

Tissue Parameters

Recipe for liquids below 1 GHz:

Water 35-58%

Sugar 40-60%

Salt 0-6%

Hydroxyethyl-cellulose <0.3%

Preventol-D7 0.1-0.7%

Recipe for liquids above 1-3 GHz:

Water 52-75%

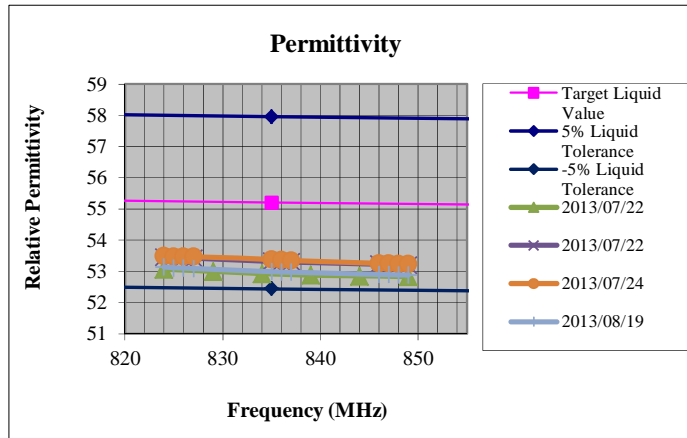
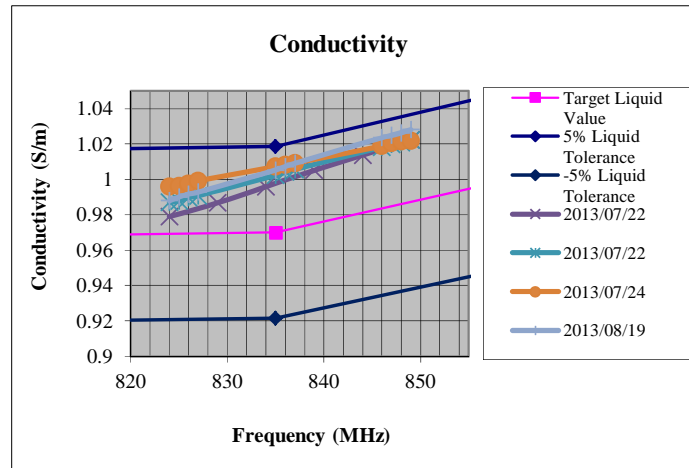
DGBE 25-48%

Salt <1.0%

SAR measurements were made within 24 hours of the measurement of liquid parameters. Relative permittivity and conductivity are within $\pm 5\%$ of the target.

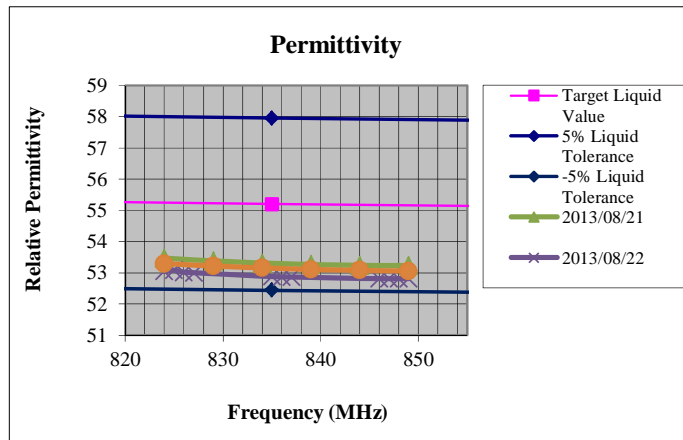
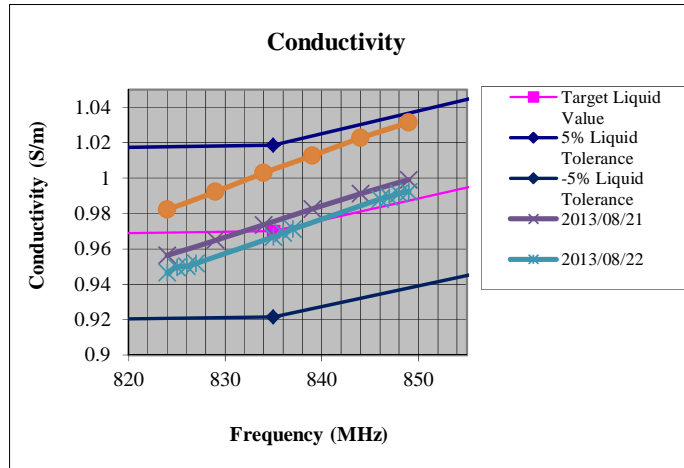
850 MHz Body Liquid

