	0.810500000	56.80	18.91
51	0.825000000	56.72	18.91
52	0.839500000	56.60	18.81
53	0.854000000	56.49	18.75

54	0.868500000	56.28	18.77
55	0.883000000	56.18	18.74
56	0.897500000	56.08	18.69
57	0.912000000	55.95	18.74
58	0.926500000	55.88	18.69
59	0.941000000	55.75	18.62
60	0.955500000	55.58	18.62
61	0.970000000	55.50	18.60
62	0.984500000	55.31	18.60
63	0.999000000	55.25	18.59
64	1.013500000	55.13	18.60
65	1.028000000	55.05	18.59
66	1.042500000	54.95	18.57
67	1.057000000	54.81	18.53
68	1.071500000	54.69	18.57
69	1.086000000	54.54	18.60
70	1.100500000	54.42	18.61
71	1.115000000	54.35	18.62
72	1.129500000	54.27	18.57
73	1.144000000	54.19	18.56
74	1.158500000	54.04	18.59
75	1.173000000	53.87	18.59
76	1.187500000	53.77	18.62
77	1.202000000	53.66	18.64
78	1.216500000	53.64	18.66
79	1.231000000	53.51	18.64
80	1.245500000	53.37	18.62
81	1.260000000	53.23	18.63
82	1.274500000	53.12	18.66
83	1.289000000	53.04	18.63
84	1.303500000	52.98	18.65
85	1.318000000	52.91	18.70
86	1.332500000	52.82	18.67
87	1.347000000	52.74	18.68
88	1.361500000	52.59	18.70
89	1.376000000	52.48	18.76
90	1.390500000	52.37	18.78
91	1.405000000	52.27	18.81
92	1.419500000	52.23	18.84
93	1.434000000	52.11	18.87
94	1.448500000	51.99	18.83
95	1.463000000	51.81	18.85
96	1.477500000	51.73	18.88
97	1.492000000	51.61	18.90
98	1.506500000	51.52	18.94
99	1.521000000	51.45	18.92
100	1.535500000	51.35	18.89
101	1.550000000	51.25	18.93
102	1.564500000	51.12	18.91
103	1.579000000	50.98	18.95
104	1.593500000	50.94	19.01
105	1.608000000	50.85	18.98
106	1.622500000	50.82	18.97
107	1.637000000	50.69	18.95
108	1.651500000	50.59	18.92
109	1.666000000	50.48	18.92
110	1.680500000	50.39	18.96

$\sigma = 0.94$ mho/m

111	1.695000000	50.32	18.99
112	1.709500000	50.27	19.03
113	1.724000000	50.19	19.00
114	1.738500000	50.13	19.02
115	1.753000000	50.02	19.05
116	1.767500000	49.90	19.06
117	1.782000000	49.81	19.12
118	1.796500000	49.77	19.14
119	1.811000000	49.67	19.17
120	1.825500000	49.59	19.16
121	1.840000000	49.49	19.12
122	1.854500000	49.42	19.16
123	1.869000000	49.31	19.19
124	1.883500000	49.21	19.20
125	1.898000000	49.15	19.21
126	1.912500000	49.07	19.21
127	1.927000000	49.00	19.21
128	1.941500000	48.96	19.23
129	1.956000000	48.84	19.23
130	1.970500000	48.79	19.29
131	1.985000000	48.70	19.32
132	1.999500000	48.62	19.34
133	2.014000000	48.58	19.35
134	2.028500000	48.48	19.37
135	2.043000000	48.38	19.37
136	2.057500000	48.26	19.41
137	2.072000000	48.18	19.44
138	2.086500000	48.10	19.50
139	2.101000000	48.04	19.50
140	2.115500000	47.94	19.48
141	2.130000000	47.84	19.49
142	2.144500000	47.76	19.49
143	2.159000000	47.65	19.52
144	2.173500000	47.57	19.56
145	2.188000000	47.53	19.55
146	2.202500000	47.48	19.56
147	2.217000000	47.42	19.52
148	2.231500000	47.32	19.54
149	2.246000000	47.23	19.53
150	2.260500000	47.15	19.57
151	2.275000000	47.09	19.61
152	2.289500000	47.05	19.63
153	2.304000000	47.02	19.63
154	2.318500000	46.95	19.61
155	2.333000000	46.83	19.62
156	2.347500000	46.74	19.64
157	2.362000000	46.67	19.69
158	2.376500000	46.59	19.73
159	2.391000000	46.56	19.74
160	2.405500000	46.51	19.76
161	2.420000000	46.44	19.74
162	2.434500000	46.34	19.75
163	2.449000000	46.22	19.77
164	2.463500000	46.12	19.86
165	2.478000000	46.11	19.86
166	2.492500000	46.03	19.86
167	2.507000000	46.01	19.86

