Re: FCC ID OSZ39001C
Applicant: Intersil Corporation
Correspondence Reference Number: 25698

1) SAR report shows concept of "alpha" as distance between laptop and
phantom. FYI - note that arbitrary spacing should not be used in lapheld
position SAR test unless device has feature to maintain spacing.

A1) Test report revised as directed.

2) EMC and SAR reports show identical output powers. Please describe
procedures used to ensure card was transmitting at max power for SAR tests,
including SAR power test results where appropriate.

A2) The power level was tuned up according to the power table (power settings along with the estimated
power measurement at this settings) provided by manufacturer using the exclusive controlling software.
The tolerance used is less than ±5%.

Procedure:

i)
- the output of the transmitter was coupled to a diode detector;
- the output of the diode detector was connected to the vertical channel of an oscilloscope;

ii)
- the measurement set up as given under i) was used to determine on the oscilloscope the peak of the
envelope of the output signal of the transmitter;
- the maximum deviation of the Y-trace of the oscilloscope was recorded as "B"

iii)
- the transmitter was replaced by a signal generator. The output frequency of the signal was made
equal to the center of the output signal of the transmitter;
- the signal generator was unmodulated. The output power of the signal generator was raised to a
level such that the deviation of the Y-trace of the oscilloscope reached level B, as indicated in ii);
- this output power level "C" (in dBm) of the signal generator was determined using a calibrated RF
power meter with a thermocouple detector;

Equipment list:
Signal Generator – Hewlett & Packard – M/N: 83752B
Oscilloscope – Hewlett & Packard – M/N: 54810A
Power Meter – Hewlett & Packard – M/N: 436A
Power Sensor – Hewlett & Packard – M/N: 8481A
Diode Detector – Narda – M/N: 503A-03

3) FYI - in future filings please list also SAR area scan dimensions

A3) Acknowledged and accepted.

4) FYI - in future filings please include photo of actual SAR verification
dipole in position at flat phantom for each band.

A4) Acknowledged and accepted.

5) FYI - in future filings keyboard up position typically not needed.

A5) Acknowledged and accepted.

6) Please submit mix procedures for 5 GHz liquid.

A6)
<u>Composition (by weight)</u>
Distilled water : 77.67 [%]
DBGE   : 2.91 [%]
Triton X-100 : 19.42 [%]

<u>Mix procedure</u>
   i)   Heat DI water up to 40 °C in mixing container using heat belts around container.
   ii)   Add up DGBE and stir at low speed about 10 minutes.
   iii) Add up Triton X-100 and stir at very low speed about 30 minutes

7) Please submit printout/output/screen-dump from dielectric test system
including several frequencies within band.

A7)
a) 5.24 GHz muscle tissue

Frequency [GHz]	Meas. after 5min			DI Water at 20°C			Init. Meas.		
	'	"	[S/m]	'	"	[S/m]	'	"	[S/m]
5.200000000	47.4568	18.9879	5.49	73.2324	19.7715	5.72	47.4606	18.9798	5.49
5.210000000	47.4274	18.9861	5.50	73.2297	19.7870	5.74	47.4227	18.9875	5.50
5.220000000	47.4029	19.0196	5.52	73.1874	19.8184	5.76	47.3925	19.0045	5.52
5.230000000	47.3650	19.0550	5.54	73.1926	19.8688	5.78	47.3496	19.0433	5.54
5.240000000	47.3182	19.0687	5.56	73.1625	19.8901	5.80	47.3104	19.0518	5.55
5.250000000	47.3100	19.0786	5.57	73.1366	19.9245	5.82	47.2982	19.0830	5.57
5.260000000	47.2770	19.0928	5.59	73.1066	19.9146	5.83	47.2832	19.0828	5.58
5.270000000	47.2406	19.1150	5.60	73.1028	19.9752	5.86	47.2285	19.0974	5.60
5.280000000	47.2001	19.1496	5.62	73.0610	20.0106	5.88	47.1946	19.1442	5.62
5.290000000	47.1724	19.1755	5.64	73.0353	20.0244	5.89	47.1719	19.1666	5.64
5.300000000	47.1484	19.1955	5.66	73.0084	20.0845	5.92	47.1509	19.1937	5.66

b) 2.45 GHz brain tissue

Frequency [GHz]	Meas. after 5min			DI Water at 20°C			Init. Meas.		
	'	"	[S/m]	'	"	[S/m]	'	"	[S/m]
1.900000000	41.6932	11.5031	1.22	78.9344	8.2763	0.87	41.6018	11.5960	1.23
1.950000000	41.6144	11.7020	1.27	78.8948	8.4940	0.92	41.5290	11.7952	1.28
2.000000000	41.3591	11.8608	1.32	78.8477	8.7015	0.97	41.2300	11.9630	1.33
2.050000000	41.2486	12.0402	1.37	78.7932	8.8898	1.01	41.1272	12.1448	1.39
2.100000000	41.0650	12.2054	1.43	78.7516	9.1068	1.06	40.9348	12.3098	1.44
2.150000000	40.8631	12.3973	1.48	78.7024	9.3275	1.12	40.7293	12.5007	1.50
2.200000000	40.7410	12.5566	1.54	78.6384	9.5285	1.17	40.6113	12.6764	1.55
2.250000000	40.5207	12.7122	1.59	78.5979	9.7267	1.22	40.3742	12.8216	1.60
2.300000000	40.3722	12.8725	1.65	78.5186	9.9376	1.27	40.2349	12.9968	1.66
2.350000000	40.1627	13.0264	1.70	78.4719	10.1496	1.33	40.0376	13.1482	1.72
2.400000000	40.0161	13.1735	1.76	78.4081	10.3492	1.38	39.8820	13.3050	1.78
2.450000000	39.8246	13.3118	1.81	78.3521	10.5491	1.44	39.7126	13.4459	1.83
2.500000000	39.6495	13.4319	1.87	78.3006	10.7416	1.49	39.5211	13.5794	1.89

