APPENDIX C – DIPOLE CALIBRATION CERTIFICATES

Certificate of Calibration Verification

Description of EUT	Tuned Dipole Antenna
EUT Model Number	D-1800-S-1
EUT Serial Number	BCL-049
Center Frequency	1800 MHz

Calibration Date: 12 April 2004

Testing conditions:

per P1528/D1.2:2003:	
Ambient Temperature (18-25 °C)	23 °C
Ambient Humidity	43%
Liquid Temperature at start of measurements:(≤2°C)	21 °C
Liquid temperature at end of measurements:	21 °C
Date and time at beginning of test:	2004-04-09-16:20 PST
Date and time at beginning of test:	2004-04-09-19:40 PST

Equipment used for measurements

Network Analyzer	HP	8752C	1 Nov 2002
Impedance adapter	AGILENT	43961A	31 Oct 2003
Short Reference	HP	04191-85300	31 Oct 2003
Open Reference	HP	04191-85302	31 Oct 2003
Load Reference	HP	04191-85301	31 Oct 2003
Signal Generator	HP	83650B	29 Feb 2004
Calibration Cable:	SMA Utiflex, 3.05 meter cable S/N 99E1206 (Number 8)		
Phantom Model:			SAM
Liquid:			1800 MHz, Head Liquid
Liquid Validation Date:			12 April 2004
Quantity of Liquid in Phantom:			19.8 Liters

Measurement Procedure

In accordance with IEEE P1528/D1.2:2003, 8.3.4, 8.2.3 through 8.2.4

Liquid Validation

Instrument	Manufacturer	Model	Calibrated
Network Analyzer	HP	4396B	1 Nov 2002
Dielectric Probe Kit,	Agilent	85070C	Each Use
H_2O, 18 M-Ohm	BACL		Each Use
Probe, SAR 10 kHz - 6 GHz	SPEAG	ES3DV2	9 Oct 2003

Attestation:

I hereby attest that the equipment are suitable for the performance requirements of IEEE P1528/D1.2:2003 and the personnel operating the test equipment and measurements are properly trained to perform the verification of this calibration procedure set forth in IEEE P1528/D1.2:2003.

The validation antenna herein meets the minimum requirements of 20 dB insertion loss

2004-04-12

Hans T. Mellberg
Engineering Manager

Date

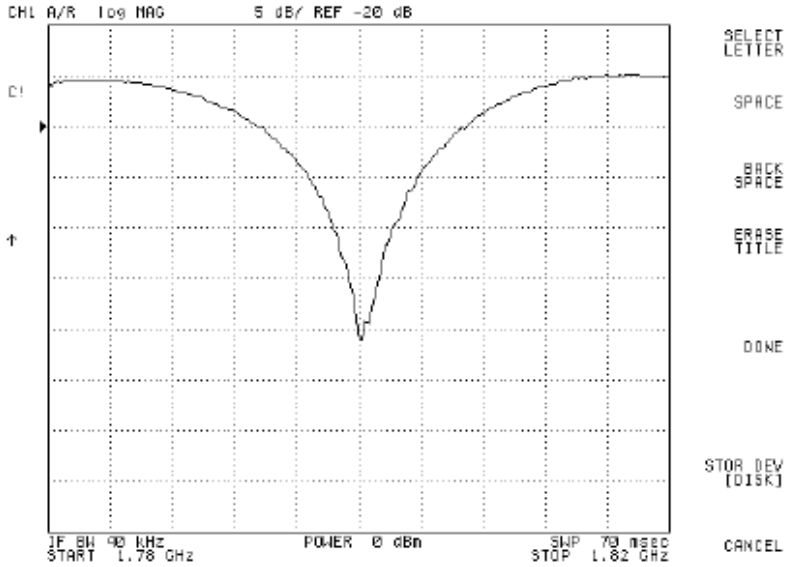
1900 MHZ Body Liquid Validation
Ambient Temp = 23 Deg C, Liquid Temp = 22 Deg C, 01/10/2005

Frequency	e'	e''
1850000000.0000	53.6364	14.1271
1852000000.0000	53.6032	14.1336
1854000000.0000	53.5811	14.1552
1856000000.0000	53.5755	14.1818
1858000000.0000	53.5671	14.1043
1860000000.0000	53.5467	14.1902
1862000000.0000	53.5254	14.1861
1864000000.0000	53.5146	14.1456
1866000000.0000	53.5033	14.1384
1868000000.0000	53.4927	14.1462
1870000000.0000	53.4814	14.1531
1872000000.0000	53.4305	14.1658
1874000000.0000	53.4212	14.1790
1876000000.0000	53.3883	14.1982
1878000000.0000	53.3702	14.2047
1880000000.0000	53.3621	14.2968
1882000000.0000	53.3574	14.3039
1884000000.0000	53.3486	14.3440
1886000000.0000	53.3350	14.3521
1888000000.0000	53.3429	14.3578
1890000000.0000	53.3272	14.3625
1892000000.0000	53.3141	14.3822
1894000000.0000	53.3018	14.3774
1896000000.0000	53.3175	14.3650
1898000000.0000	53.3232	14.2836
1900000000.0000	53.3184	14.2579
1902000000.0000	53.3596	14.2923
1904000000.0000	53.3180	14.3568
1906000000.0000	53.3252	14.3670
1908000000.0000	53.3186	14.3664
1910000000.0000	53.3149	14.3590
1912000000.0000	53.3080	14.3642
1914000000.0000	53.2821	14.3561
1916000000.0000	53.2768	14.4582
1918000000.0000	53.2874	14.4774
1920000000.0000	53.2569	14.4886
1922000000.0000	53.2678	14.4709
1924000000.0000	53.2360	14.4635
1926000000.0000	53.2249	14.5513
1928000000.0000	53.2152	14.5360
1930000000.0000	53.2068	14.5289
1932000000.0000	53.1982	14.5324
1934000000.0000	53.1936	14.5180
1936000000.0000	53.1885	14.5243
1938000000.0000	53.1719	14.5168
1940000000.0000	53.1859	14.5242
1942000000.0000	53.1940	14.5351
1944000000.0000	53.2008	14.5145
1946000000.0000	53.2161	14.5236
1948000000.0000	53.2253	14.5318
1950000000.0000	53.2201	14.5376