Dielectric parameters of muscle tissue for 1800 MHz

Reference math : OFF Title: 9-22-00

1800MHz MUSCLE

Pt#	Frequency (GHz)	Data real	Data imag
1	0.100000000	66.35	3.75
2	0.114500000	66.13	4.01
3	0.129000000	66.05	4.10
4	0.143500000	65.66	4.35
5	0.158000000	65.63	4.53
6	0.172500000	65.40	4.66
7	0.187000000	65.13	4.66
8	0.201500000	64.94	4.96
9	0.216000000	65.04	5.06
10	0.230500000	64.90	5.22
11	0.245000000	64.74	5.52
12	0.259500000	64.65	5.57
13	0.274000000	64.49	5.69
14	0.288500000	64.36	5.77
15	0.303000000	64.21	6.02
16	0.317500000	64.15	6.11
17	0.332000000	64.05	6.38
18	0.346500000	64.05	6.44
19	0.361000000	63.90	6.52
20	0.375500000	63.78	6.71
21	0.390000000	63.69	6.89
22	0.404500000	63.50	6.98
23	0.419000000	63.37	7.23
24	0.433500000	63.34	7.43
25	0.448000000	63.25	7.52
26	0.462500000	63.16	7.62
27	0.477000000	62.90	7.71
28	0.491500000	62.87	7.91
29	0.506000000	62.77	7.99
30	0.520500000	62.71	8.08
31	0.535000000	62.58	8.24
32	0.549500000	62.41	8.42
33	0.564000000	62.31	8.52
34	0.578500000	62.21	8.65
35	0.593000000	62.07	8.80
36	0.607500000	61.99	8.89
37	0.622000000	61.91	9.04
38	0.636500000	61.76	9.14
39	0.651000000	61.63	9.25
40	0.665500000	61.60	9.40
41	0.680000000	61.44	9.53
42	0.694500000	61.40	9.65
43	0.709000000	61.19	9.75
44	0.723500000	61.12	9.87
45	0.738000000	61.06	9.99
46	0.752500000	60.89	10.10
47	0.767000000	60.82	10.17
48	0.781500000	60.68	10.29
49	0.796000000	60.61	10.41
50	0.810500000	60.53	10.52
51	0.825000000	60.39	10.63
52	0.839500000	60.33	10.73
53	0.854000000	60.18	10.77

54	0.868500000	60.06	10.90
55	0.883000000	60.00	11.00
56	0.897500000	59.87	11.11
57	0.912000000	59.79	11.21
58	0.926500000	59.66	11.31
59	0.941000000	59.55	11.37
60	0.955500000	59.45	11.41
61	0.970000000	59.42	11.52
62	0.984500000	59.35	11.59
63	0.999000000	59.27	11.74
64	1.013500000	59.18	11.87
65	1.028000000	59.11	11.96
66	1.042500000	58.95	12.08
67	1.057000000	58.86	12.20
68	1.071500000	58.73	12.30
69	1.086000000	58.64	12.36
70	1.100500000	58.53	12.48
71	1.115000000	58.41	12.55
72	1.129500000	58.33	12.61
73	1.144000000	58.22	12.71
74	1.158500000	58.10	12.79
75	1.173000000	58.01	12.86
76	1.187500000	57.90	12.95
77	1.202000000	57.81	12.97
78	1.216500000	57.71	13.12
79	1.231000000	57.62	13.14
80	1.245500000	57.52	13.25
81	1.260000000	57.41	13.33
82	1.274500000	57.33	13.43
83	1.289000000	57.26	13.50
84	1.303500000	57.18	13.58
85	1.318000000	57.09	13.65
86	1.332500000	56.95	13.71
87	1.347000000	56.87	13.79
88	1.361500000	56.75	13.85
89	1.376000000	56.65	13.92
90	1.390500000	56.54	14.00
91	1.405000000	56.46	14.06
92	1.419500000	56.36	14.10
93	1.434000000	56.29	14.16
94	1.448500000	56.22	14.22
95	1.463000000	56.12	14.29
96	1.477500000	56.07	14.32
97	1.492000000	55.97	14.43
98	1.506500000	55.87	14.47
99	1.521000000	55.79	14.53
100	1.535500000	55.70	14.60
101	1.550000000	55.61	14.66
102	1.564500000	55.52	14.74
103	1.579000000	55.44	14.83
104	1.593500000	55.35	14.85
105	1.608000000	55.26	14.91
106	1.622500000	55.21	15.00
107	1.637000000	55.08	15.05
108	1.651500000	54.99	15.12
109	1.666000000	54.92	15.15
110	1.680500000	54.84	15.23

