ATTACHMENT Q – DIPOLE VALIDATION

■ Validation Data (835MHz Head)

Test Laboratory: HCT

835 Dipole Validation test: Input power(1W)
Liquid Temperature : 21.8 ℃
Date Tested : April 28, 2006

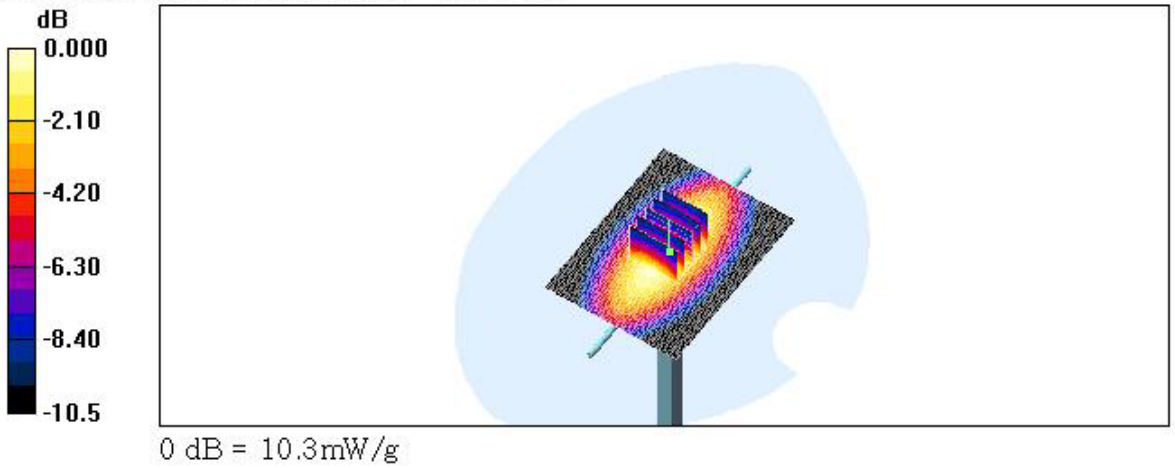
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441
Program Name: Validation

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; $\sigma = 0.872$ mho/m; $\varepsilon_r = 41.4$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section ;Measurement SW: DASY4, V4.6 Build 23

DASY4 Configuration:
- Probe: ET3DV6 - SN1607; ConvF(6.18, 6.18, 6.18); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2006-03-17
- Phantom: SAM 835/900 MHz; Type: SAM

Validation 835 MHz/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 10.3 mW/g

Validation 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 112.0 V/m; Power Drift = 0.010 dB
Peak SAR (extrapolated) = 14.0 W/kg
SAR(1 g) = 9.51 mW/g; SAR(10 g) = 6.23 mW/g
Maximum value of SAR (measured) = 10.3 mW/g



0 dB = 10.3mW/g

■ Validation Data (1900MHz Head)

Test Laboratory: HCT

1900 Dipole Validation test: Input power(1W)
Liquid Temperature : 21.8 ℃
Date Tested : April 28, 2006

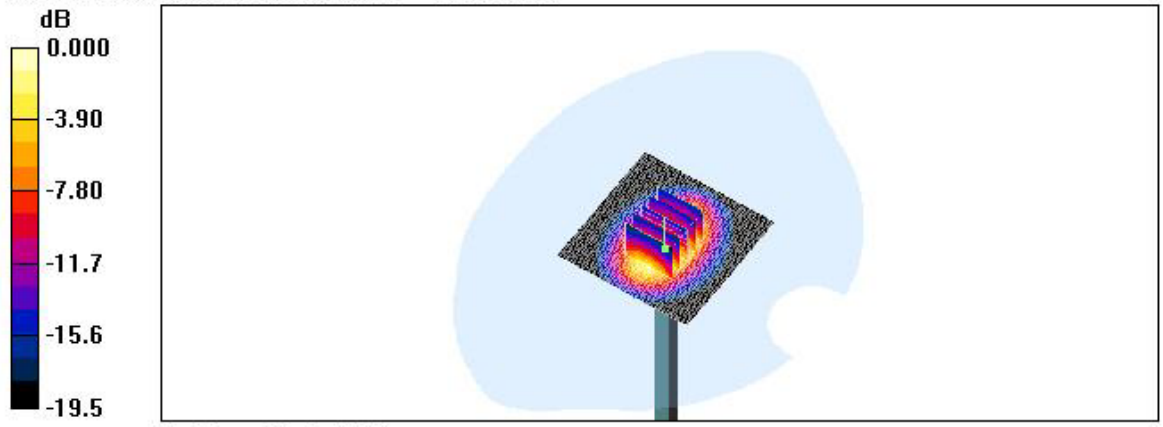
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d032
Program Name: Validation