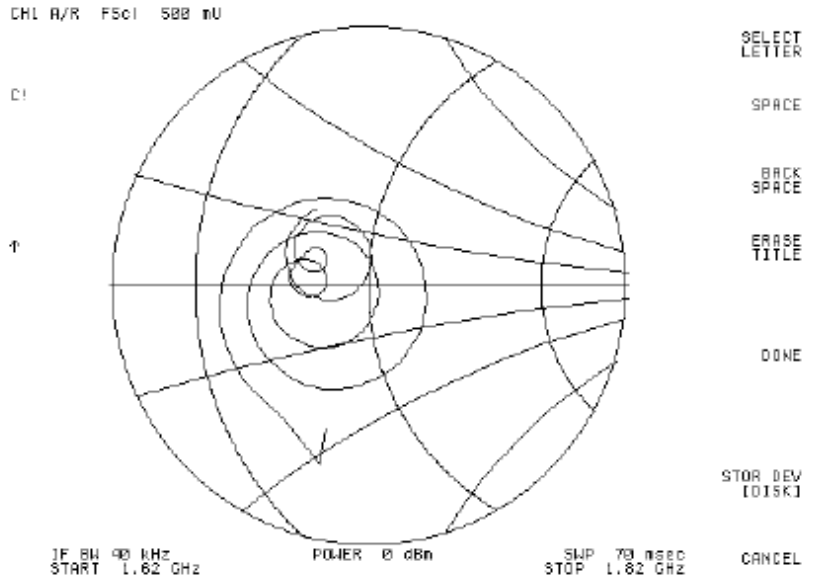
1900 MHZ Head Liquid Validation
Ambient Temp = 23 Deg C, Liquid Temp = 22 Deg C, 01/10/2005

Frequency	e'	e''
1850000000.0000	39.6525	13.1521
1852000000.0000	39.6489	13.1664
1854000000.0000	39.6134	13.1495
1856000000.0000	39.6359	13.1573
1858000000.0000	39.6478	13.1954
1860000000.0000	39.6484	13.1860
1862000000.0000	39.6475	13.2085
1864000000.0000	39.6332	13.1927
1866000000.0000	39.6548	13.2034
1868000000.0000	39.6265	13.2159
1870000000.0000	39.6146	13.2068
1872000000.0000	39.6423	13.2173
1874000000.0000	39.5806	13.2357
1876000000.0000	39.5768	13.2268
1878000000.0000	39.5629	13.2154
1880000000.0000	39.5561	13.2271
1882000000.0000	39.5149	13.2339
1884000000.0000	39.4852	13.2487
1886000000.0000	39.4794	13.2550
1888000000.0000	39.4607	13.2782
1890000000.0000	39.4563	13.2841
1892000000.0000	39.4435	13.2965
1894000000.0000	39.3883	13.3008
1896000000.0000	39.3606	13.3242
1898000000.0000	39.3528	13.3495
1900000000.0000	39.3209	13.3568
1902000000.0000	39.3193	13.3383
1904000000.0000	39.2669	13.3059
1906000000.0000	39.2535	13.2616
1908000000.0000	39.2312	13.2747
1910000000.0000	39.1927	13.2826
1912000000.0000	39.1275	13.2957
1914000000.0000	39.1863	13.3023
1916000000.0000	39.1765	13.3063
1918000000.0000	39.0324	13.3294
1920000000.0000	39.0203	13.3469
1922000000.0000	39.0522	13.3758
1924000000.0000	39.0761	13.3672
1926000000.0000	39.0832	13.3781
1928000000.0000	39.0960	13.3847
1930000000.0000	39.0355	13.3959
1932000000.0000	39.1282	13.3936
1934000000.0000	39.1338	13.4052
1936000000.0000	39.1805	13.4298
1939000000.0000	39.1928	13.4470
1940000000.0000	39.2283	13.4512
1942000000.0000	39.2545	13.5161
1944000000.0000	39.3374	13.5257
1946000000.0000	39.3653	13.5458
1948000000.0000	39.4068	13.5640
1950000000.0000	39.4570	13.5828

Insertion Loss Plot
S11



Smith Chart


CH1 A/R FSc1 500 mU
C1
SELECT LETTER
SPACE
BACK SPACE
ERASE TITLE
DONE
STOR DEV [DISK]
CANCEL
IF BW 40 kHz
START 1.62 GHz
POWER 0 dBm
SWP 70 msec
STOP 1.82 GHz

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

Client Bay Area Comp. Lab (BACL)

CALIBRATION CERTIFICATE

Object(s) D900V2 - SN:122

Calibration procedure(s) QA CAL-05.v2
Calibration procedure for dipole validation kits

Calibration date: October 3, 2003

Condition of the calibrated item In Tolerance (according to the specific calibration document)

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power sensor HP 8481A	MY41092317	18-Oct-02 (Agilent, No. 20021018)	Oct-04
Power sensor HP 8481A	US37292783	30-Oct-02 (METAS, No. 252-0236)	Oct-03
Power meter EPM E442	GB37480704	30-Oct-02 (METAS, No. 252-0236)	Oct-03
RF generator R&S SML-03	100698	27-Mar-2002 (R&S, No. 20-92389)	In house check: Mar-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (Agilent, No. 24BR1033101)	In house check: Oct 03

	Name	Function	Signature
Calibrated by:	Judith Mueller	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: October 9, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

