APPENDIX E - SYSTEM VALIDATION

900 MHz SYSTEM VALIDATION

Type:	**900 MHz Validation Dipole**
Asset Number:	**00020**
Serial Number:	**054**
Place of Validation:	**Celltech Labs Inc.**
Date of Validation:	**March 28, 2007**

Celltech Labs Inc. hereby certifies that the 900 MHz System Validation was performed on the date indicated above.

Performed by:	**Sean Johnston**
Approved by:	**Spencer Watson**

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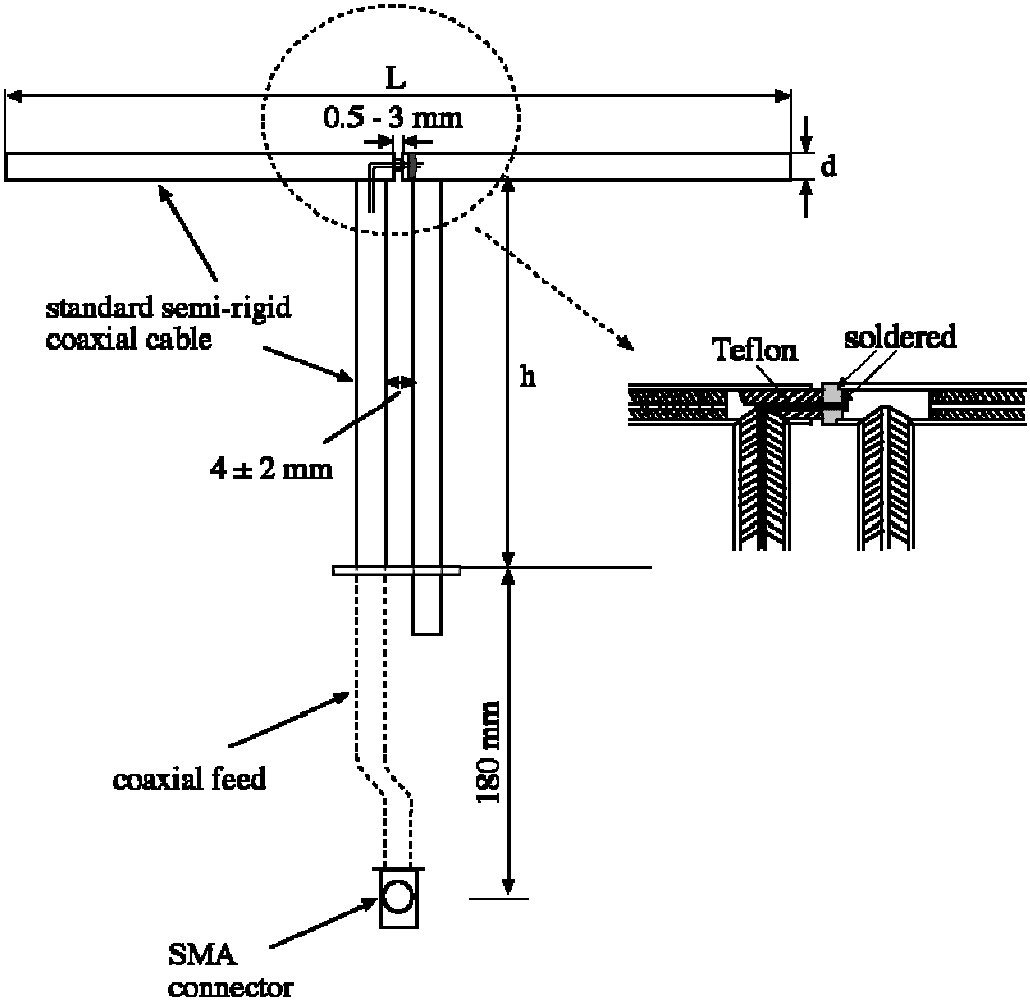
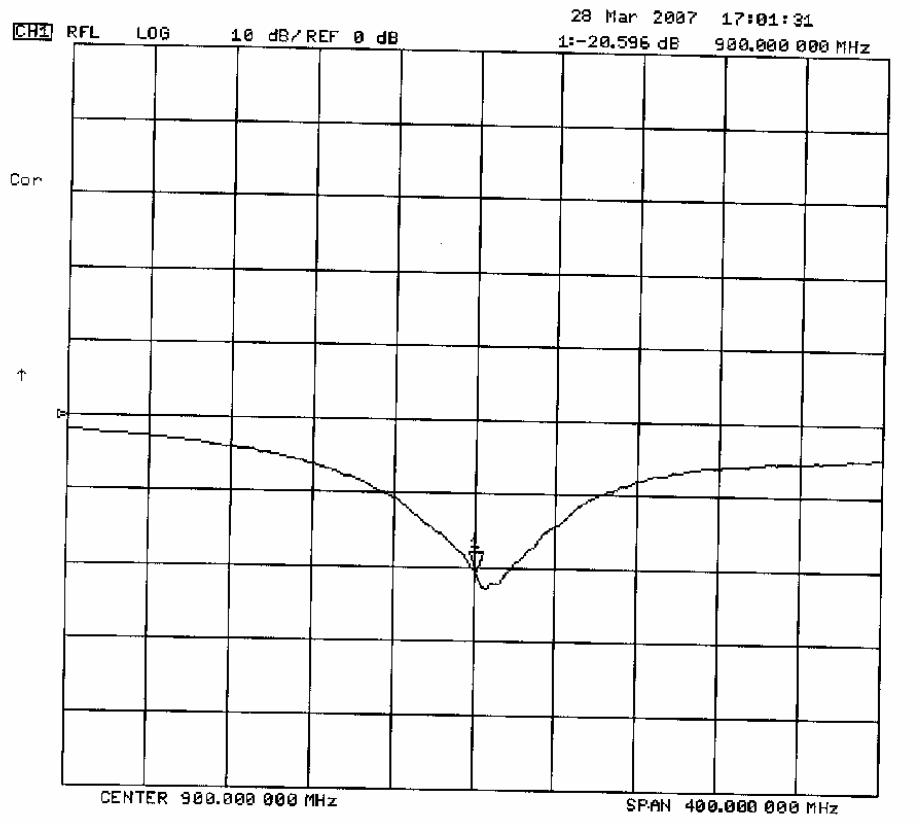
1. Validation Dipole Construction & Electrical Characteristics

