

Panasonic

Matsushita Mobile Communications Development Corporation of U.S.A.

Mr. Errol Chang
FCC Application Processing Branch

November 22, 1999

FCC ID: NWJ10A001A
Correspondence Reference Number: 10009
731 Confirmation Number EA94679
Date of Original E-Mail: 10/07/1999

Dear Mr. Chang:

I am replying to your e-mail and I am forwarding to you responses from Aprel Labs for items 5-7 and 9-11. The relevant portions of the FCC's e-mail follow with our responses inserted in the appropriate place. I will answer 1-4 and 8 and then attached to the bottom will be items 5-7 and 9-11.

Seidel, Pieter

From: oetech@fccsun07w.fcc.gov
Sent: Thursday, October 07, 1999 11:38 AM
To: pseidel@panasonic.atlanta.com
Subject: Information required
To: Pieter Seidel, Panasonic - MMCD
From: Errol Chang
echang@fcc.gov
FCC Application Processing Branch

Re: FCC ID NWJ10A001A
Applicant: Matsushita Mobile Communications Development Corporation of USA
Correspondence Reference Number: 10009
731 Confirmation Number: EA94679
Date of Original E-Mail: 10/07/1999

1. The reported ERP for TDMA mode in the cellular band appears to be inconsistent with those in the SAR report and AMPS mode output. Maximum conducted output was measured (apparently by Panasonic) at around 315 mW for AMPS and TDMA modes in the cellular band. Report ERP by APREL has 330 mW ERP for AMPS mode and 520 mW ERP for TDMA. The conducted output measured during SAR tests for AMPS and TDMA are similar to those from Panasonic. The measured ERP value for TDMA mode (520 mW) in the cellular band needs to be confirmed.

The maximum conducted output power measured by Panasonic at around 315 mW for AMPS and TDMA modes in the cellular band were reported wrong. The AMPS numbers were correct but the 800 TDMA numbers were wrong. The conducted output power measured by Aprel is below and they agree with the ERP numbers.

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Matsushita Mobile Communications Development Corporation of U.S.A.

TDMA - 835 MHz

6.27 6.13 L991
5.95 5.56 M384
5.41 5.16 H798

2. The EAS or 731 form is requesting for 600 mW ERP for AMPS and TDMA output in the cellular band and 600 mW EIRP for PCS/TDMA. These are inconsistent with the measured output values in the test reports, please revise accordingly.

I can request a change in form 731 but I cannot change the form 731 in the electronic filing format. I do not know what is appropriate to change it to anyway. Is this power number what the maximum the product will produce? It asks for rated in Watts that is conducted, so EIRP and ERP are radiated and do not apply. My competitors filing show 0.6 W and their phones do not put out but 0.4 W in AMPS. In digital modes the phone is tuned to just under 0.6 W and much lower in AMPS mode. The way I read 731, 0.6 is the correct number for the digital modes and AMPS is where the question lies. Can you please call me and answer this question?

3. The pictures in the device photo exhibit are different than that indicated in the SAR report. There appears to be different outer packaging or models for this phone. This phone also has 4 battery options, 2 each for standard and extended batteries. It needs to be clarified if any variations in battery performance due to these battery options could affect the SAR for the different operating conditions and configurations. If the outer dimensions of the different models for this phone could affect worst case SAR, it needs to be clarified.

There are two models, business (EBTX-110) and durable (EBTX-120). The only difference is the durable has a rubber coating added to the business models plastic. This makes the durable slightly larger and thus providing more space between the user and the phone. SAR would then be decreased with this model in any position. SAR was taken with the worst case battery as noted in that report. Appendix A in the user manual has the dimensions.

4. The operator's manual indicates the phone has an optional setting to allow an external antenna to be used for vehicle mount operations. In order to qualify for categorical exclusion from routine evaluation for MPE, a 20-cm separation distance is needed between persons and the antenna and the ERP must be 1.5 W or less. This exclusion is dependent on the antenna installation and antenna gain. Please clarify and include appropriate installation and operation requirements in the manual for users and installers.

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On page 51 of the operator's manual, the phone has an optional setting to allow the user to select an external antenna to be used for the handsfree cradle. This feature has been removed and the user cannot select the antenna. When the phone is in the handsfree cradle the external antenna is automatically selected. The operator's manual has been revised since the original filing. As for installation, we do not sell an antenna with our kit. The antenna selection is left up to the installer.

8. This phone (and/or different models) allows body-worn operations using two Panasonic provided holsters. A minimum separation distance of 1.1 cm was determined and one of the holsters was also tested with a phone. Please clarify both holsters will provide at least the required separation distance for meeting SAR limit with respect to the different battery options and also clarify if there are any metallic parts or components in the belt-clips or other parts of the holsters that could affect SAR.