111	1.695000000	54.75	15.27
112	1.709500000	54.66	15.35
113	1.724000000	54.60	15.39
114	1.738500000	54.43	15.48
115	1.753000000	54.40	15.50
116	1.767500000	54.30	15.56
117	1.782000000	54.20	15.63
118	1.796500000	54.13	15.67
119	1.811000000	54.02	15.69
120	1.825500000	53.93	15.80
121	1.840000000	53.86	15.80
122	1.854500000	53.77	15.82
123	1.869000000	53.70	15.87
124	1.883500000	53.61	15.91
125	1.898000000	53.58	15.95
126	1.912500000	53.47	15.98
127	1.927000000	53.40	16.01
128	1.941500000	53.36	16.08
129	1.956000000	53.30	16.09
130	1.970500000	53.24	16.14
131	1.985000000	53.18	16.21
132	1.999500000	53.12	16.27
133	2.014000000	53.03	16.30
134	2.028500000	52.99	16.38
135	2.043000000	52.91	16.47
136	2.057500000	52.83	16.54
137	2.072000000	52.77	16.59
138	2.086500000	52.69	16.64
139	2.101000000	52.60	16.72
140	2.115500000	52.49	16.78
141	2.130000000	52.44	16.83
142	2.144500000	52.32	16.89
143	2.159000000	52.25	16.94
144	2.173500000	52.16	16.98
145	2.188000000	52.06	17.01
146	2.202500000	51.97	17.07
147	2.217000000	51.91	17.11
148	2.231500000	51.82	17.16
149	2.246000000	51.74	17.16
150	2.260500000	51.65	17.22
151	2.275000000	51.61	17.28
152	2.289500000	51.53	17.28
153	2.304000000	51.44	17.36
154	2.318500000	51.35	17.39
155	2.333000000	51.31	17.41
156	2.347500000	51.20	17.49
157	2.362000000	51.15	17.50
158	2.376500000	51.04	17.56
159	2.391000000	51.01	17.59
160	2.405500000	50.92	17.63
161	2.420000000	50.85	17.68
162	2.434500000	50.73	17.72
163	2.449000000	50.65	17.76
164	2.463500000	50.58	17.80
165	2.478000000	50.53	17.84
166	2.492500000	50.43	17.84
167	2.507000000	50.40	17.90

168	2.521500000	50.26	17.91
169	2.536000000	50.22	17.95
170	2.550500000	50.14	17.98
171	2.565000000	50.07	18.08
172	2.579500000	50.03	18.03
173	2.594000000	49.94	18.06
174	2.608500000	49.89	18.10
175	2.623000000	49.81	18.14
176	2.637500000	49.77	18.18
177	2.652000000	49.68	18.24
178	2.666500000	49.62	18.30
179	2.681000000	49.52	18.30
180	2.695500000	49.47	18.33
181	2.710000000	49.41	18.40
182	2.724500000	49.34	18.43
183	2.739000000	49.28	18.47
184	2.753500000	49.17	18.58
185	2.768000000	49.10	18.58
186	2.782500000	49.03	18.61
187	2.797000000	48.95	18.62
188	2.811500000	48.90	18.65
189	2.826000000	48.85	18.74
190	2.840500000	48.75	18.77
191	2.855000000	48.68	18.80
192	2.869500000	48.61	18.81
193	2.884000000	48.54	18.86
194	2.898500000	48.49	18.83
195	2.913000000	48.42	18.84
196	2.927500000	48.36	18.95
197	2.942000000	48.27	18.99
198	2.956500000	48.19	18.99
199	2.971000000	48.13	19.02
200	2.985500000	48.06	19.00
201	3.000000000	48.00	19.02