c) 2.45 GHz muscle tissue

Frequency [GHz]	Meas. after 5min			DI Water at 20°C			Init. Meas.		
	'	"	[S/m]	'	"	[S/m]	'	"	[S/m]
2.300000000	54.2202	13.5670	1.74	78.4236	9.9093	1.27	54.2780	13.7627	1.76
2.316666667	54.4740	13.8945	1.79	78.3962	9.9744	1.29	54.4978	13.9002	1.79
2.333333333	54.6210	13.9947	1.82	78.3803	10.0494	1.30	54.5738	13.9269	1.81
2.350000000	54.5412	13.8325	1.81	78.3551	10.1195	1.32	54.4403	13.8202	1.81
2.366666667	54.3566	13.5343	1.78	78.3351	10.1833	1.34	54.2212	13.6798	1.80
2.383333333	54.1769	13.3652	1.77	78.3221	10.2643	1.36	54.0524	13.6235	1.81
2.400000000	54.1004	13.4679	1.80	78.2966	10.3313	1.38	54.0034	13.7340	1.83
2.416666667	54.1518	13.8128	1.86	78.2751	10.3863	1.40	54.1064	13.9674	1.88
2.433333333	54.2431	14.2076	1.92	78.2600	10.4610	1.42	54.2197	14.2053	1.92
2.450000000	54.3175	14.3795	1.96	78.2374	10.5238	1.43	54.2792	14.3137	1.95
2.466666667	54.3348	14.2586	1.96	78.2196	10.6030	1.46	54.2390	14.2214	1.95
2.483333333	54.2989	14.0013	1.93	78.2081	10.6711	1.47	54.1441	14.0657	1.94
2.500000000	54.2148	13.8224	1.92	78.1659	10.7190	1.49	54.0397	13.9911	1.95

8) What is specific heat capacity for 5 GHz liquid and how was it determined?

A8) Specific heat capacity: 4.019 [J/g/°C]

Determining the Heat Capacity of Simulated Tissue
Instruments and Materials
- Calibrated differential thermometer (Vitek or BAT-8 or equivalent)
- Two identical 500 ml containers
- A thermally insulated vessel (thick styrofoam, with a form fitting hole for one container)
- Hot and cold tap water
- Solution under test
- Hot plate
- Temperature vs. time (chart recorder, or data logger)

Method

Heat can be propagated by conduction, convection and radiation. In the case of liquids heated from below, gravity convection is the main and predominant heating mechanism of the fluid mass.

Obtain two containers that can be rapidly heated (e.g. glass or suitable plastic). Fill one container with 250 ml of water, the other with the same mass of simulated tissue. The initial temperature of the water should be the same as that of the simulated tissue ($\pm1°C$). Since we are dealing with heating by electromagnetic sources at ambient temperature, it is essential that we eliminate the chance of any direct infrared heating of the temperature sensor. To ensure this, position the tip of the sensor 2 mm from the bottom of the center of the container. Turn on the heat source and wait at least 5 minutes for its temperature to stabilize. Record the initial temperature of the water. Place the container of water 5 mm above the center of the hot plate and monitor the temperature increase.

After 30 seconds of heating, the water temperature should have increased by at least 5°C. Record the time and temperature. Remove the container from the heat source and place it in the thermally insulated vessel. Stir the liquid thoroughly and record the steady state temperature 120 seconds after stirring.

Repeat the above procedure using the container of simulated tissue. Ensure that the container is placed on the same area of the hot plate, is heated for the identical length of time, and the steady state temperature is recorded after the identical time interval.

Since the heat capacity of water is $C_w = 1$ cal/°C/g with excellent approximation (~1%) in the temperature range of interest, the heat capacity (C_s) of the solution is given by:

$$C_s = C_w \cdot \frac{\Delta T_w}{\Delta T_s}$$

where T_w is the temperature increase of water and T_s the temperature increase of the solution. The ration of the values, $\tilde{T}_w$ T_s, should be the same (within the sensivity of the thermometer) at the end of the heating and stirring. This ensures that the liquids have been uniformly heated.

Rationale

$$C \cdot \Delta T = Heat\_Flow \cdot Time = Total\_Heating\_Energy$$

If the heat flow, sample mass, and absorption (heat transfer) are the same for both liquids, then:

$$C_w \cdot \Delta T_w = C_s \cdot \Delta T_s$$

The heat flow and total heating are kept constant by using the same source for the same amount of time. If the heat transfer mechanisms for the woe liquids are about the same, with insignificant differences in convective and conductive characteristics, then any differences in temperature increase are a direct measure of the specific heat capacity, C.

Reference
 "SAR measurement operation guide", O.M. Garay and Q. Balzano, 1995, Motorola
"Tissue Recipe and Calibration Requirements", SSI/DRB-TP-D01-033, 1998, Aprel

9) 5 GHz SAR uses 2.4 GHz probe factor - please revise/retest.
A9) Test report revised as directed.