The belt clip provides 24 mm of separation from the body. This measurement was taken from the outside edge of the clip (that would touch the body) and the inside side of the case touching the back of the radio. The clip does have a bent spring steel in it and both carry cases use the same clip. The nylon carry case has no metal in it but the leather carry case has a metal zipper pull. This clip was measured and the data is in section 8 of the report.

The SAR report indicated that a warning will be placed in the manual for body-mount operations. This warning is not in the current version of the manual uploaded. Please upload revised manual or pages relating to the warning. The warning statement should caution users to operate with the two holsters provided by Panasonic for purpose of SAR compliance, and other holsters, especially ones with metallic parts or those cannot provide 1.1 cm separation could cause SAR limit to be exceeded and must not be used.

This is the statement in the user manual on Page 5 in the safety section. This is an excerpt but I have also added the new user manual to the exhibits.

This phone is designed to be used at the ear. When used with a private handsfree headset, make sure the phone is placed in a Panasonic holster or carry case and attached to your belt or clothing. Using the phone with a Panasonic holster or carry case provides for optimal safety and performance levels. In order to comply with the Specific Absorption Rate (SAR) the phone must be at least 1.1 cm away from the body when in conversation.

The design of your phone and suggested Panasonic accessories comply with the FCC

19 November, 1999

Mr. Errol Chang
FCC Application Processing Branch

Re: Questions from the FCC

FCC ID: NWJ10A001A
Correspondence Reference Number: 10009
731 Confirmation Number EA94679
Date of Original E-Mail: 10/07/1999

Dear Mr. Chang:

Pursuant to your e-mail to Panasonic – MMCD’s Pieter Seidel I am forwarding to you our responses to items 5-7 and 9-11. The relevant portions of the FCC’s e-mail follow with our responses inserted in the appropriate place:

```
> -----Original Message-----
> From: oetech@fccsun07w.fcc.gov [SMTP:oetech@fccsun07w.fcc.gov]
> Sent: Thursday, October 07, 1999 11:38 AM
>
> To: Pieter Seidel, Panasonic – MMCD, pseidel@panasonic.atlanta.com
> From: Errol Chang, echang@fcc.gov
> FCC Application Processing Branch
>
> Re: FCC ID NWJ10A001A
> Applicant: Matsushita Mobile Communications
> Development Corporation of USA
> Correspondence Reference Number: 10009
> 731 Confirmation Number: EA94679
> Date of Original E-Mail: 10/07/1999
>
> [snip]
>
> 5. Supplemental SAR is needed, for the worst case SAR obtained with
> the Uni-Head phantom, to support worst case exposure condition with
> respect to normal operating configurations with a regular human-head
> model. If there is more than +/- 10% difference in SAR for the AMPS
> mode between the Uni-Head and regular head models, the worst case SAR
> for PCS/TDMA mode should also be evaluate with a regular head model.
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The worst case conditions found during the UniHead testing were used during the Left and Right “typical head model” verification. The maximum 1g SAR obtained on the three phantoms is

Table 1.

Phantom Type	UniHead	Left “typical” head	Right “typical” head
Maximum 1g SAR (W/kg)	1.44	1.52	1.55
D wrt UniHead	-	+5.3%	-7.9%

The highest “typical” head value is well within the specified overall margin of uncertainty for the UniHead (+7.9% higher vs $\pm 14.5\%$) and also less than 10%. Figures 1 and 2 show the “typical” phantoms used.



Figure 1. Left hand “realistic” phantom used for verification measurements.



Figure 2. Right hand “realistic” phantom used for verification measurements.