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Flat Section ;Measurement SW: DASY4, V4.6 Build 23

DASY4 Configuration:
- Probe: ET3DV6 - SN1607; ConvF(5.14, 5.14, 5.14); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2006-03-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 49.2 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 185.8 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 72.2 W/kg
SAR(1 g) = 40.4 mW/g; SAR(10 g) = 20.8 mW/g
Maximum value of SAR (measured) = 44.6 mW/g



0 dB = 44.6mW/g

■ Validation Data (835MHz Head)

Test Laboratory: HCT

850 Dipole Validation test: Input power(1W)
Liquid Temperature : 21.7℃
Date Tested : June 06, 2006

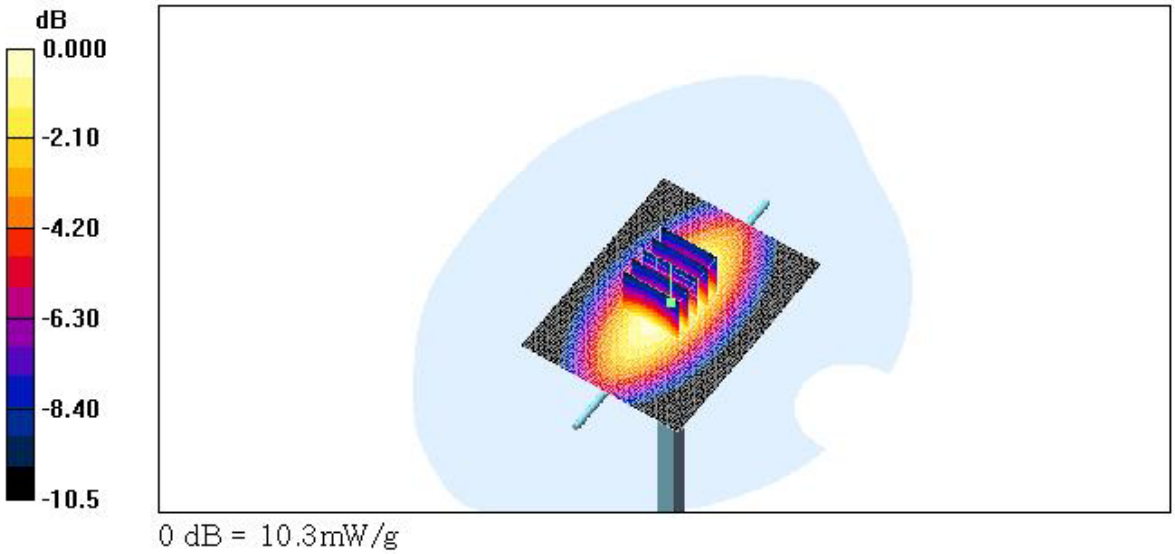
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441
Program Name: Validation

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; $\sigma = 0.876$ mho/m; $\varepsilon_r = 41$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section ;Measurement SW: DASY4, V4.7 Build 21

DASY4 Configuration:
- Probe: ET3DV6 - SN1607; ConvF(6.18, 6.18, 6.18); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2006-03-17
- Phantom: SAM 835/900 MHz; Type: SAM

Validation 835 MHz/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 10.5 mW/g

Validation 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 112.3 V/m; Power Drift = 0.033 dB
Peak SAR (extrapolated) = 14.1 W/kg
SAR(1 g) = 9.59 mW/g; SAR(10 g) = 6.3 mW/g
Maximum value of SAR (measured) = 10.3 mW/g



0 dB = 10.3mW/g

■ Validation Data (1900MHz Head)

