ATTACHMENT Q – DIPOLE VALIDATION

HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD.
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■ Validation Data (835MHz Head)

Test Laboratory: HCT

835 Dipole Validation test: Input power(1W)
Liquid Temperature : 22.1 ℃
Date Tested : June 08, 2006

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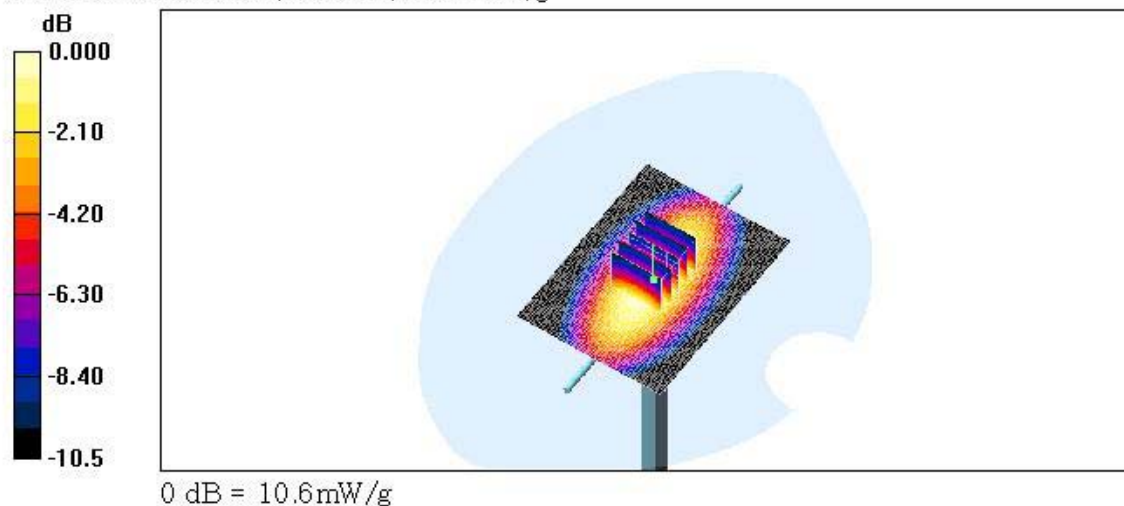**Program Name: Validation 835 MHz**

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 835$ MHz; $\sigma = 0.876$ mho/m; $\varepsilon_r = 40.9$; $\rho = 1000$ kg/m^3

Phantom section: Flat Section ;Measurement SW: DASY4, V4.6 Build 23

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.85, 6.85, 6.85); Calibrated: 2006-03-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2005-11-30
- Phantom: SAM 835/900 MHz; Type: SAM

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

Validatoin 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 113.3 V/m; Power Drift = -0.002 dB
Peak SAR (extrapolated) = 14.4 W/kg
SAR(1 g) = 9.79 mW/g; SAR(10 g) = 6.41 mW/g
Maximum value of SAR (measured) = 10.6 mW/g

0 dB = 10.6mW/g

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■ Validation Data (1900MHz Head)

Test Laboratory: HCT

1900 Dipole Validation test: Input power(1W)
Liquid Temperature : 22.1 ℃
Date Tested : June 08, 2006

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

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.46$ mho/m; $\epsilon_r = 38.2$; $\rho = 1000$ kg/m^3

Phantom section: Flat Section ;Measurement SW: DASY4, V4.6 Build 23

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.16, 5.16, 5.16); Calibrated: 2006-03-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn447; Calibrated: 2005-11-30
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 1900MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
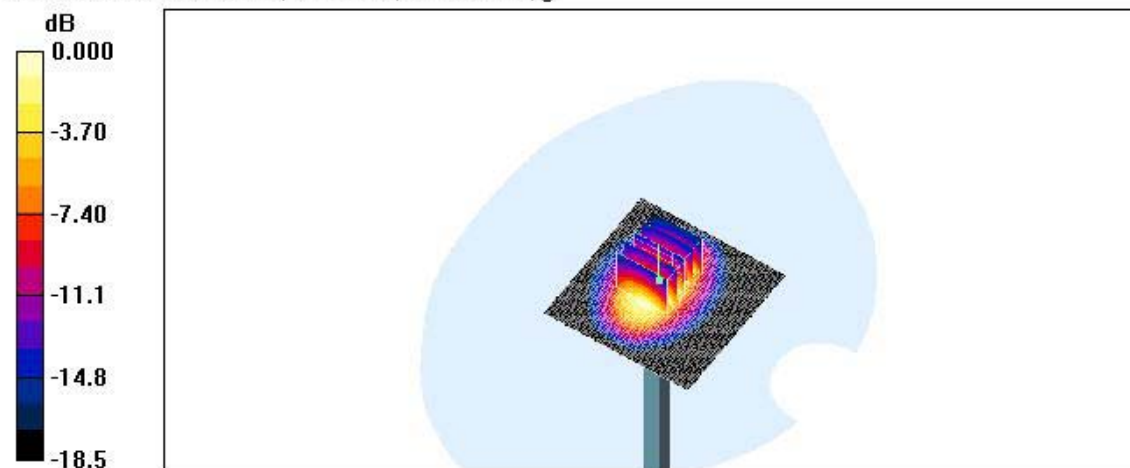Maximum value of SAR (interpolated) = 50.6 mW/g