- > 6. Please clarify whether the validation included in the SAR report
- > is for the cellular or PCS band. Both should be included.

The validation scans for both the cellular (Figure 3 and 4) and PCS band (Figure 5 and 6) follow. The one in the submitted SAR report was included by accident by our fresh SAR technician – it was taken with the 835 MHz reference phone but with the wrong separation.

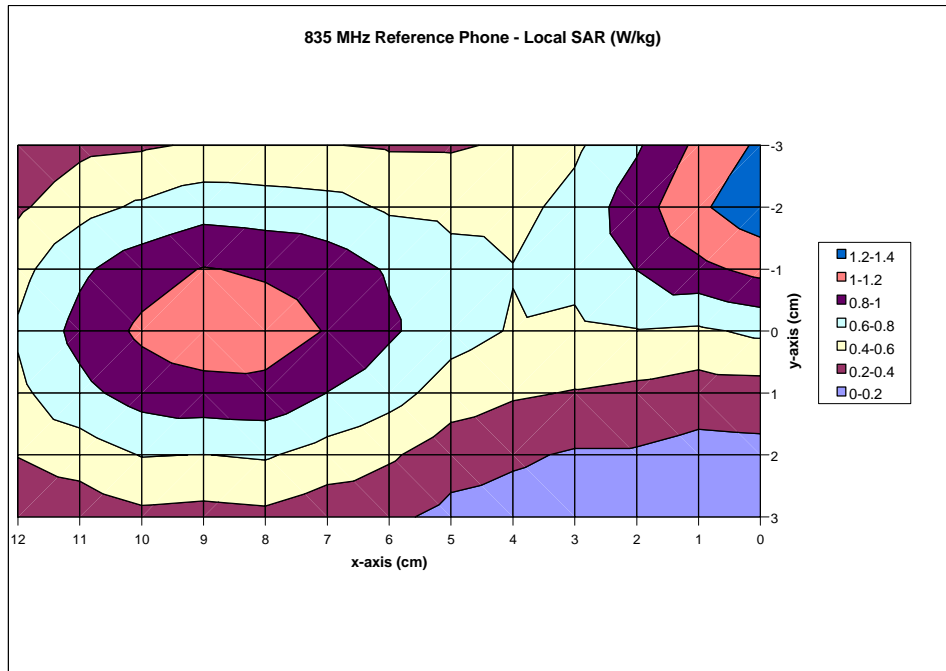


Figure 3. Area Plot of the 835 MHz Reference Phone, 2.5mm above surface.

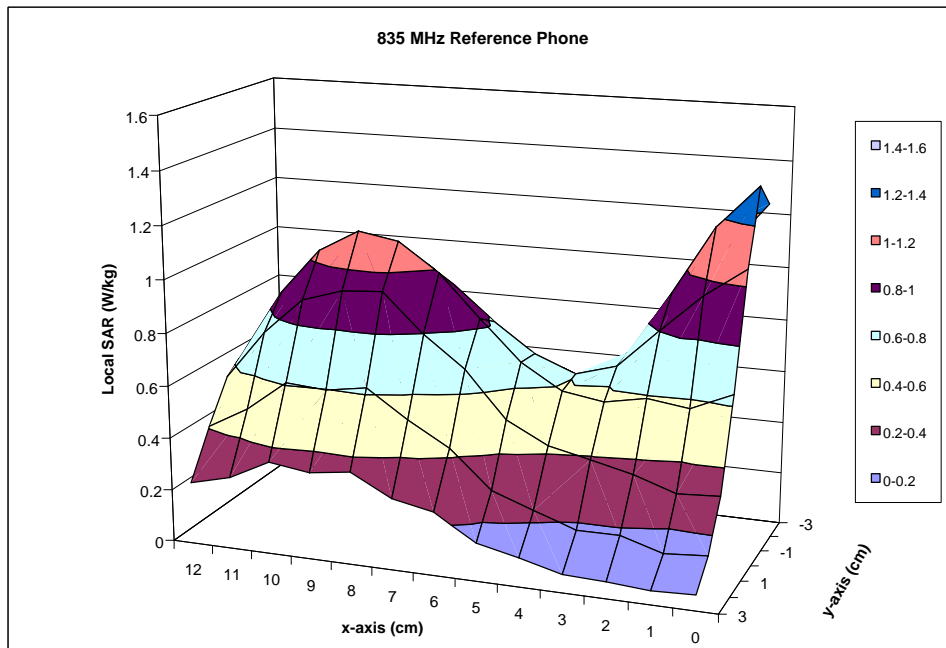


Figure 4. Surface Plot of the 835 MHz Reference Phone, 2.5mm above surface.

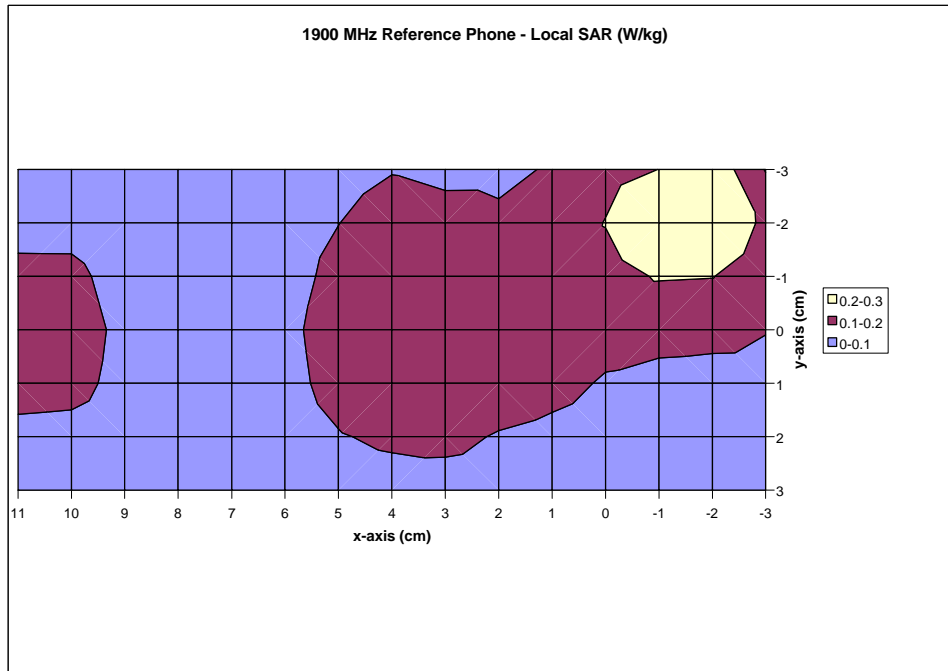


Figure 5. Area Plot of the 1900 MHz Reference Phone, 2.5mm above surface.

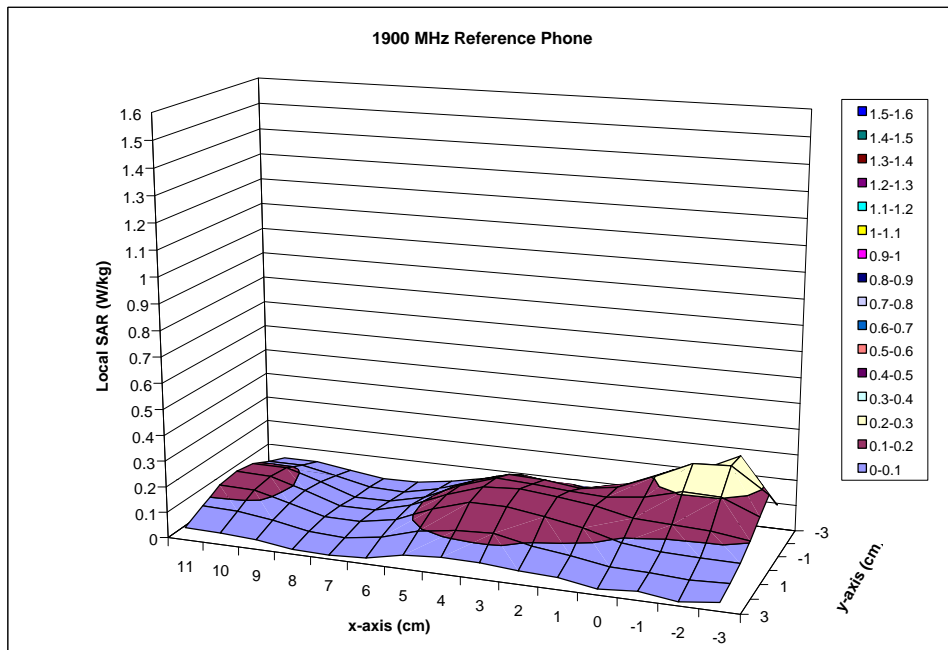


Figure 6. Surface Plot of the 1900 MHz Reference Phone, 2.5mm above surface.

- > 7. The E-field probe calibration curve for 1900 MHz only covers up to
- > 0.16W, as indicated on the plot. This range of power is
- > insufficient. Please clarify and if re-calibration is needed, the
- > SAR at PCS/TDMA band should be repeated.

The original thermal calibration was performed on 21 May 1999 yielding a thermal conversion factor of 4.9. The low RF power range had been noticed and the recalibration was performed on 30 July 1999 yielding a thermal conversion factor of 6.8. The data for this redetermination of the thermal conversion factor follows (Table 2 and Figure 7). Since the maximum 1g SAR is inversely proportional to the thermal conversion factor the reported 1900 MHz TDMA maximum 1g SAR will be reduced from 1.241 W/kg to 0.89 W/kg.

Table 2. 1900 MHz Head Thermal Conversion Factor Calibration with Narda Probe

1900 MHz Data (Heike & Paul) BRAIN

RF Power			Ch0	Ch1	Ch2	delta T (30 sec)	Sum	Thermal
W	dBm	R&S	uV	uV	uV	deg. C	Vi/Ei	W/kg
0.21727	23.37	-16.92	1104	454	166	0.0169	2192.87	1.56