Test Laboratory: HCT

1900 Dipole Validation test: Input power(1W)
Liquid Temperature : 21.7℃
Date Tested : June 06, 2006

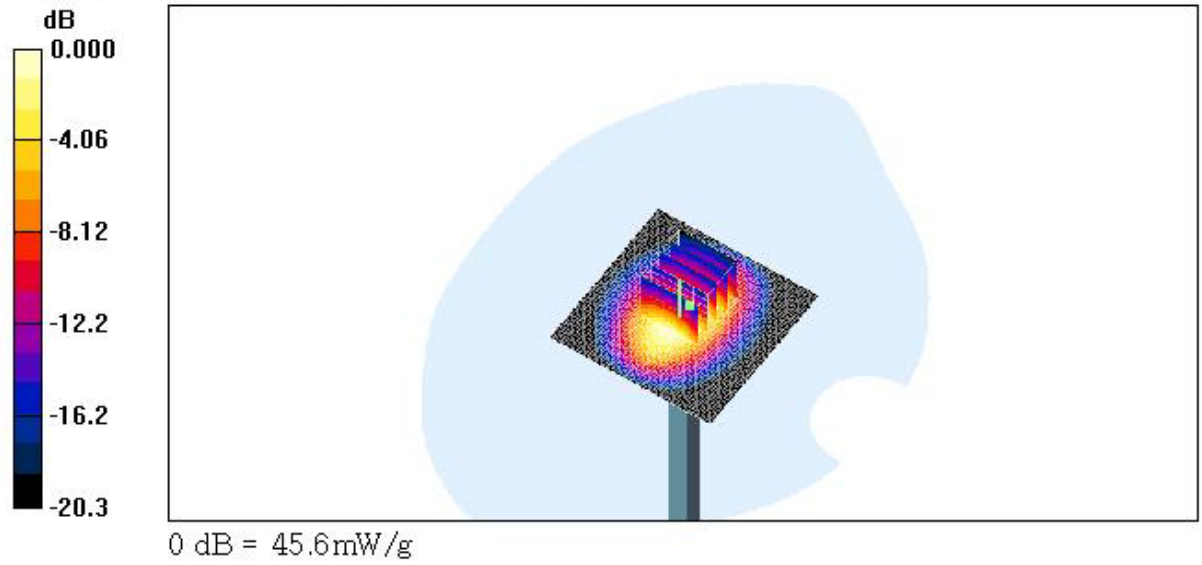
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d032
Program Name: Validation

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Flat Section ;Measurement SW: DASY4, V4.7 Build 21

DASY4 Configuration:
- Probe: ET3DV6 - SN1607; ConvF(5.14, 5.14, 5.14); Calibrated: 2005-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2006-03-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 47.9 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 187.3 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 74.2 W/kg
SAR(1 g) = 41 mW/g; SAR(10 g) = 21 mW/g
Maximum value of SAR (measured) = 45.6 mW/g



0 dB = 45.6mW/g

■ Dielectric Parameter (850MHz Head)

Title : SP-210

SubTitle : GSM850 Head

April 28, 2006 08:50 AM

Frequency	e'	e''
800.000000 MHz	41.9025	18.7553
805.000000 MHz	41.8892	18.7544
810.000000 MHz	41.8264	18.7670
815.000000 MHz	41.7411	18.7323
820.000000 MHz	41.6756	18.7459
825.000000 MHz	41.6385	18.7623
830.000000 MHz	41.5359	18.7863
835.000000 MHz	41.4165	18.7627
840.000000 MHz	41.3523	18.7451
845.000000 MHz	41.2468	18.6877
850.000000 MHz	41.1875	18.6800
855.000000 MHz	41.1061	18.6275
860.000000 MHz	41.0393	18.6227
865.000000 MHz	40.9534	18.6542
870.000000 MHz	40.8807	18.6211
875.000000 MHz	40.7265	18.5817
880.000000 MHz	40.6819	18.5167
885.000000 MHz	40.5376	18.5362
890.000000 MHz	40.4059	18.5077
895.000000 MHz	40.3140	18.4239
900.000000 MHz	40.2455	18.3835

■ Dielectric Parameter (1900MHz Head)

