
SAR PROBE ISSUE

Dates of Tests: April 07 and April 21 , 2009

< Cellular Head>

The test frequencies are properly matched as this is a cellular band. The probe calibration for permittivity and conductivity is within +/-5%, were the probe calibrated center frequency at 900MHz has permittivity and conductivity of 41.5 and 0.97 respectively. At the probe extreme frequencies the following are true: at 800 MHz the permittivity and conductivity are 39.4 and 0.86 respectively. At 1000 MHz the permittivity and conductivity are 43.6 and 1.03 respectively. The probe was calibrated at these parameters in order to cover the frequency range 800 MHz to 1000 MHz.

The screenshot shows a 'Conversion' dialog box with the following fields and values:

Name:	X:	Y:	Z:
900 (Head)	8.59	8.59	8.59
Alpha:	0.67	0.67	0.67
Delta:	0.62	0.62	0.62

Frequency range:	to	Calibrated for:
800	1000	900

Units: MHz

Permittivity range:	to	Calibrated for:
39.4	43.6	41.5

Conductivity range:	to	Calibrated for:
0.86	1.03	0.97

Units: S/m

Buttons: OK, Cancel

< Cellular Body>

The test frequencies are properly matched as this is a cellular band. The probe calibration for permittivity and conductivity is within +/-5%, were the probe calibrated center frequency at 900MHz has permittivity and conductivity of 55.0 and 1.05 respectively. At the probe extreme frequencies the following are true: at 800 MHz the permittivity and conductivity are 52.3 and 0.92 respectively. At 1000 MHz the permittivity and conductivity are 57.8 and 1.1 respectively. The probe was calibrated at these parameters in order to cover the frequency range 800 MHz to 1000 MHz.

Conversion							
Name:	900 (Body)						OK
	X:	Y:	Z:				
Conversion factor:	8.63	8.63	8.63				
Alpha:	0.36	0.36	0.36				
Delta:	1.01	1.01	1.01				
Frequency range:	800	to	1000	MHz	Calibrated for:	900	MHz
Permittivity range:	52.3	to	57.8		Calibrated for:	55	
Conductivity range:	0.92	to	1.1	S/m	Calibrated for:	1.05	S/m
Cancel							

< PCS Head>

The test frequencies are properly matched as this is a PCS band. The probe calibration for permittivity and conductivity is within +/-5%, were the probe calibrated center frequency at 1810MHz has permittivity and conductivity of 40.0 and 1.4 respectively. At the probe extreme frequencies the following are true: at 1710 MHz the permittivity and conductivity are 38 and 1.29 respectively. At 1910 MHz the permittivity and conductivity are 42.0 and 1.47 respectively. The probe was calibrated at these parameters in order to cover the frequency range 1710 MHz to 1910 MHz.

Conversion							
Name:	1810 (Head)						OK
	X:	Y:	Z:				
Conversion factor:	7.56	7.56	7.56				
Alpha:	0.71	0.71	0.71				
Delta:	0.59	0.59	0.59				
Frequency range:	1710	to	1910	MHz	Calibrated for:	1810	MHz
Permittivity range:	38	to	42		Calibrated for:	40	
Conductivity range:	1.29	to	1.47	S/m	Calibrated for:	1.4	S/m
Cancel							

< PCS Body>

The test frequencies are properly matched as this is a PCS band. The probe calibration for permittivity and conductivity is within +/-5%, were the probe calibrated center frequency at 1810MHz has permittivity and conductivity of 53.3 and 1.52 respectively. At the probe extreme frequencies the following are true: at 1710 MHz the permittivity and conductivity are 50.6 and 1.38 respectively. At 1910 MHz the permittivity and conductivity are 56 and 1.6 respectively. The probe was calibrated at these parameters in order to cover the frequency range 1710 MHz to 1910 MHz.