Date	Temp (°C)	Frequency (MHz)	Relative Permittivity	Conductivity (S/m)
2013/07/22	22	824	53.0675	0.979
		829	53.0024	0.9867
		834	52.9294	0.9959
		839	52.879	1.0051
		844	52.8573	1.0137
		849	52.8301	1.0224
2013/07/22	21.7	824	53.4581	0.987
		825	53.4693	0.9878
		826	53.4287	0.9898
		827	53.4236	0.9908
		835	53.3186	1.0023
		836	53.3044	1.0041
		837	53.2991	1.0056
		846	53.2291	1.0183
		847	53.22	1.0199
		848	53.2085	1.0207
2013/07/24	21.7	824	53.4927	0.9957
		825	53.4773	0.9962
		826	53.476	0.9976
		827	53.471	0.9992
		835	53.3837	1.0072
		836	53.3561	1.0082
		837	53.349	1.0092
		846	53.2553	1.0188
		847	53.244	1.0203
		848	53.2416	1.0215
2013/08/19	20.2	824	53.1407	0.9879
		825	53.1112	0.9901
		826	53.1077	0.9917
		827	53.0913	0.9928
		835	52.9899	1.0053
		836	52.9764	1.0073
		837	52.9731	1.0091
		846	52.9011	1.0236
		847	52.8969	1.0248
848	52.8861	1.0263		
849	52.8861	1.0281		



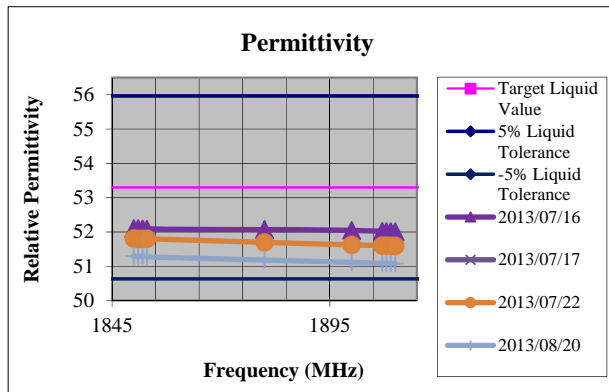
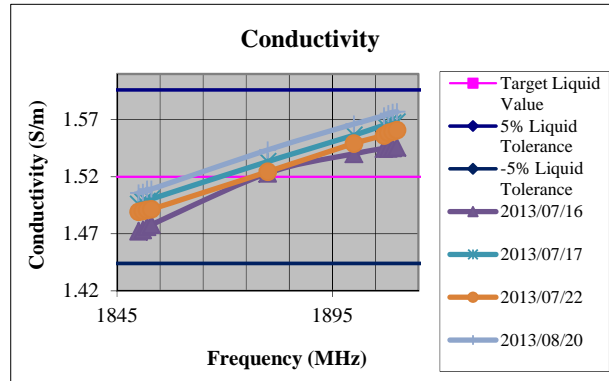
850 MHz Body Liquid

Date	Temp (°C)	Frequency (MHz)	Relative Permittivity	Conductivity (S/m)
2013/08/21	20.6	824	53.4732	0.9564
		829	53.3846	0.965
		834	53.3143	0.9736
		839	53.2708	0.9826
		844	53.2422	0.9912
		849	53.2353	0.9991
2013/08/22	21.3	824	53.0538	0.9465
		825	53.0847	0.9497
		826	53.0229	0.9501
		827	53.005	0.9518
		835	52.8802	0.9668
		836	52.8742	0.9689
		837	52.8654	0.9711
		846	52.8126	0.9881
2013/09/11	22.1	824	53.2996	0.9824
		829	53.2221	0.9922
		834	53.1577	1.003
		839	53.106	1.0127
		844	53.0827	1.0227
		849	53.0601	1.0313