0.275423	24.4	-15.89	1394	554	208	0.0184	2743.03	1.70
0.346737	25.4	-14.89	1741	674	247	0.0215	3387.03	1.99
0.430527	26.34	-13.95	2158	740	366	0.0267	4158.68	2.47
0.587489	27.69	-12.6	2896	950	464	0.0354	5492.2	3.27
0.74131	28.7	-11.59	3630	1177	574	0.0472	6857.26	4.37
0.948418	29.77	-10.52	4578	1484	720	0.0612	8642.51	5.66
1.183042	30.73	-9.56	5620	1846	903	0.0728	10664.5	6.73
1.475707	31.69	-8.6	6904	2280	1113	0.0879	13121	8.13
1.958845	32.92	-7.37	8779	2905	1426	0.1216	16705.6	11.25
2.483133	33.95	-6.34	11377	3833	1929	0.1469	21839.6	13.59
3.334264	35.23	-5.06	14063	4858	2441	0.2016	27217.9	18.65
4.602566	36.63	-3.66	19067	6616	3369	0.2893	37016.7	26.76

Directional Coupler factor 20.29 dB (Asset 100251 cal file data (Janusz, 21 Jul 96))
 Additional inline attenuation 20 dB

Sensitivity (e) 0.52 0.54 0.51 - Sensor Sensitivity in mV/ (mW/cm²)
 n = 1.50 e 0.78 0.81 0.765

Density 1.3 g/cm³ 1300 kg/m³ - Marcin, summer 97
 Conductivity 18 mS/cm 1.8 S/m - Tony 20-May-99
 Heat Capacity (c) 2.775 J/C/g 2775 J/C/kg - average of Balzano (2.7) and Kuster (2.85) values
 Exposure Time 30 seconds 30 seconds
 Slope of Measure Voltage (m_v) 7985.43 uV/W 0.00799 V/W
 - standard error or m_v 103.252 uV/W 0.0001 V/W 1.3%
 Slope of Measure Temp Change (m_T) 0.06147 C/W 0.06147 C/W
 - standard error or m_T 0.00071 C/W 0.00071 C/W 1.2%

Tissue Conversion Factor (g)	6.8
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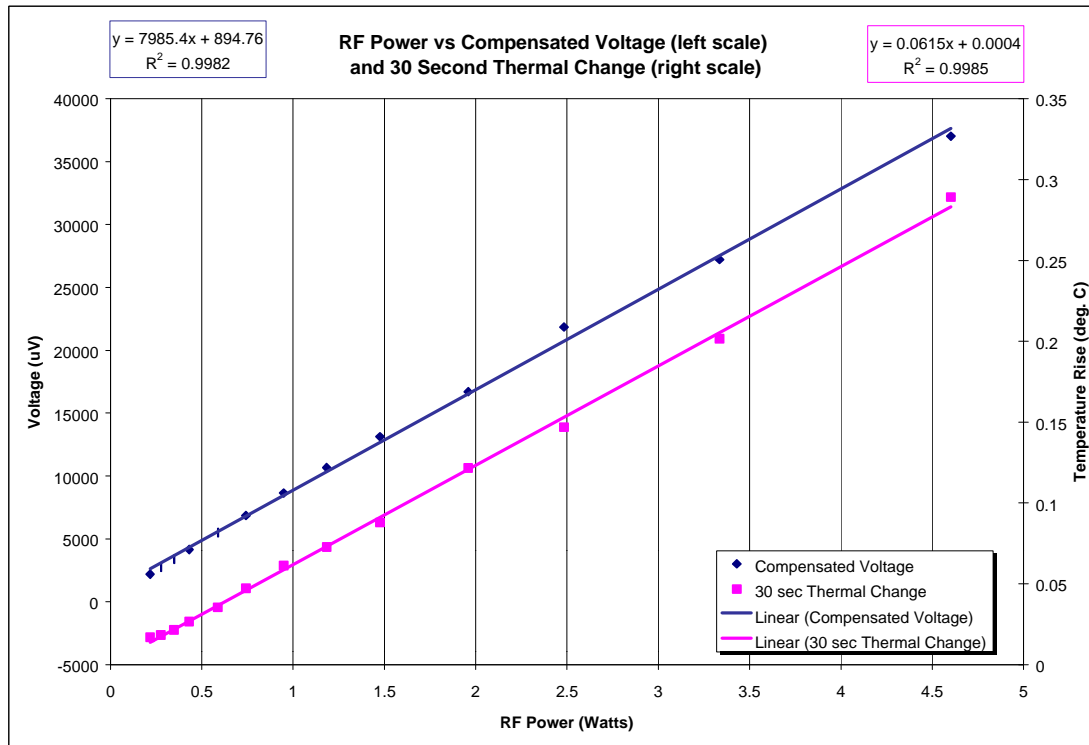


Figure 7. 1900 MHz Head Tissue Thermal Conversion Factor Calibration with Narda Probe.

- > 9. Body-mount conditions were only tested for the cellular band. It should also be tested for the PCS band since tissue dielectric properties are different. The worst case separation distance between cellular and PCS band for body-mount use should be incorporated in the proposed warning statement.