Conversion							
Name:	1810 (Body)						OK
	X:		Y:		Z:		Cancel
Conversion factor:	7.45		7.45		7.45		
Alpha:	0.6		0.6		0.6		
Delta:	0.64		0.64		0.64		
Frequency range:	1710	to	1910	MHz	Calibrated for:	1810	MHz
Permittivity range:	50.6	to	56		Calibrated for:	53.3	
Conductivity range:	1.38	to	1.6	S/m	Calibrated for:	1.52	S/m

The target permittivity and conductivity at 835 MHz is 55.2 and 0.97 and at 1900 MHz 53.3 and 1.52 respectively which is within the calibrated range of the probe parameter. The following parameters are declared in the probe calibration certificate on page 8:

Cellular Head : 41.5 and 0.90
 Body : 55.2 and 0.97
 PCS Head : 40 and 1.4
 Body : 53.3 and 1.52

f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.67	0.62	8.59 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.71	0.59	7.56 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.60	0.65	7.27 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.51	0.69	6.92 ± 11.0% (k=2)
2600	± 50 / ± 100	Head	39.0 ± 5%	1.96 ± 5%	0.32	0.91	6.81 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.36	1.01	8.63 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.60	0.64	7.45 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.53	0.68	7.36 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.26	1.15	6.80 ± 11.0% (k=2)
2600	± 50 / ± 100	Body	52.5 ± 5%	2.16 ± 5%	0.27	1.18	6.69 ± 11.0% (k=2)

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

The system manufacturer has carried out addition steps as detailed on page 4 of KDB450824. This is detailed in the calibration certificates. The measured SAR values in the report are all below 10 % of the SAR limit. The measured fluid dielectric parameters for 835 MHz and 1900 MHz, performed during test values were all within +/- 5 % of the 835 MHz and 1900 MHz Target value.