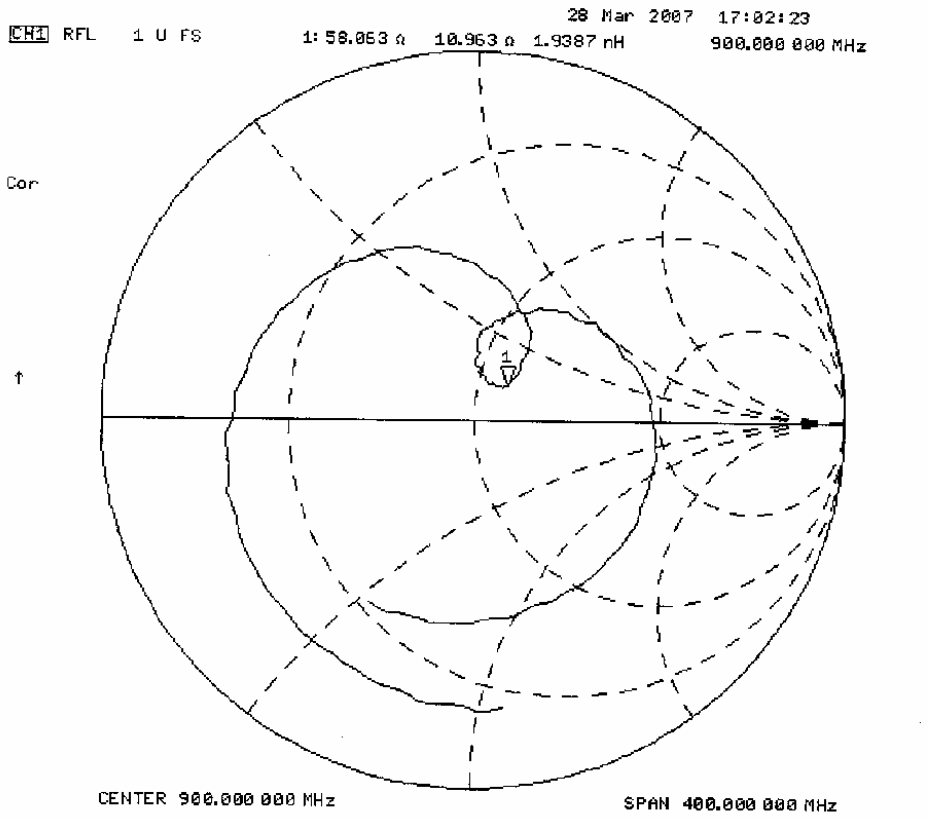
The validation dipole was constructed in accordance with the IEEE Standard "Annex G (informative) Reference dipoles for use in system validation". The electrical properties were measured using an HP 8753ET Network Analyzer. The network analyzer was calibrated to the validation dipole N-type connector feed point using an HP85032E Type N calibration kit. The dipole was placed parallel to a planar phantom at a separation distance of 15.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:

Feed point impedance at 900 MHz	Re{Z} = 58.063Ω
	Im{Z} = 10.963Ω
Return Loss at 900 MHz	-20.596dB



2. Validation Dipole VSWR Data





3. Validation Dipole Dimensions

Frequency (MHz)	L (mm)	h (mm)	d (mm)
300	420.0	250.0	6.2
450	288.0	167.0	6.2
835	161.0	89.8	3.6
900	**149.0**	**83.3**	**3.6**
1450	89.1	51.7	3.6
1800	72.0	41.7	3.6
1900	68.0	39.5	3.6
2000	64.5	37.5	3.6
2450	51.8	30.6	3.6
3000	41.5	25.0	3.6

4. Validation Phantom

The validation phantom is the SAM (Specific Anthropomorphic Mannequin) phantom manufactured by Schmid & Partner Engineering AG. The SAM phantom is a Fiberglass shell integrated in a wooden table. The shape of the shell corresponds to the phantom defined by SCC34-SC2. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

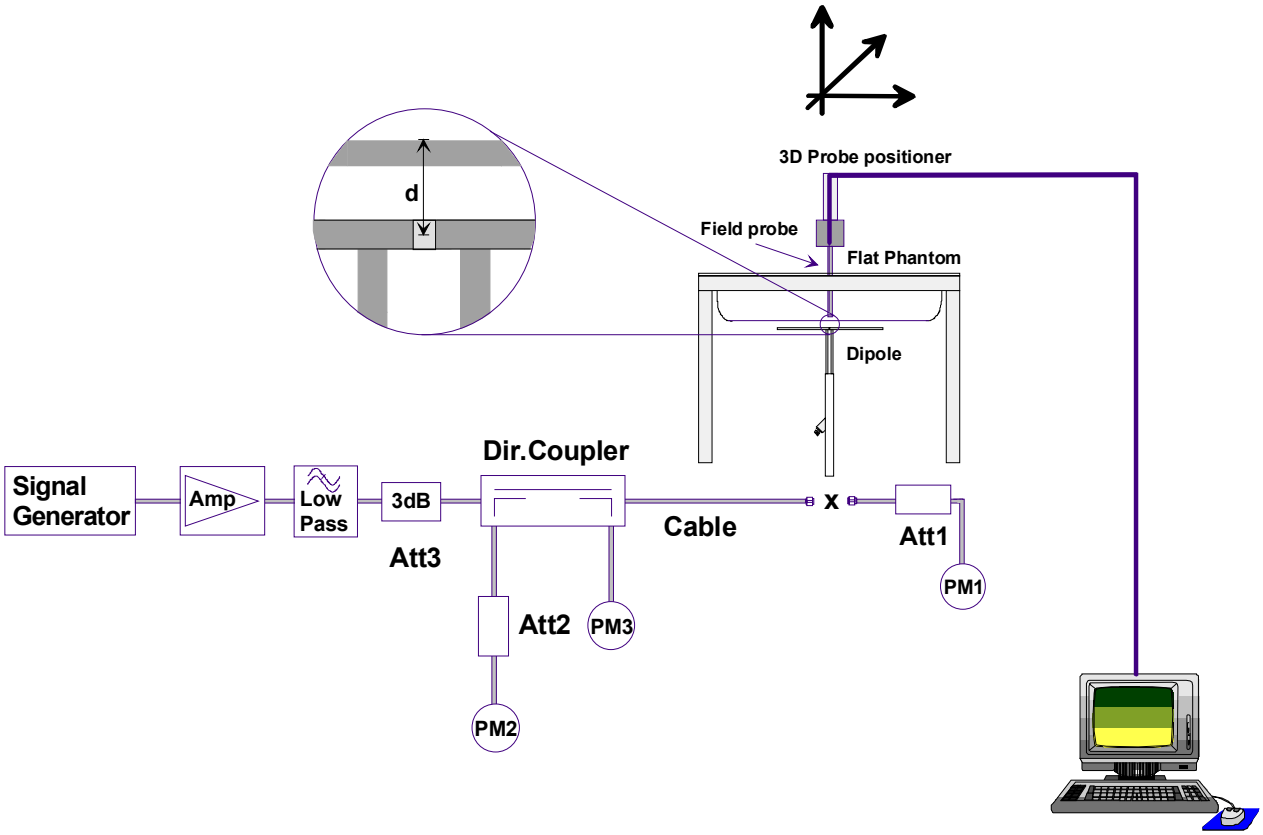
Shell Thickness: 2.0 ± 0.1 mm
Filling Volume: Approx. 25 liters
Dimensions: 50 cm (W) x 100 cm (L)