A new set of SAR measurements were performed with an APREL E-009 triangular probe, s/n 116, and 1900 MHz muscle tissue. The calibration data and charts, as well as the 1900 Reference Phone reference scans follow. The full set of SAR measurements was performed at 7mm between the phantom and the handset. The maximum 1g SAR determined was 0.999 W/kg. Using our measurements of peak local SAR versus separation we determine that at a distance of 3.8mm the SAR would reach 1.5 W/kg. Since the separation for 1.5 W/kg in the AMPS mode is 11mm, it should be the one used in the warning statement.

Table 3. 1900 MHz Body Tissue Dielectric Parameter Calibration

SIMULATION FLUID # **981125-MB**
 CALIBRATION DATE **29-Oct-99 (-4)**
 CALIBRATED BY **Heike**
 Frequency Range **1GHz-2.5GHz**
 Frequency Calibrated **1900 MHz**
 Tissue Type **MIXED BRAIN**

Position [cm]	Amplitude [dBm]	Phase [deg]
0	-44.58	168.79
0.5	-46.31	84.16
1	-47.93	0.4
1.5	-49.72	-86.19
2	-51.71	-170.88
2.5	-53.67	104.5
3	-55.5	17.99
3.5	-57.34	-64.96
ΔdB_1	-7.13	Δdeg_1
ΔdB_2	-7.36	Δdeg_2
ΔdB_3	-7.57	Δdeg_3
ΔdB_4	-7.62	Δdeg_4
ΔdB_{AVG} [dB]	-7.42	Δdeg_{AVG} [deg]
dB_{AVG} (α_{AVG}) [dB/cm]	-3.71	deg_{AVG} (β_{AVG}) [deg/cm]
(α_{AVG}) [NP/cm]	-0.42712953	(β_{AVG}) [rad/cm]
f [Hz]	1.90E+09	
μ [H/cm]	1.25664E-08	
ϵ_0 [F/cm]	8.854E-14	
ϵ_r	54.41	
$\sigma_{effective}$ [S/m]	1.69	

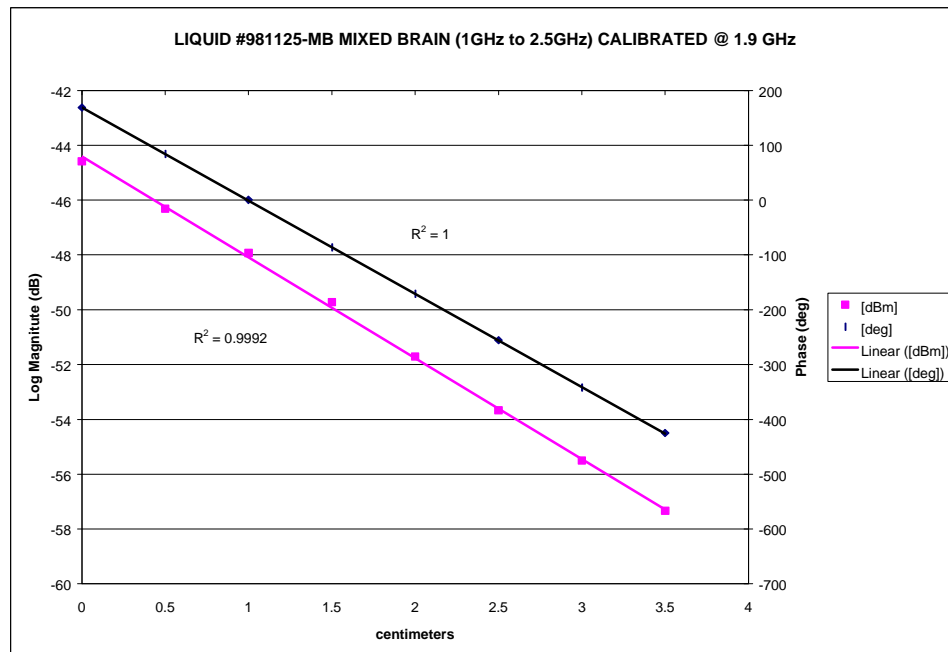


Figure 8. 1900MHz Body Tissue Dielectric Parameter Calibration

Table 4. 1900 MHz Body Thermal Conversion Factor Calibration with APREL Probe

1900 MHz Data (Heike & Sherry) - MUSCLE with E-115

RF Power			Ch0	Ch1	Ch2	delta T (30 sec)	Sum	Thermal
W	dBm	R&S	uV	uV	uV	deg. C	V/EI	SAR
								W/kg
0.176604	22.47	-17.82	5420	1147	2406	0.0307	6740.21	2.84
0.22856	23.59	-16.7	6885	1514	3101	0.0383	8639.33	3.54
0.28774	24.58	-15.7	8374	1831	3735	0.047	10471.6	4.35
0.36141	25.58	-14.71	10156	2271	4565	0.0556	12764.9	5.14
0.453942	26.57	-13.72	12402	2808	5615	0.0705	15645.2	6.52
0.587489	27.69	-12.6	15405	3589	7153	0.0852	19647.3	7.88