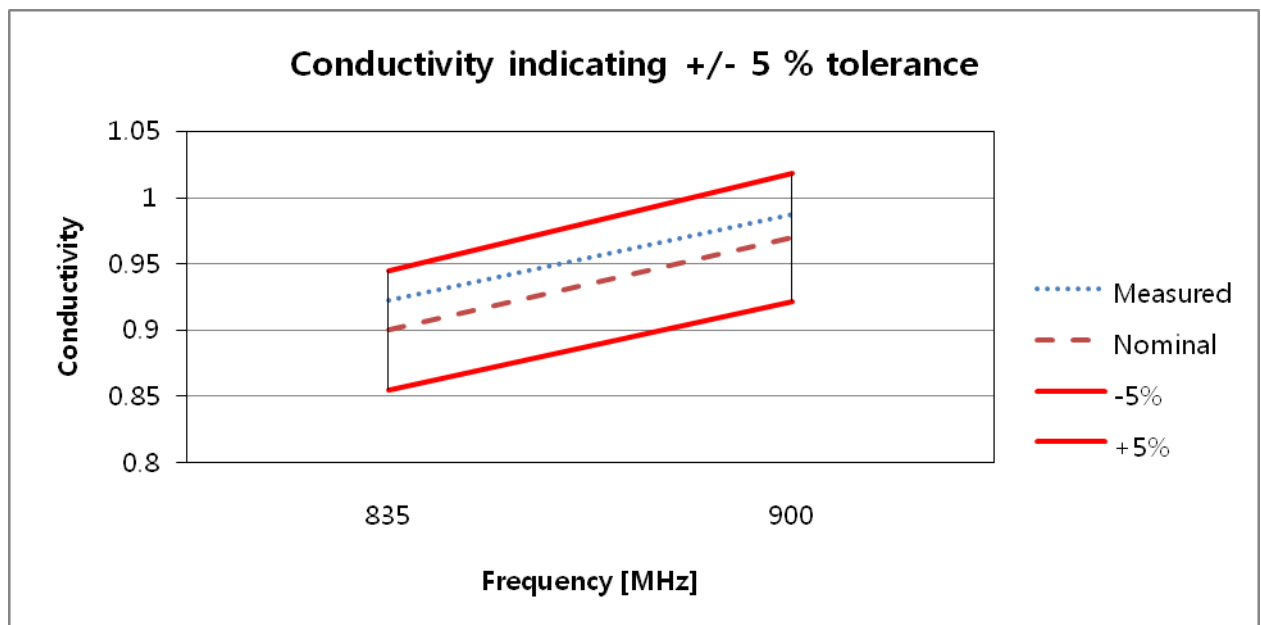
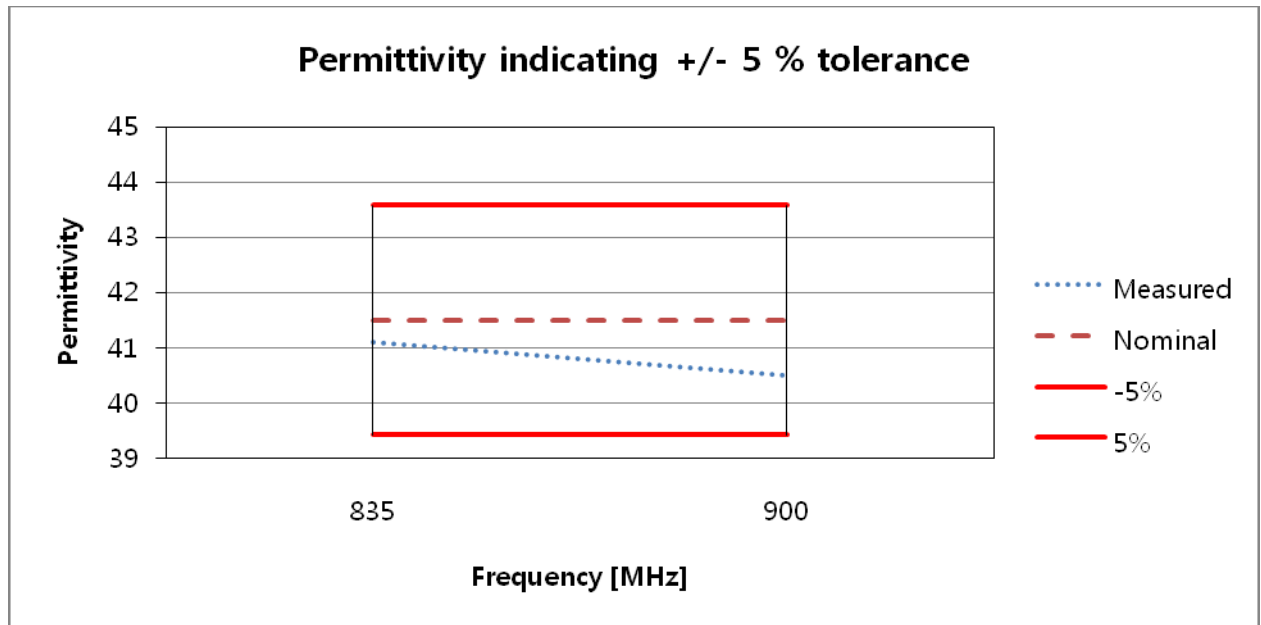
Cellular Body (DUO-2100)

Frequency (MHz)	Tissue type	Measured Fluid Parameter Date: 21/04/2009				Nominal fluid Parameter used Manufacturer in Cal certificate	
		ϵ	Deviation (%)	σ	Deviation (%)	ϵ	σ
835	Head	41.1	- 0.96	0.922	+ 2.44	41.5	0.90
900		40.5	- 2.41	0.987	+ 1.75	41.5	0.97
835	Body	53.2	- 3.62	0.993	+ 2.37	55.20	0.97
900		52.8	- 4.00	1.058	+ 0.76	55.0	1.05