Validation 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 185.1 V/m; Power Drift = –0.011 dB
Peak SAR (extrapolated) = 70.1 W/kg
SAR(1 g) = 40 mW/g; SAR(10 g) = 21.1 mW/g
Maximum value of SAR (measured) = 43.9 mW/g

0 dB = 43.9mW/g

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■ Dielectric Parameter (850MHz Head)

Title : SP-120
SubTitle : GSM850Head
June 03, 2006 11:10 AM

Frequency	e'	e''
800.000000 MHz	41.2673	18.8934
805.000000 MHz	41.1487	18.8895
810.000000 MHz	41.1300	18.8914
815.000000 MHz	41.0839	18.8686
820.000000 MHz	41.0472	18.8382
825.000000 MHz	40.9915	18.8715
830.000000 MHz	40.9096	18.8434
835.000000 MHz	40.8999	18.8640
840.000000 MHz	40.8552	18.8315
845.000000 MHz	40.8525	18.7980
850.000000 MHz	40.7991	18.8408
855.000000 MHz	40.6968	18.8149
860.000000 MHz	40.7012	18.8004
865.000000 MHz	40.6629	18.7776
870.000000 MHz	40.5851	18.7562
875.000000 MHz	40.5337	18.7881
880.000000 MHz	40.4613	18.7608
885.000000 MHz	40.4064	18.7388
890.000000 MHz	40.2993	18.7572
895.000000 MHz	40.2447	18.6615
900.000000 MHz	40.1601	18.6643

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■ Dielectric Parameter (850MHz Body)

Title : SP-120
SubTitle : GSM850Body
June 03, 2006 07:20 AM

Frequency	e'	e''
800.000000 MHz	56.5952	20.7223
805.000000 MHz	56.5496	20.6840
810.000000 MHz	56.4154	20.6790
815.000000 MHz	56.4118	20.6258
820.000000 MHz	56.3909	20.6298
825.000000 MHz	56.3041	20.6194
830.000000 MHz	56.2681	20.6068
835.000000 MHz	56.1586	20.6168
840.000000 MHz	56.1773	20.6110
845.000000 MHz	56.1412	20.6041
850.000000 MHz	56.1779	20.6126
855.000000 MHz	56.1145	20.6705
860.000000 MHz	56.1093	20.6509
865.000000 MHz	56.0768	20.5880
870.000000 MHz	56.0468	20.5568
875.000000 MHz	56.0600	20.5246
880.000000 MHz	56.0111	20.5226
885.000000 MHz	55.9852	20.5221
890.000000 MHz	55.9397	20.4711
895.000000 MHz	55.9384	20.3972
900.000000 MHz	55.8565	20.3568

■ Dielectric Parameter (1900MHz Head)

Title : SP-120
SubTitle : GSM1900Head
June 03, 2006 05:40 PM

Frequency	e'	e''
1.800000000 GHz	38.6549	13.5629
1.810000000 GHz	38.6266	13.5895
1.820000000 GHz	38.5757	13.5963
1.830000000 GHz	38.5522	13.6320
1.840000000 GHz	38.5062	13.6631
1.850000000 GHz	38.4555	13.6793
1.860000000 GHz	38.4163	13.6977
1.870000000 GHz	38.3849	13.7174
1.880000000 GHz	38.3280	13.7469
1.890000000 GHz	38.2855	13.7736
1.900000000 GHz	38.2394	13.7733
1.910000000 GHz	38.2087	13.8107
1.920000000 GHz	38.1610	13.8235
1.930000000 GHz	38.1521	13.8123
1.940000000 GHz	38.1208	13.8387
1.950000000 GHz	38.0481	13.8531
1.960000000 GHz	38.0158	13.8745
1.970000000 GHz	37.9722	13.8945
1.980000000 GHz	37.9187	13.9065
1.990000000 GHz	37.9429	13.9616
2.000000000 GHz	37.8869	13.9754

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■ Dielectric Parameter (1900MHz Body)

Title : SP-120
SubTitle : GSM1900Body
June 08, 2006 01:25 PM

Frequency	e'	e''
1.800000000 GHz	53.0284	14.1523
1.810000000 GHz	52.9740	14.1997
1.820000000 GHz	52.9744	14.2615
1.830000000 GHz	52.9503	14.3592
1.840000000 GHz	52.9608	14.4229
1.850000000 GHz	52.9233	14.5036
1.860000000 GHz	52.8934	14.5412
1.870000000 GHz	52.8118	14.5674
1.880000000 GHz	52.7991	14.5831
1.890000000 GHz	52.7401	14.5538
1.900000000 GHz	52.6777	14.5392
1.910000000 GHz	52.6352	14.5288
1.920000000 GHz	52.5567	14.5484
1.930000000 GHz	52.5369	14.5904
1.940000000 GHz	52.4900	14.6362
1.950000000 GHz	52.4734	14.7120
1.960000000 GHz	52.4641	14.7702
1.970000000 GHz	52.4539	14.8404
1.980000000 GHz	52.4288	14.8887
1.990000000 GHz	52.3959	14.9230
2.000000000 GHz	52.4049	14.9572

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