0.74817	28.74	-11.55	18506	4395	8667	0.1083	23722.3	10.02
1.047129	30.2	-10.09	23193	6348	11719	0.1445	31022.9	13.37
1.207814	30.82	-9.47	27734	6860	13232	0.17	35944.5	15.73
1.538155	31.87	-8.42	33008	8545	16309	0.2079	43498.8	19.23
1.967886	32.94	-7.35	39478	10645	19897	0.248	52646.5	22.94
2.540973	34.05	-6.24	47339	13257	24390	0.3543	63909.5	32.77
3.365116	35.27	-5.02	56885	16992	30371	0.4438	78415.1	41.05
4.385307	36.42	-3.87	67578	20890	36523	0.5695	94025.7	52.68
5.559043	37.45	-2.84	78662	25146	43408	0.7032	110762	65.05
7.24436	38.6	-1.69	92285	30762	52148	0.8998	131835	83.23
9.885531	39.95	-0.34	108887	38574	63965	1.042	159144	96.39

Directional Coupler factor 20.29 dB (Asset 100251 cal file data (Janusz, 21 Jul 96))
 Additional inline attenuation 20 dB

Sensitivity (e) 0.899 0.889 0.862 - Sensor Sensitivity in mV/(mW/cm²)
 n = 1.50 e 1.3485 1.3335 1.293

Density 1.3 g/cm³ 1300 kg/m³ - Marcin, summer 97
 Conductivity 16.9 mS/cm 1.69 S/m - Heike 8-Oct-99
 Heat Capacity (c) 2.775 J/C/g 2775 J/C/kg - average of Balzano (2.7) and Kuster (2.85) values
 Exposure Time 30 seconds 30 seconds
 Slope of Measure Voltage (m_v) 16410.5 uV/W 0.01641 V/W
 - standard error or m_v 702.748 uV/W 0.0007 V/W 4.3%
 Slope of Measure Temp Change (m_T) 0.1124 C/W 0.1124 C/W
 - standard error or m_T 0.00337 C/W 0.00337 C/W 3.0%

Tissue Conversion Factor (a) 7.2

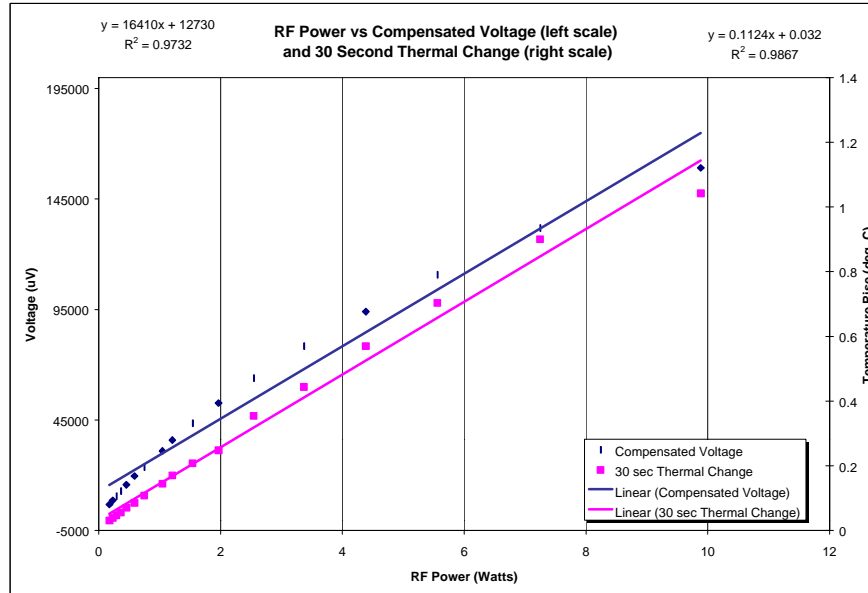


Figure 9. 1900 MHz Body Thermal Conversion Factor Calibration with APREL Probe.

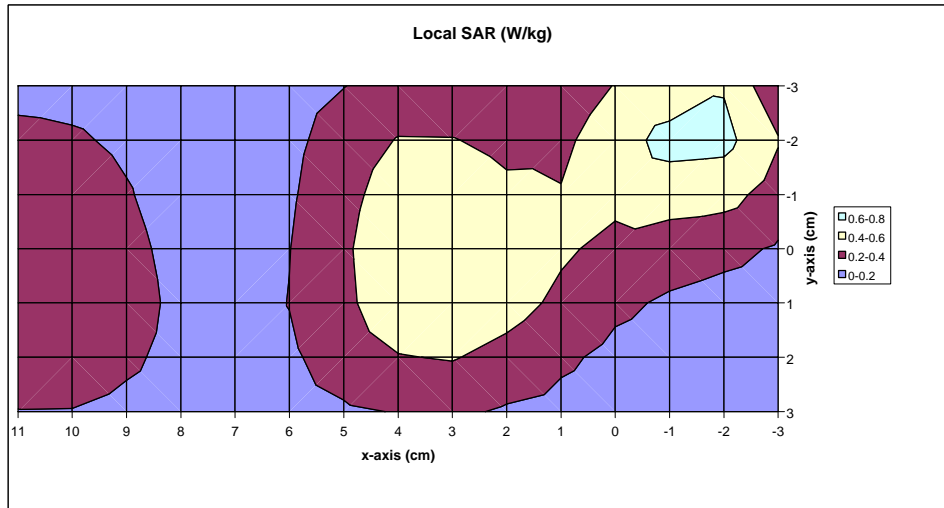


Figure 10. Area Plot of the 1900 MHz Reference Phone, 2.5mm above surface.

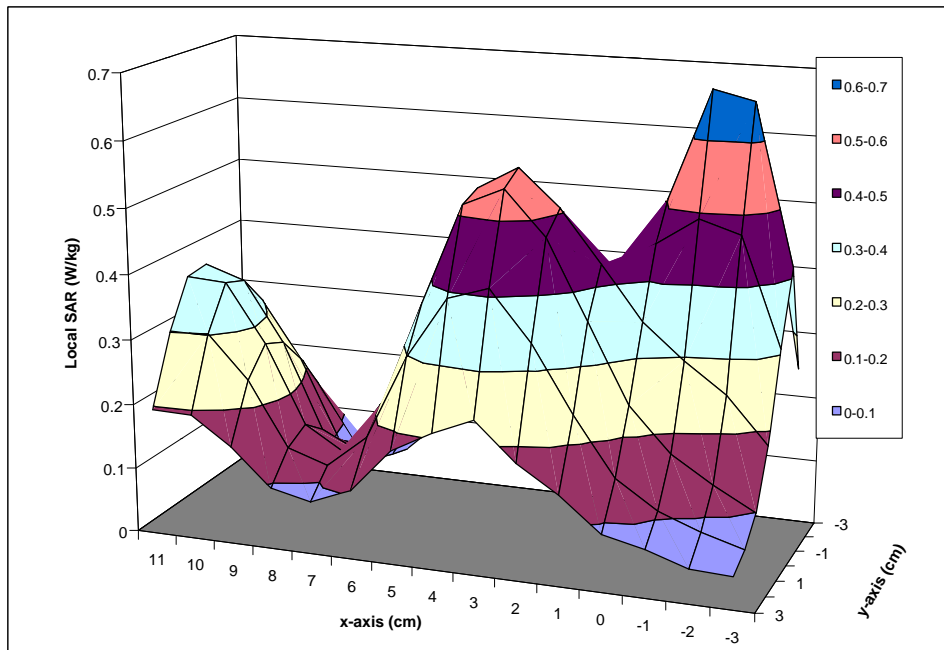


Figure 11. Surface Plot of the 1900 MHz Reference Phone, 2.5mm above surface.

Notice that the reference plots have a higher signal because of the improved sensitivity of the APREL probe over the Narda as well as the smaller separation from the sensor to the tip of the probe of 2.3mm for APREL vs 7mm for Narda..