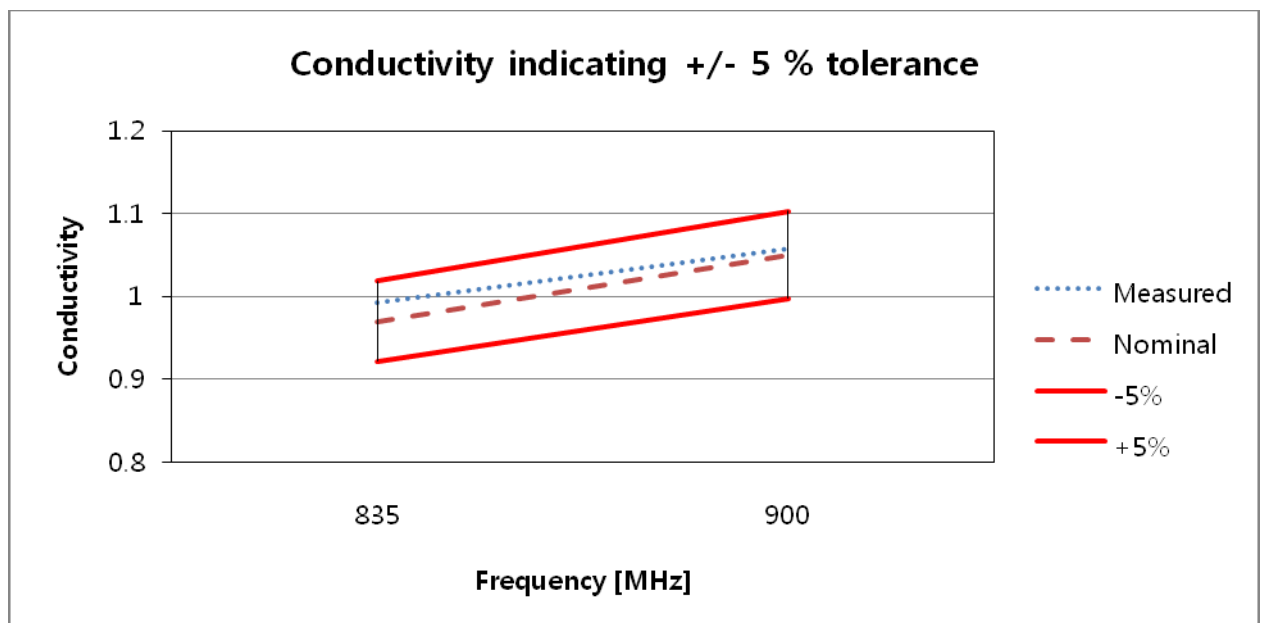
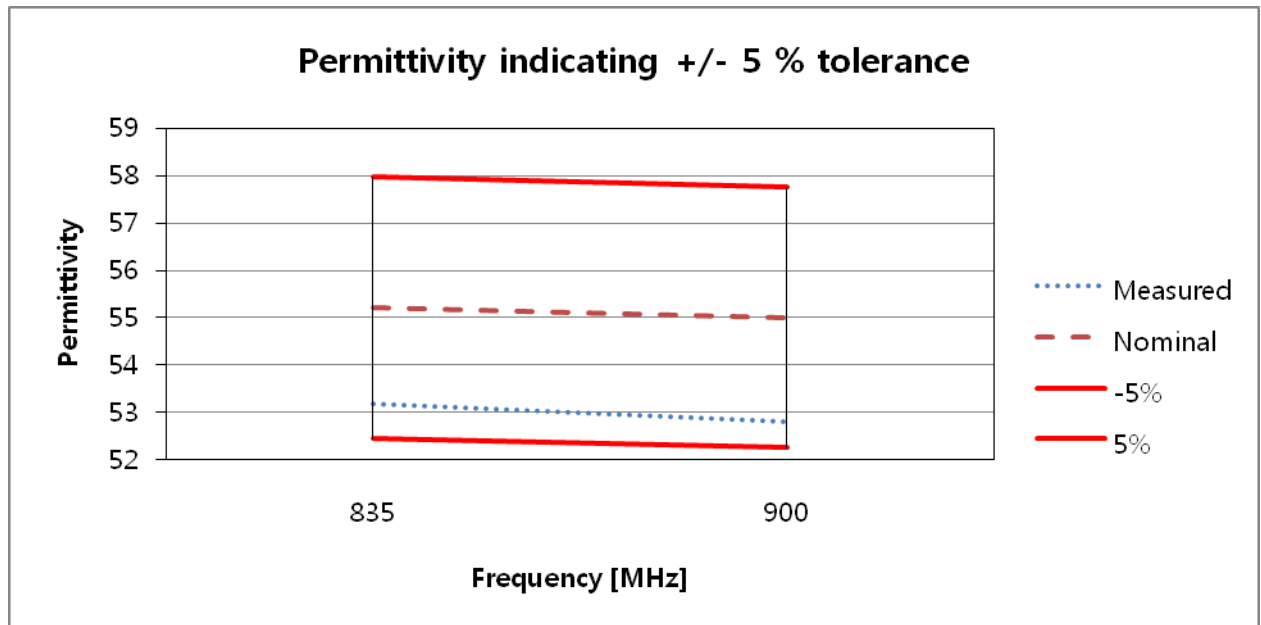
PCS Body (DUO-2100)