APPENDIX D - TEST SYSTEM VERIFICATIONS SCANS

Liquid Measurement Result

2005-1-10

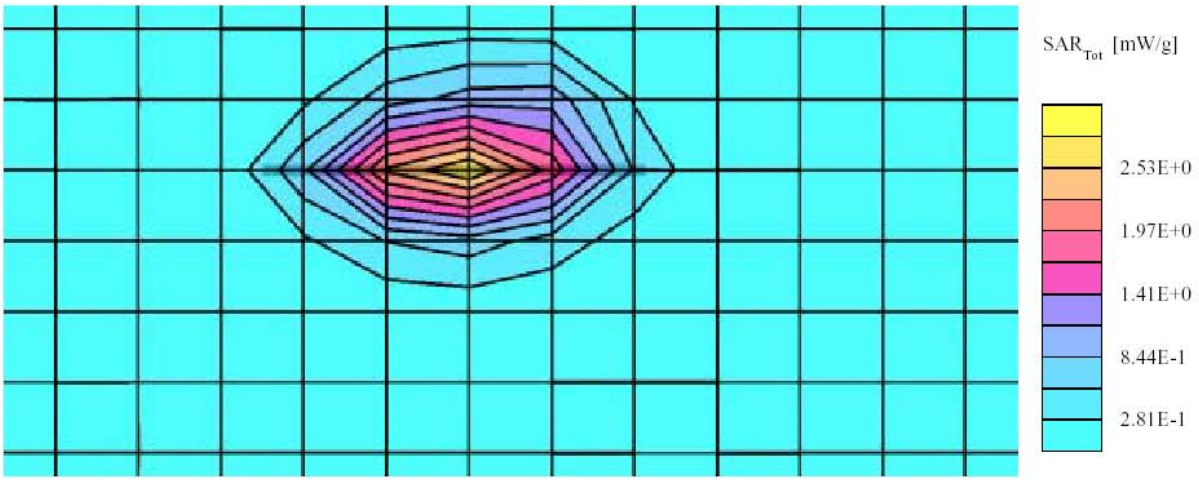
Simulant	Freq [MHz]	Parameters	Liquid Temp [ºC]	Target Value	Measured Value	Deviation	Limits [%]
Body	1900	ε_r	22.0	53.3	53.4	0.19	±5
		σ	22.0	1.52	1.50	-1.32	±5
		1g SAR	22.0	24.97	24.89	-0.32	±10
Head	1900	ε_r	22.0	40.0	39.3	-2.00	±5
		σ	22.0	1.4	1.41	0.71	±5
		1g SAR	22.0	39.7	38.64	-2.67	±10

ε_r = relative permittivity, σ = conductivity and ρ=1000kg/m^3

Body Forward Power = 20.3 dBm = 107.15 mW
Head Forward Power = 20.17 dBm = 103.99 mW

1900 MHz Head Liquid System Validation (Ambient Temp = 23 Deg C, Liquid Temp = 22 Deg C, Forwar Power = 20.17dBm, 01/10/2005)

SAM Phantom; Flat Section; Position: (90°,90°); Frequency: 1900 MHz
Probe: ES3DV2 - SN3019; ConvF(4.70,4.70,4.70); Crest factor: 1.0; Head 1900 MHz: σ = 1.41 mho/m ε_r = 39.3 ρ = 1.00 g/cm^3
Cube 5x5x7: SAR (1g): 4.13 mW/g, SAR (10g): 2.08 mW/g, (Worst-case extrapolation)
Coarse: Dx = 12.0, Dy = 14.0, Dz = 10.0
Powerdrift: 0.03 dB



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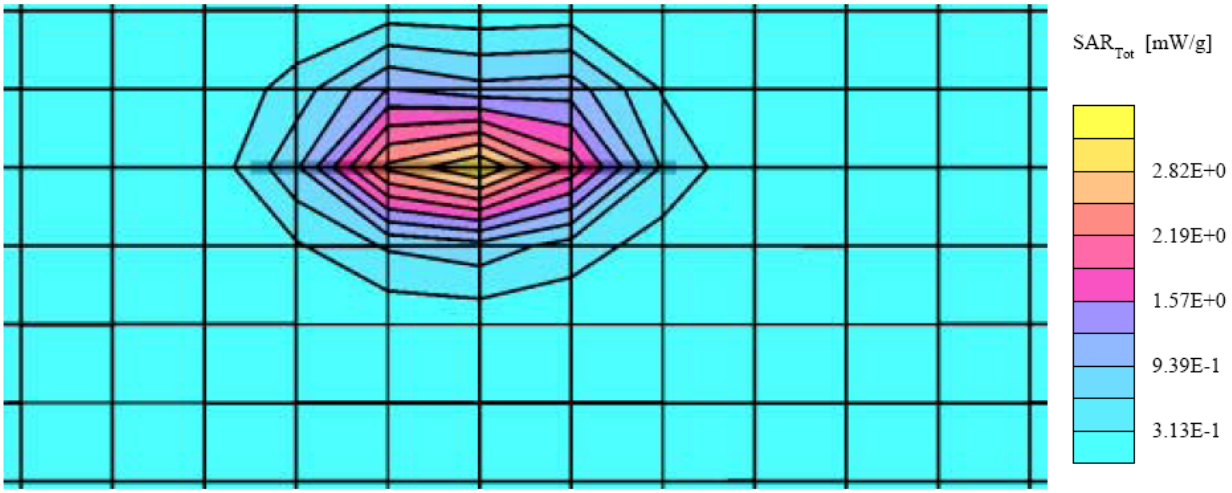
1900 MHz Body Liquid System Validation (Ambient Temp = 23 Deg C, Liquid Temp = 22 Deg C, Forwar Power = 20.3 dBm, 01/10/2005)

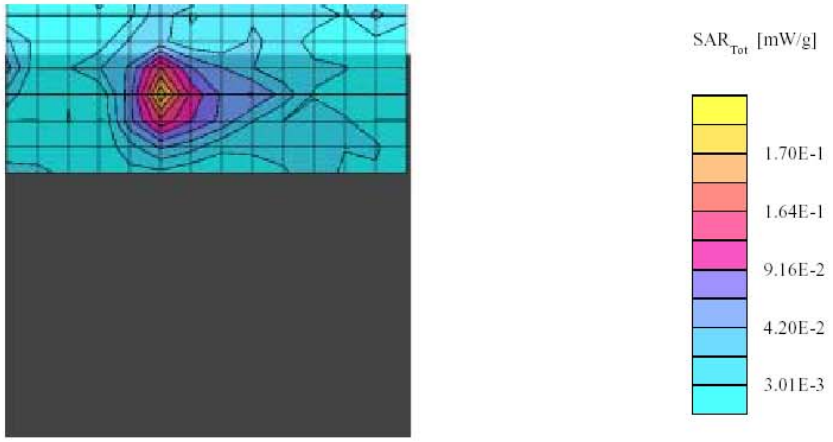
SAM Phantom; Flat Section; Position: (90°,90°); Frequency: 1900 MHz
Probe: ES3DV2 - SN3019; ConvF(4.60,4.60,4.60); Crest factor: 1.0; Body 1900 MHz: σ = 1.51 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Cube 5x5x7: SAR (1g): 2.79 mW/g, SAR (10g): 1.41 mW/g, (Worst-case extrapolation)
Coarse: Dx = 12.0, Dy = 14.0, Dz = 10.0
Powerdrift: -0.01 dB