Frequency	e'	e''
1.800000000 GHz	40.4700	13.4447
1.810000000 GHz	40.3949	13.4678
1.820000000 GHz	40.3743	13.5123
1.830000000 GHz	40.3180	13.6095
1.840000000 GHz	40.2952	13.6795
1.850000000 GHz	40.2765	13.7438
1.860000000 GHz	40.2054	13.8046
1.870000000 GHz	40.2040	13.8151
1.880000000 GHz	40.1207	13.8237
1.890000000 GHz	40.0946	13.7929
1.900000000 GHz	40.0265	13.7656
1.910000000 GHz	39.9883	13.7645
1.920000000 GHz	39.9162	13.7558
1.930000000 GHz	39.8761	13.7715
1.940000000 GHz	39.8298	13.8212
1.950000000 GHz	39.7830	13.9041
1.960000000 GHz	39.7620	13.9698
1.970000000 GHz	39.7537	14.0566
1.980000000 GHz	39.7340	14.1153
1.990000000 GHz	39.7035	14.1339
2.000000000 GHz	39.6417	14.1265

■ Dielectric Parameter (850MHz Body)

Title : SP-210
SubTitle : GSM850 Body
April 28, 2006 11:05 AM

Frequency	e'	e''
800.000000 MHz	55.2893	21.4718
805.000000 MHz	55.2392	21.4593
810.000000 MHz	55.1965	21.4328
815.000000 MHz	55.1495	21.4533
820.000000 MHz	55.1602	21.4131
825.000000 MHz	55.0969	21.3835
830.000000 MHz	54.9815	21.3903
835.000000 MHz	54.9403	21.3533
840.000000 MHz	54.9484	21.3864
845.000000 MHz	54.8378	21.3647
850.000000 MHz	54.8272	21.3716
855.000000 MHz	54.7217	21.3271
860.000000 MHz	54.6852	21.2895
865.000000 MHz	54.6040	21.3019
870.000000 MHz	54.5673	21.2866
875.000000 MHz	54.5026	21.2930
880.000000 MHz	54.4557	21.2872
885.000000 MHz	54.3724	21.2533
890.000000 MHz	54.3156	21.2572
895.000000 MHz	54.2420	21.2152
900.000000 MHz	54.1985	21.1408

■ Dielectric Parameter (1900MHz Body)

Title : SP-210
SubTitle : GSM1900 Body
April 28, 2006 04:50 PM

Frequency	e'	e''
1.800000000 GHz	52.9100	13.7531
1.810000000 GHz	52.8724	13.8557
1.820000000 GHz	52.8594	13.9043
1.830000000 GHz	52.8138	13.9671
1.840000000 GHz	52.7748	14.0099
1.850000000 GHz	52.7257	14.0185
1.860000000 GHz	52.6620	14.0371
1.870000000 GHz	52.6220	14.0639
1.880000000 GHz	52.6057	14.0948
1.890000000 GHz	52.6104	14.1467
1.900000000 GHz	52.6215	14.2034
1.910000000 GHz	52.6013	14.2706
1.920000000 GHz	52.5153	14.3698
1.930000000 GHz	52.4487	14.4481
1.940000000 GHz	52.4028	14.5151
1.950000000 GHz	52.4055	14.5622
1.960000000 GHz	52.3667	14.6089
1.970000000 GHz	52.3661	14.6558
1.980000000 GHz	52.1797	14.6379
1.990000000 GHz	52.0383	14.6688
2.000000000 GHz	51.9665	14.6992

■ Dielectric Parameter (850MHz Head)

Title : SP-210
SubTitle : GSM850HEAD
June 06, 2006 09:00 AM

Frequency	e'	e''
800.000000 MHz	41.3975	18.9346
805.000000 MHz	41.3240	18.9397
810.000000 MHz	41.2463	18.9245
815.000000 MHz	41.2240	18.8734
820.000000 MHz	41.1573	18.8720
825.000000 MHz	41.1459	18.9139
830.000000 MHz	41.0503	18.8574
835.000000 MHz	41.0123	18.8539
840.000000 MHz	40.9461	18.8584
845.000000 MHz	41.0033	18.8181
850.000000 MHz	40.8757	18.8194
855.000000 MHz	40.7905	18.8194
860.000000 MHz	40.7850	18.8074
865.000000 MHz	40.7597	18.7603
870.000000 MHz	40.6547	18.7870
875.000000 MHz	40.6122	18.7455
880.000000 MHz	40.5580	18.7480
885.000000 MHz	40.4690	18.7307
890.000000 MHz	40.4422	18.7356
895.000000 MHz	40.3351	18.7342
900.000000 MHz	40.2785	18.6987