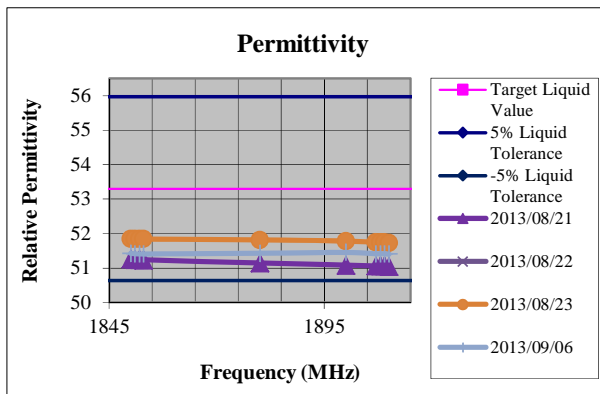
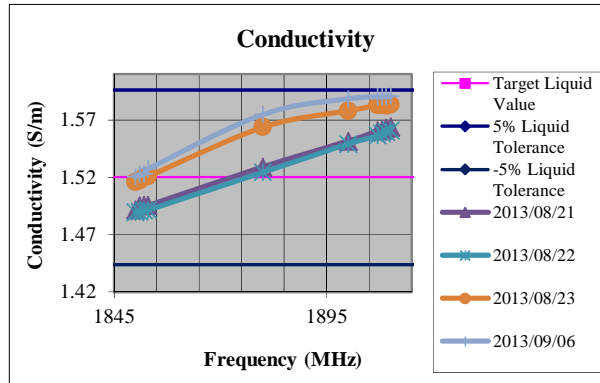
1900 MHz Body Liquid

Date	Temp (°C)	Frequency (MHz)	Relative Permativity	Conductivity (S/m)
2013/07/16	22.1	1850	52.0998	1.4722
		1851	52.0992	1.4734
		1852	52.0913	1.4761
		1853	52.0839	1.478
		1880	52.0681	1.5231
		1900	52.0504	1.5401
		1907	52.0161	1.5448
		1908	52.0121	1.5449
		1909	52.0115	1.5452
		1910	52.0088	1.5459
2013/07/17	20.8	1850	52.146	1.4958
		1851	52.1327	1.4979
		1852	52.1274	1.4984
		1853	52.1218	1.5005
		1880	52.0345	1.5333
		1900	51.9584	1.5564
		1907	51.933	1.5653
		1908	51.9291	1.5666
		1909	51.9182	1.567
		1910	51.9214	1.568
2013/07/22	21.2	1850	51.8128	1.4893
		1851	51.7995	1.4901
		1852	51.7993	1.4911
		1853	51.802	1.4915
		1880	51.6969	1.5244
		1900	51.6261	1.5491
		1907	51.6022	1.5562
		1908	51.6029	1.5585
		1909	51.5992	1.5595
		1910	51.5975	1.5609
2013/08/20	21.7	1850	51.2923	1.5059
		1851	51.289	1.5063
		1852	51.2932	1.5091
		1853	51.2739	1.5092
		1880	51.18	1.5435
		1900	51.1149	1.5662
		1907	51.0885	1.5734
		1908	51.0867	1.5753
		1909	51.0837	1.5765
		1910	51.0779	1.577



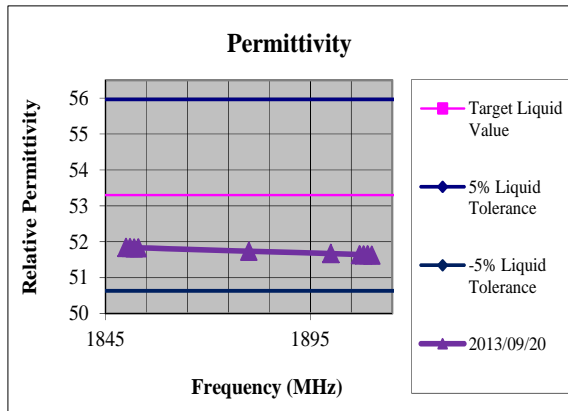
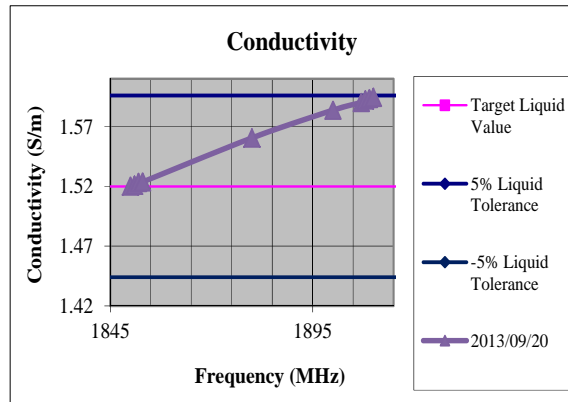
1900 MHz Body Liquid