5. 900 MHz System Validation Setup

6. 900 MHz Validation Dipole Setup

7. SAR Measurement

Measurements were made using a dosimetric E-field probe ET3DV6 (S/N: 1387, Conversion Factor 6.0). The SAR measurement was performed with the E-field probe in mechanical detection mode only. The setup and determination of the forward power into the dipole was performed using the following procedures.



First the power meter PM1 (including attenuator Att1) is connected to the cable to measure the forward power at the location of the dipole connector (X). The signal generator is adjusted for the desired forward power at the dipole connector (taking into account the attenuation of Att1) as read by power meter PM2. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2. If the signal generator does not allow adjustment in 0.01dB steps, the remaining difference at PM2 must be taken into consideration. PM3 records the reflected power from the dipole to ensure that the value is not changed from the previous value. The reflected power should be 20dB below the forward power.

8. Measurement Conditions

The phantom was filled with 900 MHz Brain tissue simulant.

Relative Permittivity: 39.6 (-4.5% from target)
Conductivity: 0.94 mho/m (-3.0% from target)
Fluid Temperature: 22.0°C
Fluid Depth: ≥ 15.0 cm

Environmental Conditions:
Ambient Temperature: 22.5°C
Barometric Pressure: 101.9 kPa
Humidity: 33%

The 900 MHz Brain tissue simulant consisted of the following ingredients:

Ingredient	Percentage by weight
Water	40.71%
Sugar	56.63%
Salt	1.48%
Dowicil 75	0.19%
HEC	0.99%
Target Dielectric Parameters at 22 °C	ε_r = 41.5 (+/- 5%) σ = 0.97 S/m (+/- 5%)

9. System Validation SAR Results

SAR @ 0.25W Input averaged over 1g (W/kg)				SAR @ 1W Input averaged over 1g (W/kg)			
IEEE Target		Measured	Deviation	IEEE Target		Measured	Deviation
2.70	**+/- 10%**	2.65	-1.8%	**10.8**	**+/- 10%**	10.6	-1.8%
SAR @ 0.25W Input averaged over 10g (W/kg)				**SAR @ 1W Input averaged over 10g (W/kg)**			
IEEE Target		Measured	Deviation	IEEE Target		Measured	Deviation
1.73	**+/- 10%**	1.66	-4.0%	**6.92**	**+/- 10%**	6.64	-4.0%
The results have been normalized to 1W (forward power) into the dipole.							