- > 10. Please provide additional information on how SAR for TDMA mode
- > in the cellular band was determined (0.577 W/kg) - according to what
- > output levels and duty factor etc. (also see item #1 above regarding
- > output discrepancies).

In the Head SAR report the worst case peak SAR for AMPS was 0.92 W/kg on the low channel. The worst case peak SAR for the cellular TDMA mode was 0.37 W/kg, also on the low channel. The maximum 1g SAR for the AMPS mode was determined to be 1.436 W/kg. The maximum 1g SAR for the cellular TDMA mode was estimated as $1.436 * 0.37 / 0.92 = 0.577$ W/kg.

- > 11. There are 3 separate files uploaded for SAR. The file sizes are
- > identical. The contents also appear to be the same. Please confirm
- > that these files are identical so that we can delete the other two
- > since these files are quite large.

We appeared to have problems using the primary site to upload the files. Even though the Status window was green with OK in it, there was also a Microsoft Internet Explorer error window open with the message:

Internet Explorer cannot open the Internet site
<https://gullfoss.fcc.gov/prod/oet/forms/blobs/comload.cgi>.

The operation timed out

Since I was concerned that the whole file was not uploaded I tried it again with the same result. This was discussed with the FCC's Kwok Chan at the time (afternoon of 02 July 1999) who suggested using the alternate site (<https://svartifoss.fcc.gov/prod/oet/index.html>). This uploaded the file with not subsequent error messages. (I uploaded files earlier this week with the same error message with the primary site and I now ignore these errors. It appears that there is an incorrect link on the primary site that is correct on the alternate).

This would explain why 3 separate files were uploaded for SAR. You should retain one and delete the other two.