Date	Temp (°C)	Frequency (MHz)	Relative Permittivity	Conductivity (S/m)
2013/08/21	21.6	1850	51.2546	1.4913
		1851	51.2403	1.4949
		1852	51.2437	1.4953
		1853	51.2334	1.4954
		1880	51.1438	1.5291
		1900	51.0829	1.5517
		1907	51.0577	1.5603
		1908	51.0555	1.5609
		1909	51.0561	1.563
		1910	51.0473	1.5637
2013/08/22	21.5	1850	51.8128	1.4893
		1851	51.7995	1.4901
		1852	51.7993	1.4911
		1853	51.802	1.4915
		1880	51.6969	1.5244
		1900	51.6261	1.5491
		1907	51.6022	1.5562
		1908	51.6029	1.5585
		1909	51.5992	1.5595
		1910	51.5975	1.5609
2013/08/23	21.3	1850	51.8432	1.516
		1851	51.8359	1.5171
		1852	51.8401	1.5201
		1853	51.8379	1.5208
		1880	51.8149	1.5637
		1900	51.7819	1.5781
		1907	51.742	1.5827
		1908	51.7455	1.5827
		1909	51.7403	1.5826
		1910	51.7311	1.5836
2013/09/06	20.8	1850	51.4239	1.5204
		1851	51.4102	1.5225
		1852	51.4025	1.5231
		1853	51.405	1.5275
		1880	51.4266	1.5749
		1900	51.4501	1.5886
		1907	51.4115	1.5902
		1908	51.4128	1.5903
		1909	51.4119	1.5906
		1910	51.4004	1.5908



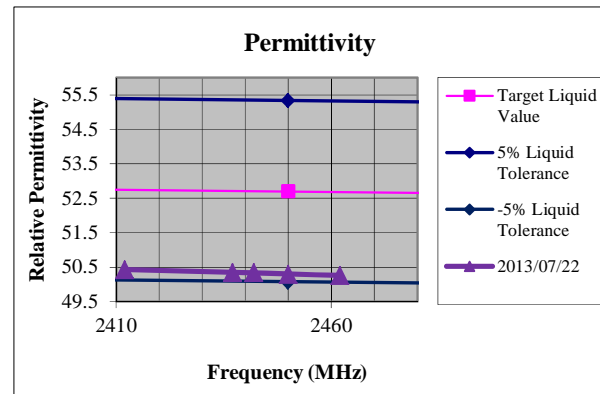
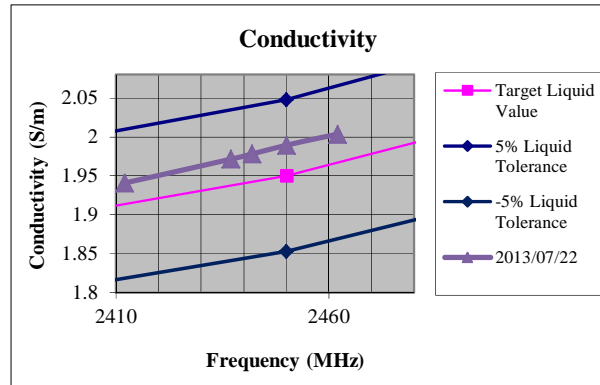
1900 MHz Body Liquid

Date	Temp (°C)	Frequency (MHz)	Relative Permativity	Conductivity (S/m)
2013/09/20	21.3	1850	51.844	1.5203
		1851	51.8392	1.5211
		1852	51.8259	1.5233
		1853	51.8327	1.5238
		1880	51.736	1.5606
		1900	51.6729	1.5838
		1907	51.6408	1.5903
		1908	51.6373	1.5924
		1909	51.6392	1.5936
		1910	51.6275	1.5945



2450 MHz Body Liquid

Date	Temp (°C)	Frequency (MHz)	Relative Permittivity	Conductivity (S/m)
2013/07/22	22.6	2412	50.4314	1.9407
		2437	50.3489	1.9714
		2442	50.3397	1.978
		2450	50.3005	1.9894
		2462	50.2621	2.0034



Test Equipment
SAR1 Lab

Instrument description	Supplier / Manufacturer	Model	Serial No.	Calibration (date)	Calibration Due (date)
Robot	Staubli	TX90	F10/5D3NA 1/A/01	N/A	N/A
SAM Twin Phantom	SPEAG	SM 000 T01 DA	1592	N/A	N/A
Elliptical Phantom	SPEAG	QD OVA 001 BB	1092	N/A	N/A
Software	SPEAG	Dasy52.6.2.482	N/A	N/A	N/A
Device Holder	SPEAG	SD 000H01	N/A	N/A	N/A