System Validation - 900 MHz Dipole - March 28, 2007

DUT: Dipole 900 MHz; Asset: 00020; Serial: 054

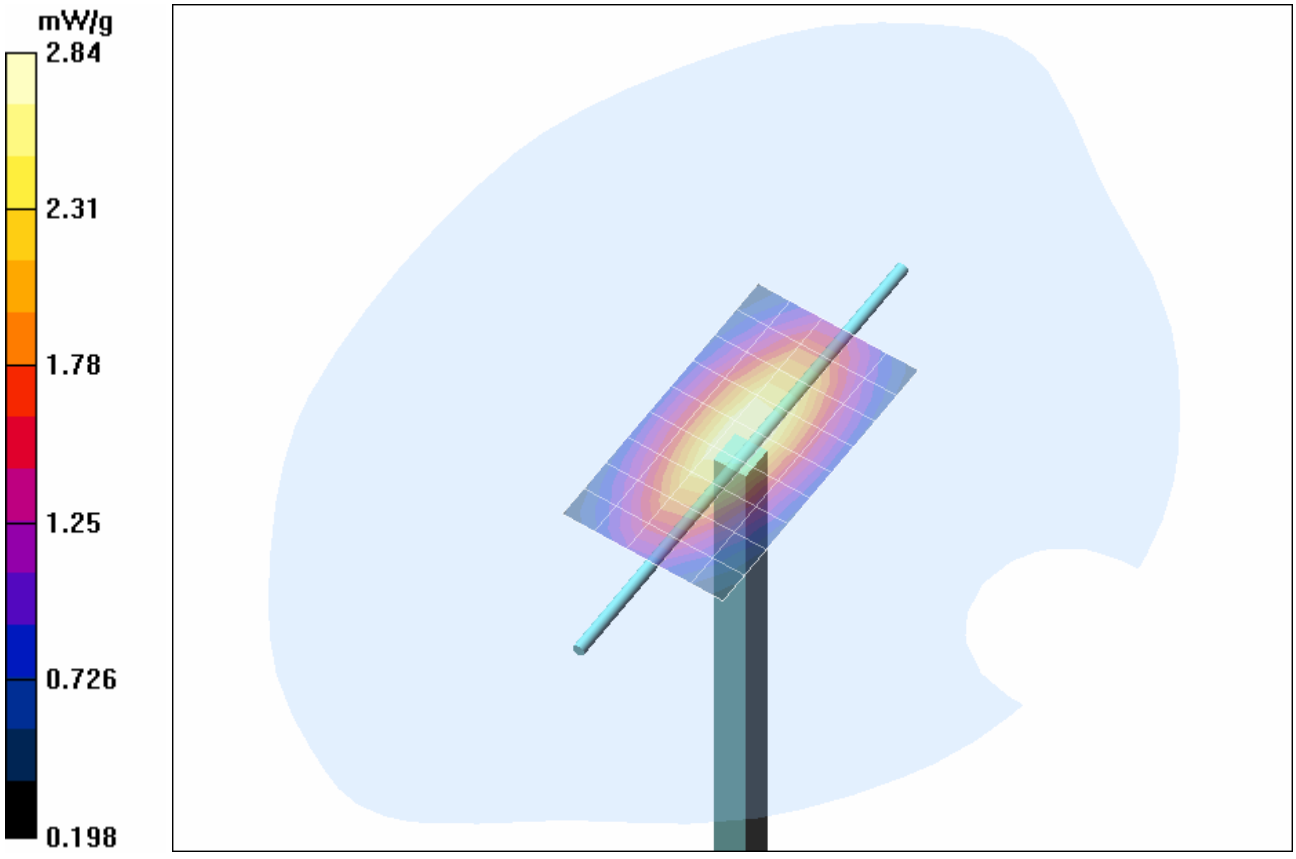
Ambient Temp: 22.5°C; Fluid Temp: 22.0°C; Barometric Pressure: 101.9 kPa; Humidity: 33%