APPENDIX E - EUT SCANS

BBK, Model: BKGP-302 (Bottom touching to flat phantom, Ambient Temp = 23 Deg C, Liquid Temp = 22 Deg C, Middle Channel, 01/10/2005)

SAM Phantom; Flat Section; Position: (90°,90°); Frequency: 1880 MHz
Probe: ES3DV2 - SN3019; ConvF(4.60,4.60,4.60); Crest factor: 1.0; Body 1900 MHz: σ = 1.51 mho/m ε_r = 53.3 ρ = 1.00 g/cm^3
Cube 5x5x7: SAR (1g): 0.178 mW/g, SAR (10g): 0.096 mW/g, (Worst-case extrapolation)
Coarse: Dx = 12.0, Dy = 14.0, Dz = 10.0
Powerdrift: -0.03 dB



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APPENDIX F – CONDUCTED OUTPUT POWER MEASUREMENT

Provision Applicable

According to FCC §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts. According to FCC § 24.232(b), EIRP peak power for mobile/portable stations are limited to 2 watts.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Test equipment

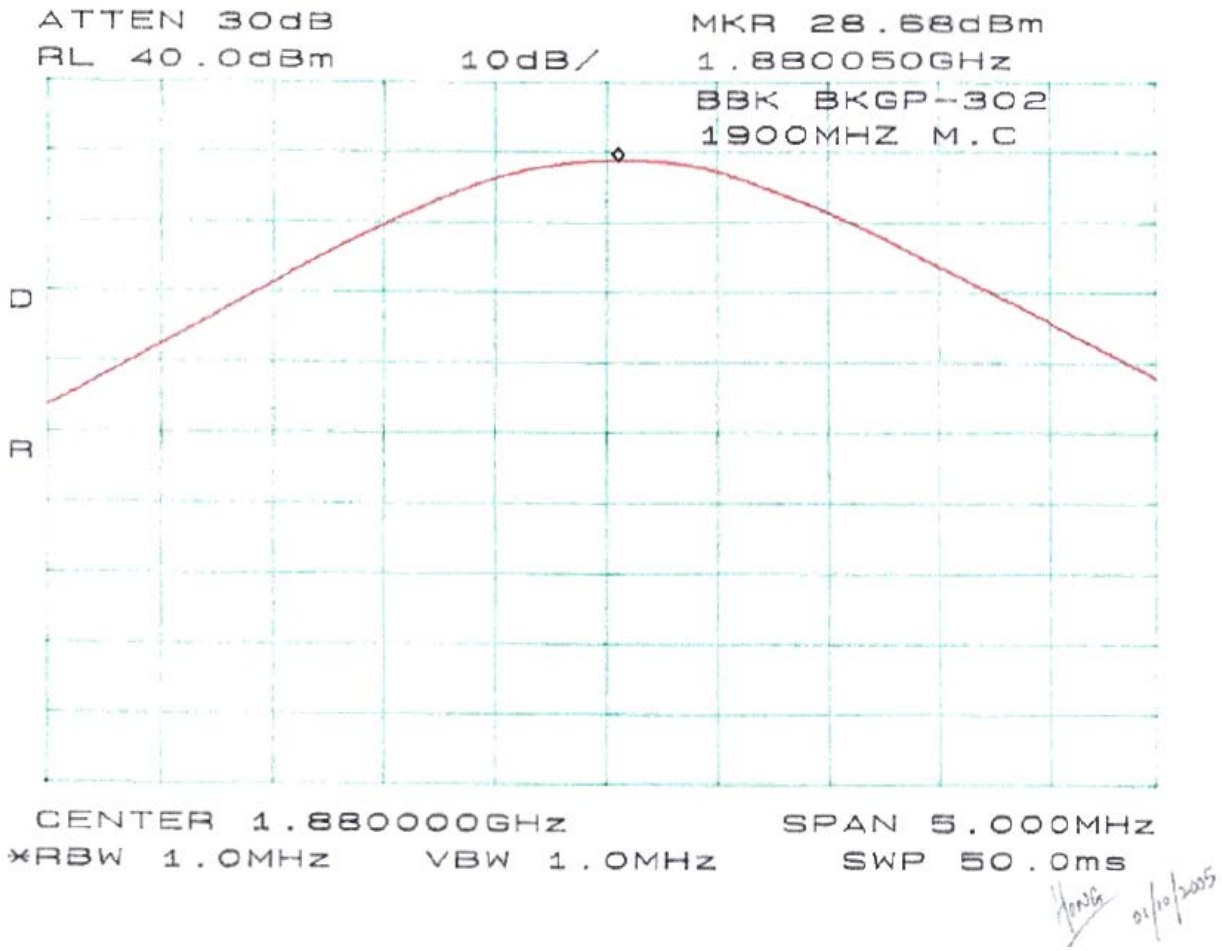
Hewlett Packard HP8564E Spectrum Analyzer, Calibration Due Date: 2005-08-01.
Hewlett Packard HP 7470A Plotter, Calibration not required.
A.H. Systems SAS200 Horn Antenna, Calibration Due Date: 2005-05-31
Com-Power AB-100 Dipole Antenna, Calibration Due Date: 2005-09-05

Test Results

GSM:

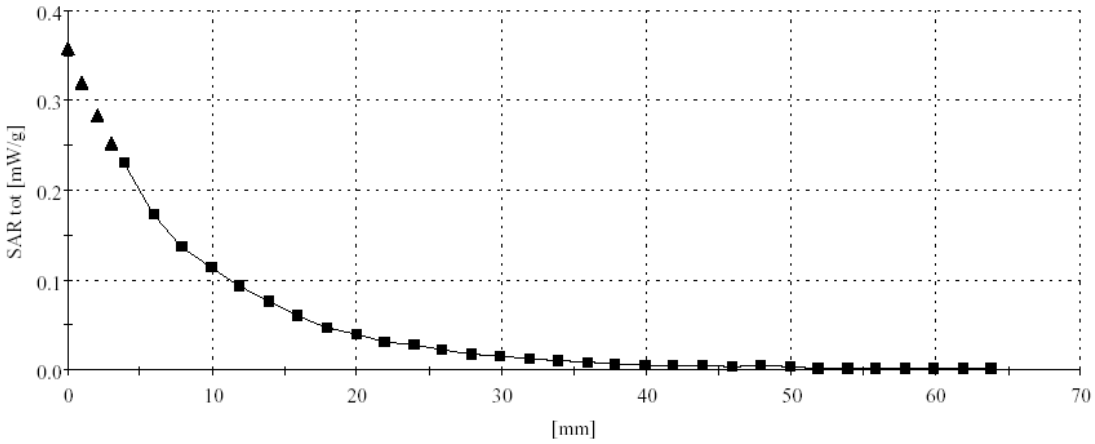
Frequency (MHz)	Output Power in dBm	Output Power in W	Limit (W)
1880.00	28.68	0.738	2

Please refer to the following plots.


ATTEN 30dB
RL 40.0dBm
10dB/
MKR 28.68dBm
1.880050GHz
BBK BKGP-302
1900MHZ M.C
D
R
CENTER 1.880000GHz
SPAN 5.000MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms
01/10/2005

APPENDIX G – Z-AXIS PLOT

BBK, Model: BKGP-302 (Ambient Temp = 23 Deg C, Liquid Temp = 22 Deg C, 01/10/2005)
SAM Phantom; Section; Position: ; Frequency: 1880 MHz
Probe: ET3DV2 - SN3019; ConvF(4.60,4.60,4.60); Crest factor: 8.0; Body Liquid 1900 MHz: σ = 1.51 mho/m ε_r = 53.0 ρ = 1.00 g/cm^3
: , ()
Z-Axis: Dx = 12.0, Dy = 14.0, Dz = 10.0