SAR 3 Lab

Instrument description	Supplier / Manufacturer	Model	Serial No.	Calibration (date)	Calibration Due (date)
Robot	Staubli	TX90	F11/5G2MA 1/C/01	N/A	N/A
SAM Twin Phantom	SPEAG	SM 000 T01 DA	1637	N/A	N/A
SAM Twin Phantom	SPEAG	SM 000 T01 DA	1638	N/A	N/A
Elliptical Phantom	SPEAG	QD OVA 001 BB	1124	N/A	N/A
Software	SPEAG	Dasy52.6.2.482	N/A	N/A	N/A
Device Holder	SPEAG	SD 000H01	N/A	N/A	N/A

SAR 4 Lab

Instrument description	Supplier / Manufacturer	Model	Serial No.	Calibration (date)	Calibration Due (date)
Robot	Staubli	TX90	F11/5GW9A 1/A/01	N/A	N/A
SAM Twin Phantom	SPEAG	SM 000 T01 DA	1639	N/A	N/A
SAM Twin Phantom	SPEAG	SM 000 T01 DA	1640	N/A	N/A
Elliptical Phantom	SPEAG	QD OVA 001 BB	1125	N/A	N/A
Software	SPEAG	Dasy52.6.2.482	N/A	N/A	N/A
Device Holder	SPEAG	SD 000H01	N/A	N/A	N/A
Data Acquisition Electronics	SPEAG	DAE4	1265	2011/05/13	2014/05/13
Data Acquisition Electronics	SPEAG	DAE4	1265	2013/06/11	2014/06/11
SAR Probe	SPEAG	ES3DV3	3260	2012/09/25	2013/09/25

Shared Equipment

Instrument description	Supplier / Manufacturer	Model	Serial No.	Calibration (date)	Calibration Due (date)
Data Acquisition Electronics	SPEAG	DAE4	1233	2012/11/06	2013/11/06
Data Acquisition Electronics	SPEAG	DAE4	1266	2011/05/30	2014/05/30
Data Acquisition Electronics	SPEAG	DAE4	1265	2011/05/13	2014/05/13
Data Acquisition Electronics	SPEAG	DAE4	1265	2013/06/11	2014/06/11
SAR Probe	SPEAG	ES3DV3	3244	2012/11/07	2013/11/07
SAR Probe	SPEAG	ES3DV3	3261	2012/08/17	2013/08/17
SAR Probe	SPEAG	ES3DV3	3261	2013/06/05	2014/06/05
SAR Probe	SPEAG	ES3DV3	3260	2013/06/19	2014/06/19
SAR Probe	SPEAG	ES3DV3	3323	2013/06/12	2014/06/12
900 MHz Body Tissue Simulant	SPEAG	MSL 900	110614-7	2013/07/22 – 2013/09/11	N/A
900 MHz Body Tissue Simulant	SPEAG	MSL 900	110518-7	2013/08/19 – 2013/08/22	N/A
1900 MHz Body Tissue Simulant	SPEAG	MSL 1900	110615-4	2013/07/16 – 2013/08/23	N/A
1900 MHz Body Tissue Simulant	SPEAG	MSL 1900	110530-3	2013/09/06 – 2013/09/20	N/A
2450 MHz Body Tissue Simulant	SPEAG	MSL 2450	110824-1	2013/07/24	N/A
835 MHz Dipole	SPEAG	D835V2	4d113	2012/11/05	2014/11/05
1900 MHz Dipole	SPEAG	D1900V2	5d135	2012/11/06	2014/11/06
2450 MHz Dipole	SPEAG	D2450V2	859	2012/11/07	2014/11/07
Network Analyzer	Agilent	FieldFox N9923A	MY51491621	2012/04/02	2014/04/02
Directional coupler	Werlatone	C6529	11249	N/A	N/A
RF Amplifier	Vectawave	VTL5400	N/A	N/A	N/A
Dielectric Measurement Kit	SPEAG	DAK-3.5	1023	2012/02/20	2014/02/20
Synthesized CW Generator	Agilent	8371213	US37101255	N/A	N/A
Power Meter	Agilent	E4419B	MY45101996	2011/07/29	2013/07/29
Power Sensor	Agilent	E9300A	MY41498484	2011/08/05	2013/08/05
Power Sensor	Agilent	E9300A	MY41498492	2011/08/05	2013/08/05
Radio Communications Tester	Rohde & Schwarz	CMU 200	101821	2011/05	2013/05
Radio Communications Tester	Rohde & Schwarz	CMU 200	109879	2011/05	2013/05
Radio Communications Tester	Rohde & Schwarz	CMU 200	110759	2011/05	2013/05

Equipment Calibration/Performance Documents:

Attached:

SAR Probe ES3DV3 Calibration Report

835 MHz Dipole Calibration Report

1900 MHz Dipole Calibration Report

2450 MHz Dipole Calibration Report