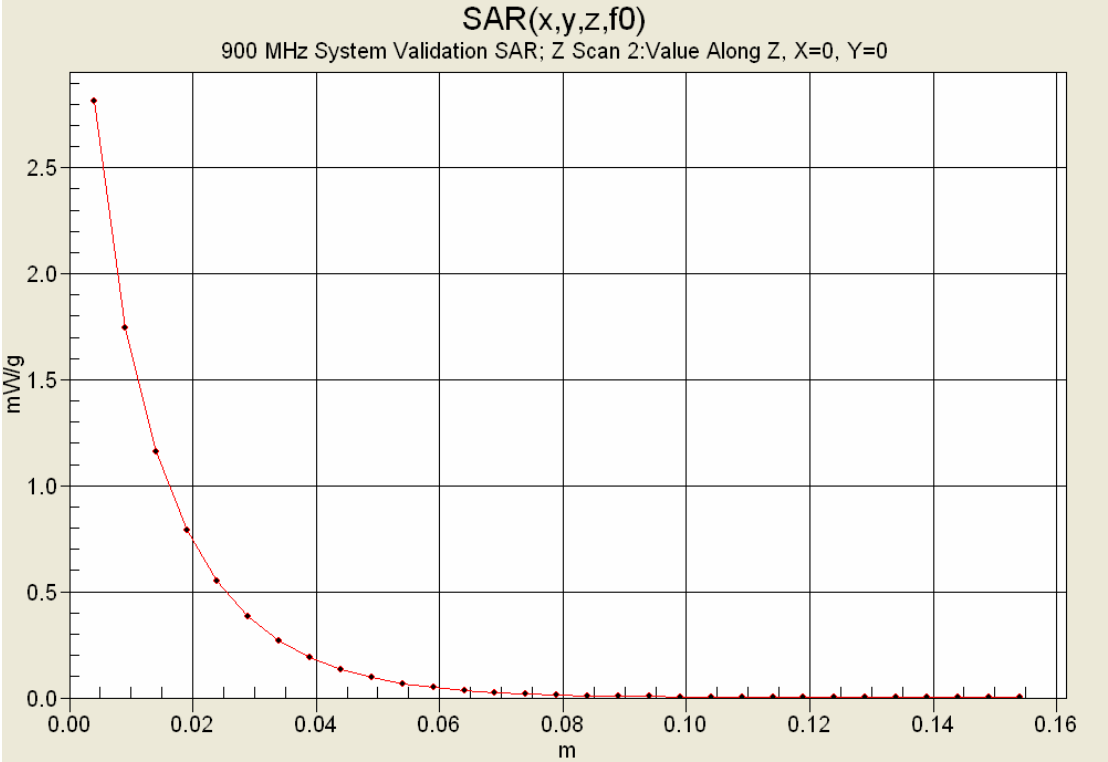
Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 900 MHz; Duty Cycle: 1:1
Medium: HSL900 Medium parameters used: f = 900 MHz; σ = 0.94 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1387; ConvF(6, 6, 6); Calibrated: 16/03/2007
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 21/06/2006
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

900 MHz System Validation/Area Scan (6x10x1):
Measurement grid: dx=10mm, dy=10mm

900 MHz System Validation/Zoom Scan 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.5 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 4.48 W/kg
SAR(1 g) = 2.65 mW/g; SAR(10 g) = 1.66 mW/g
Maximum value of SAR (measured) = 2.84 mW/g





10. Measured Fluid Dielectric Parameters

900 MHz System Validation (Brain)

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Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
Wed 28/Mar/2007
Frequency (GHz)
FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

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Freq	FCC_eH	FCC_sH	Test_e	Test_s
0.8000	41.68	0.90	40.80	0.84
0.8100	41.63	0.90	40.73	0.85
0.8200	41.58	0.90	40.58	0.87
0.8300	41.53	0.90	40.54	0.87
0.8400	41.50	0.91	40.37	0.88
0.8500	41.50	0.92	40.20	0.89
0.8600	41.50	0.93	40.05	0.90
0.8700	41.50	0.94	40.03	0.91
0.8800	41.50	0.95	39.76	0.92
0.8900	41.50	0.96	39.76	0.93
0.9000	41.50	0.97	39.56	0.94
0.9100	41.50	0.98	39.45	0.95
0.9200	41.49	0.98	39.44	0.96
0.9300	41.47	0.99	39.34	0.97
0.9400	41.45	0.99	39.30	0.98
0.9500	41.43	0.99	39.02	0.98
0.9600	41.42	1.00	39.12	1.00
0.9700	41.40	1.00	38.87	1.01
0.9800	41.38	1.01	38.79	1.01
0.9900	41.36	1.01	38.79	1.03
1.0000	41.34	1.01	38.56	1.03