<ENTER HERE YOUR COMPANY NAME>

APPENDIX H – EUT TEST POSITION PHOTOS

Bottom Touching Flat Phantom

APPENDIX I – EUT & ACCESSORIES PHOTOS

EUT – Front View

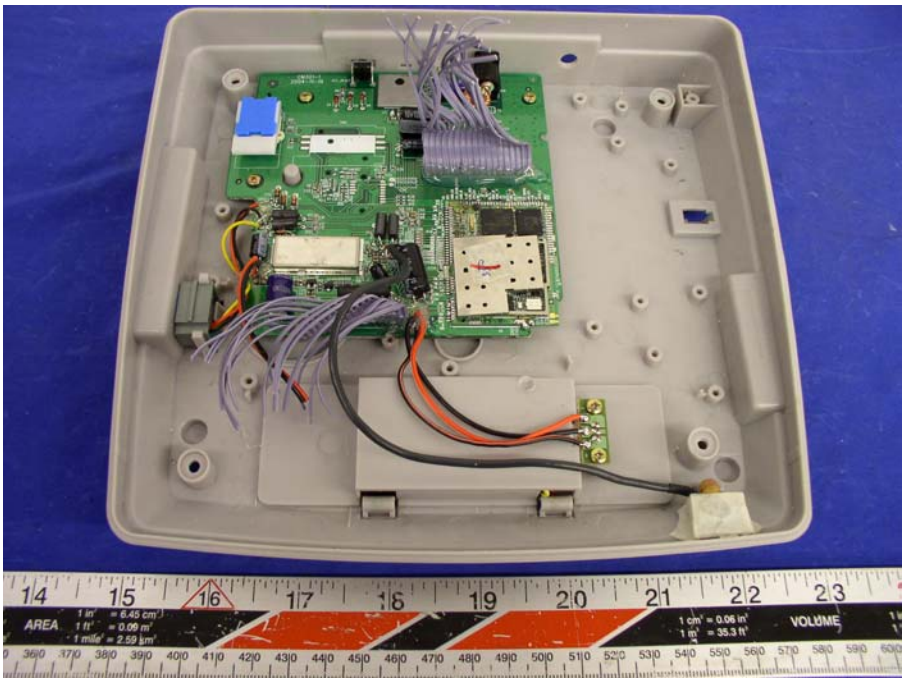
EUT – Rear View

EUT – Port View

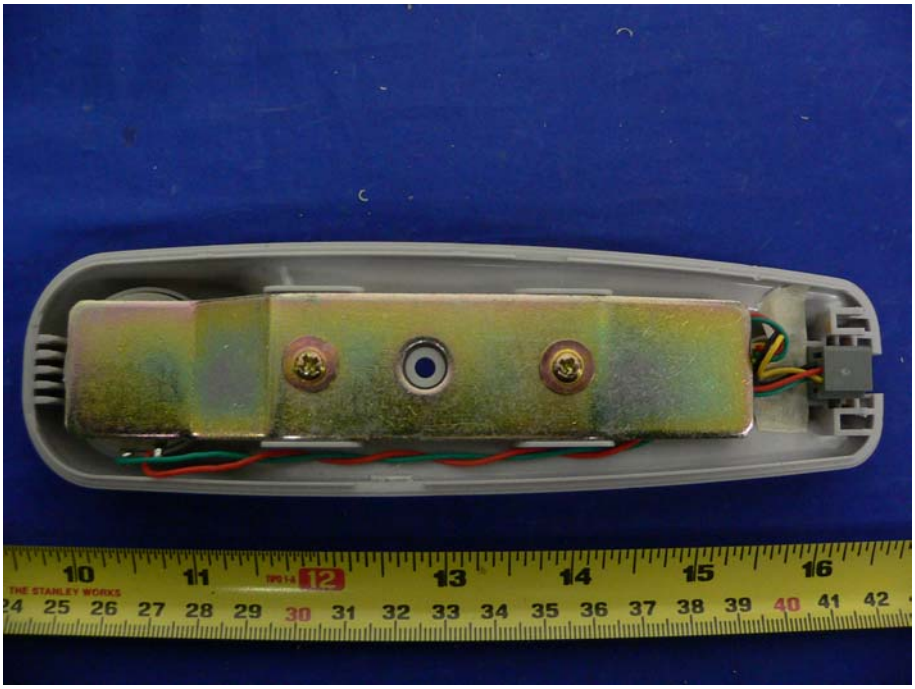
EUT –Headset View

EUT –Charger View

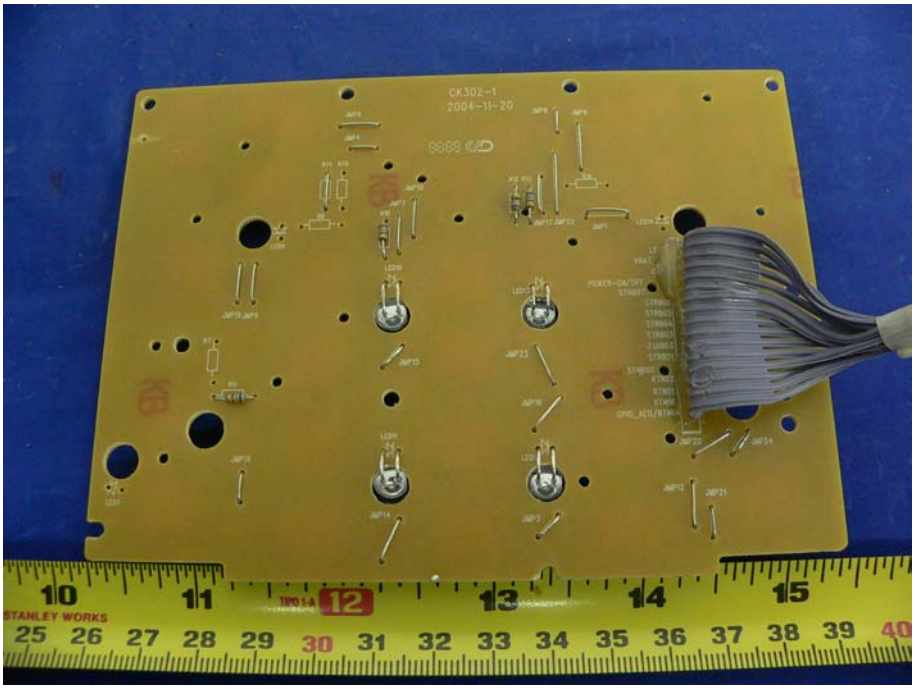
EUT –Uncover View