■ Dielectric Parameter (850MHz Body)

Title : SP-210
SubTitle : GSM850BODY
June 06, 2006 10:15 AM

Frequency	e'	e''
800.000000 MHz	55.2208	21.1536
805.000000 MHz	55.2035	21.1081
810.000000 MHz	55.0560	21.0762
815.000000 MHz	55.0704	21.0201
820.000000 MHz	54.9710	20.9889
825.000000 MHz	54.9086	20.9783
830.000000 MHz	54.9124	20.9934
835.000000 MHz	54.7641	20.9983
840.000000 MHz	54.7276	20.9730
845.000000 MHz	54.7173	20.9272
850.000000 MHz	54.6945	20.9627
855.000000 MHz	54.5764	21.0014
860.000000 MHz	54.6098	20.9499
865.000000 MHz	54.5328	20.9193
870.000000 MHz	54.4721	20.8721
875.000000 MHz	54.4400	20.8411
880.000000 MHz	54.3873	20.8237
885.000000 MHz	54.2944	20.7958
890.000000 MHz	54.2461	20.7035
895.000000 MHz	54.1885	20.6262
900.000000 MHz	54.1335	20.5801

■ Dielectric Parameter (1900MHz Head)

Title : SP-210
SubTitle : GSM1900 HEAD
June 06, 2006 08:06 AM

Frequency	e'	e''
1.800000000 GHz	38.5628	13.5806
1.810000000 GHz	38.5709	13.6072
1.820000000 GHz	38.5237	13.6300
1.830000000 GHz	38.4908	13.6445
1.840000000 GHz	38.4042	13.6672
1.850000000 GHz	38.4012	13.6880
1.860000000 GHz	38.3369	13.7039
1.870000000 GHz	38.3072	13.7407
1.880000000 GHz	38.2363	13.7759
1.890000000 GHz	38.2102	13.8047
1.900000000 GHz	38.1690	13.7928
1.910000000 GHz	38.1428	13.8277
1.920000000 GHz	38.0912	13.8431
1.930000000 GHz	38.0882	13.8316
1.940000000 GHz	38.0510	13.8763
1.950000000 GHz	38.0016	13.8532
1.960000000 GHz	37.9625	13.8819
1.970000000 GHz	37.9012	13.9104
1.980000000 GHz	37.8697	13.9203
1.990000000 GHz	37.8207	13.9645
2.000000000 GHz	37.8005	13.9933

■ Dielectric Parameter (1900MHz Body)

Title : SP-210
SubTitle : GSM1900BODY
June 06, 2006 11:30 AM

Frequency	e'	e''
1.800000000 GHz	53.0266	14.1248
1.810000000 GHz	52.9912	14.1775
1.820000000 GHz	52.9822	14.2329
1.830000000 GHz	52.9537	14.3381
1.840000000 GHz	52.9597	14.4093
1.850000000 GHz	52.9237	14.4959
1.860000000 GHz	52.8677	14.5205
1.870000000 GHz	52.8322	14.5455
1.880000000 GHz	52.8122	14.5532
1.890000000 GHz	52.7407	14.5424
1.900000000 GHz	52.6502	14.5208
1.910000000 GHz	52.6168	14.5166
1.920000000 GHz	52.5246	14.5057
1.930000000 GHz	52.4782	14.5543
1.940000000 GHz	52.4566	14.5769
1.950000000 GHz	52.4462	14.6868
1.960000000 GHz	52.4184	14.7409
1.970000000 GHz	52.4280	14.8359
1.980000000 GHz	52.4165	14.8568
1.990000000 GHz	52.3943	14.9136
2.000000000 GHz	52.3762	14.9087