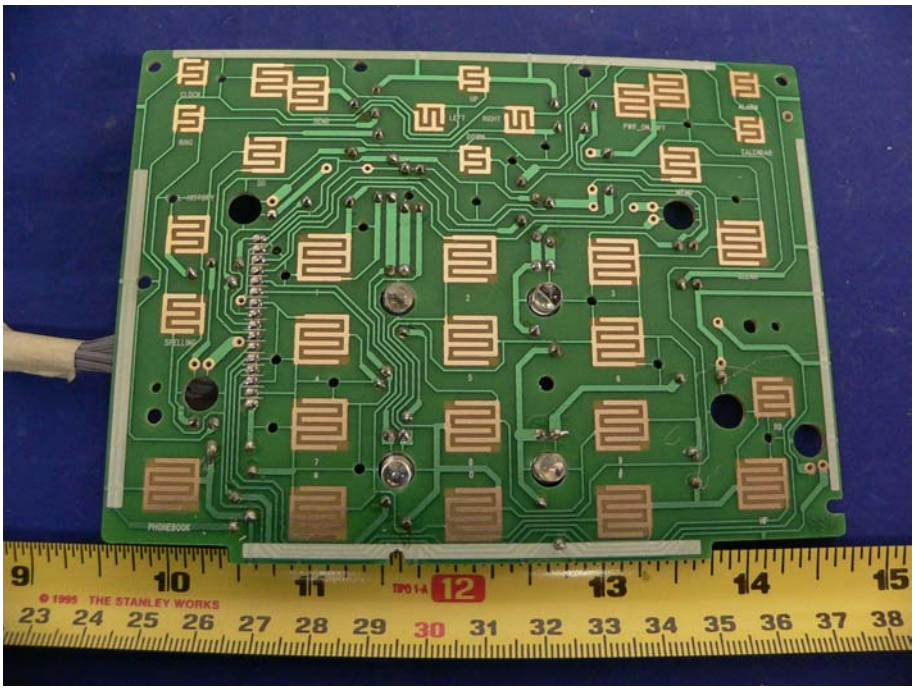
EUT –Headset Uncover View



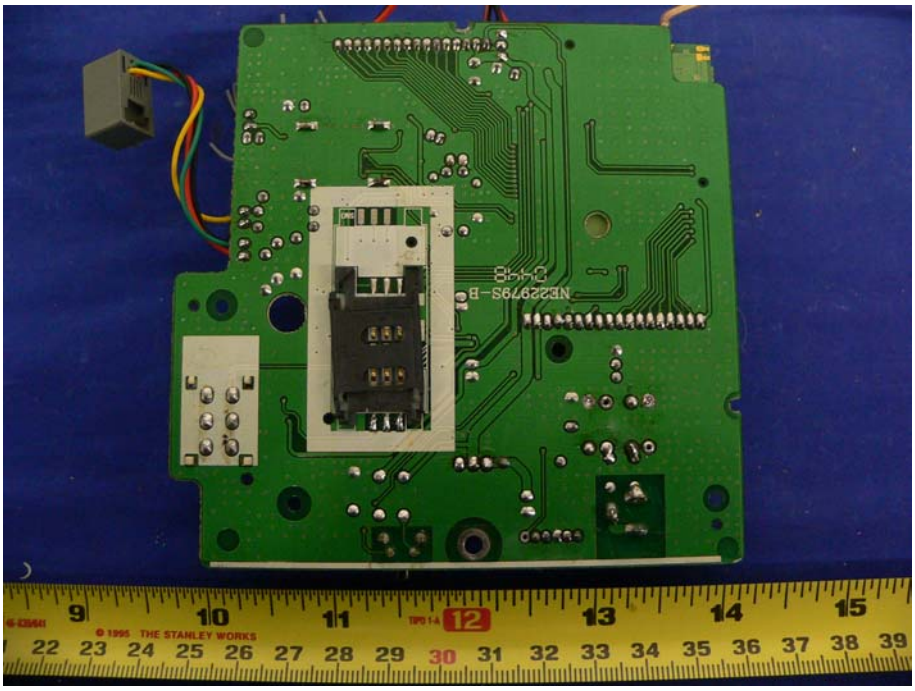
EUT –Keyboard Component View



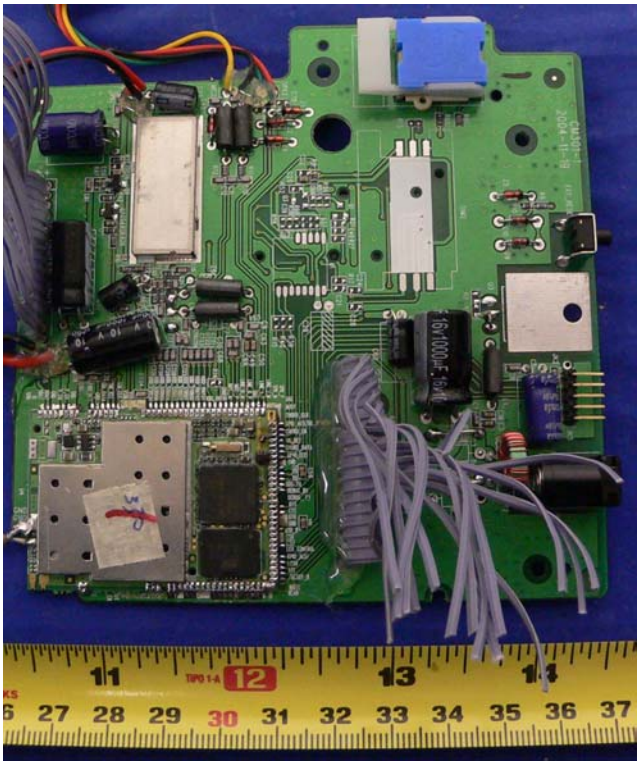
EUT –Keyboard Solder View



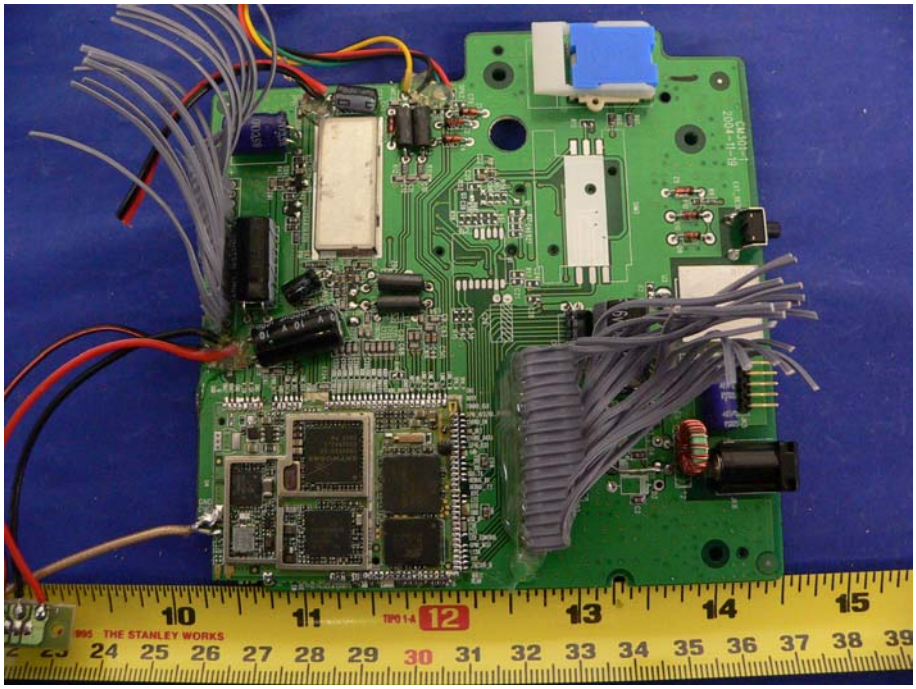
EUT –Main Board Solder View



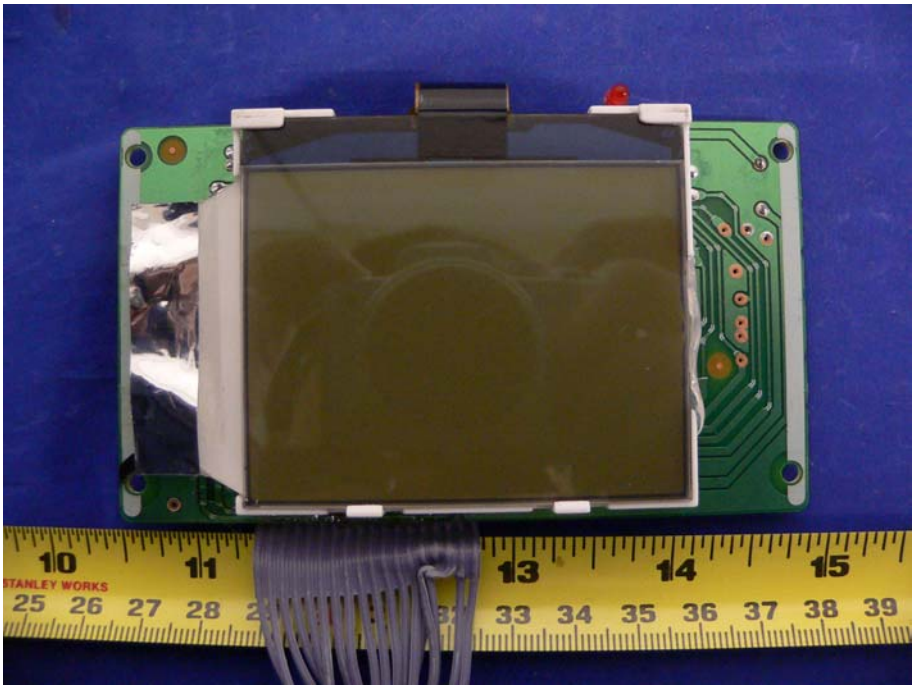
EUT –Main Board View



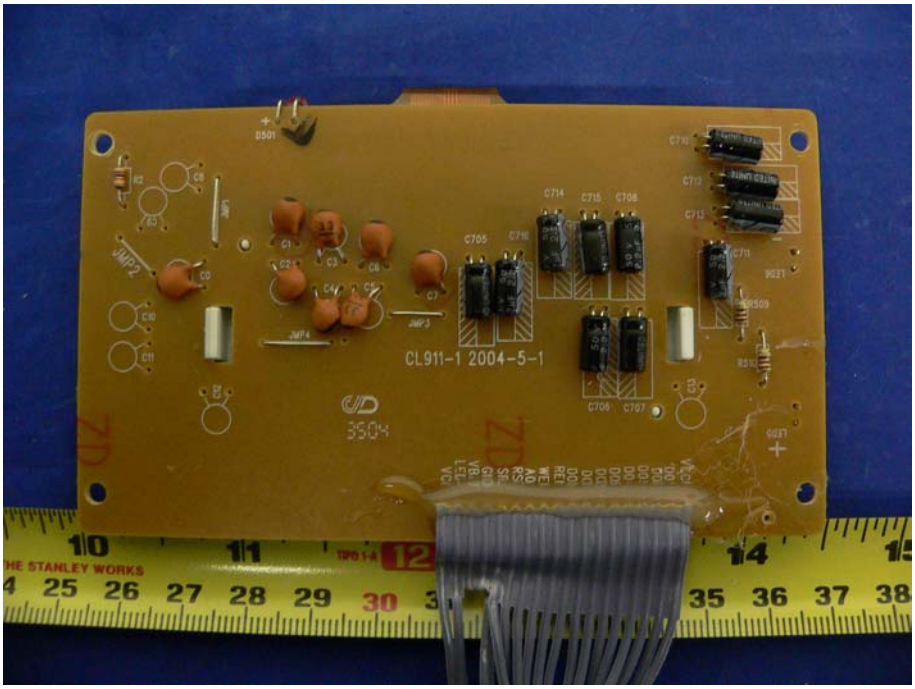
EUT –Main Board Without Shielding View



EUT –Display View

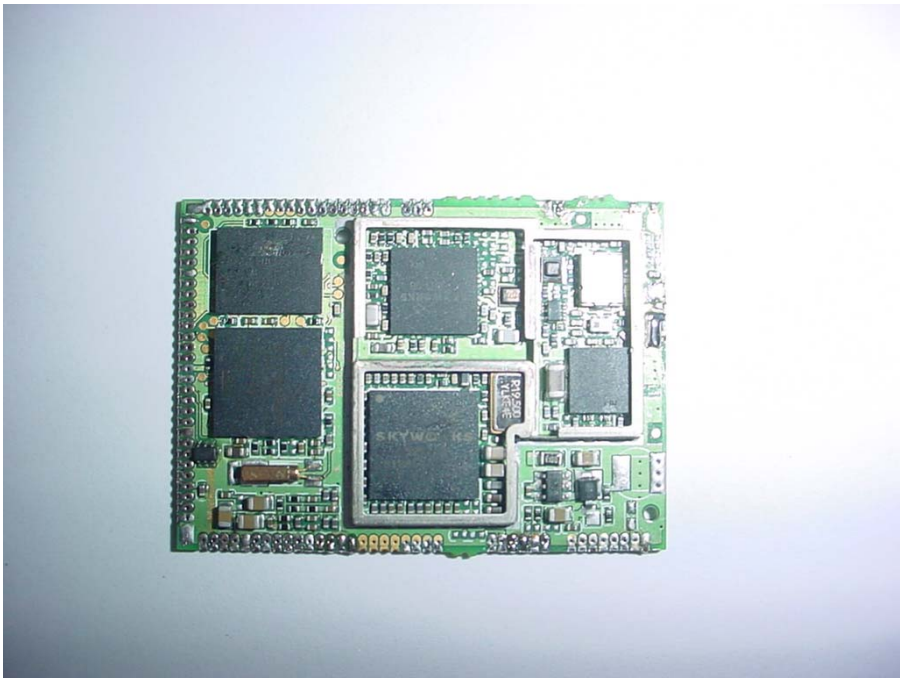


EUT –Display Components View

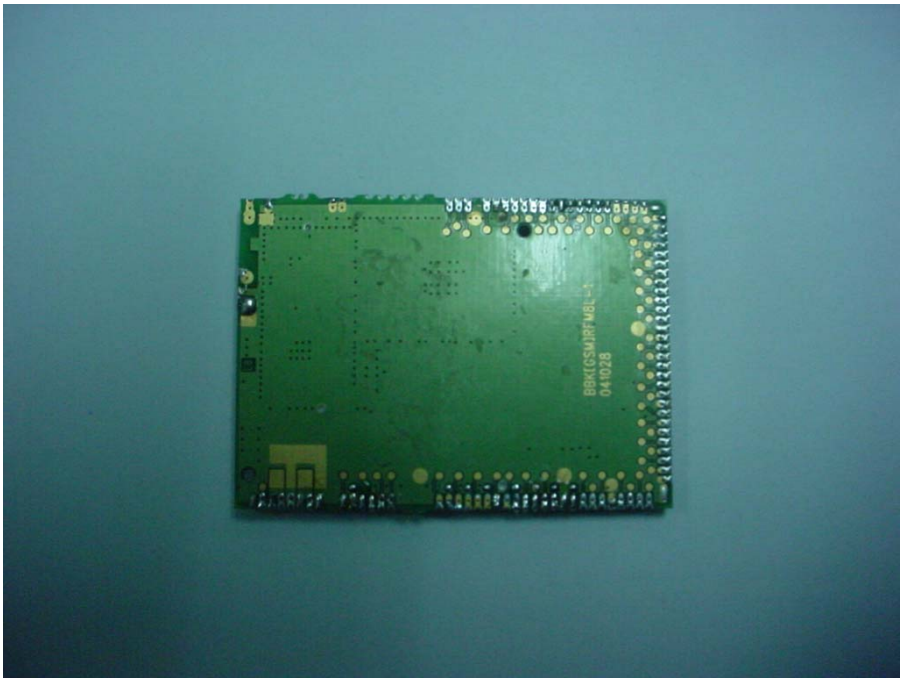


EUT –Battery View

RF Board Top View



RF Board Bottom View



APPENDIX J - INFORMATIVE REFERENCES

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