Frequency (MHz)	Tissue type	Measured Fluid Parameter Date: 07/04/2009				Nominal fluid Parameter used Manufacturer in Cal certificate	
		ϵ	Deviation (%)	σ	Deviation (%)	ϵ	σ
1850	Head	39.3	- 1.75	1.403	+ 0.21	40.0	1.40
1880		39.2	- 2.00	1.422	+ 1.57	40.0	1.40
1900		39.1	- 2.25	1.440	+ 2.86	40.0	1.40
1850	Body	52.8	- 0.94	1.542	+ 1.45	53.3	1.52
1880		52.8	- 0.94	1.555	+ 2.30	53.3	1.52
1900		52.7	- 1.13	1.545	+ 1.64	53.3	1.52

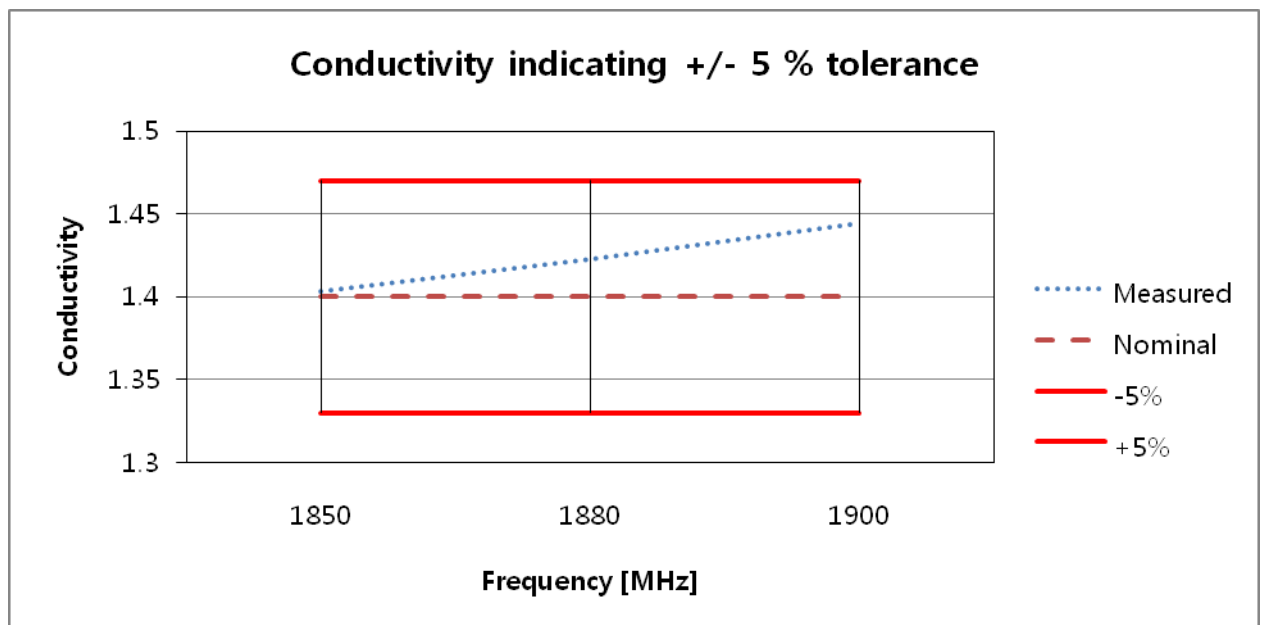
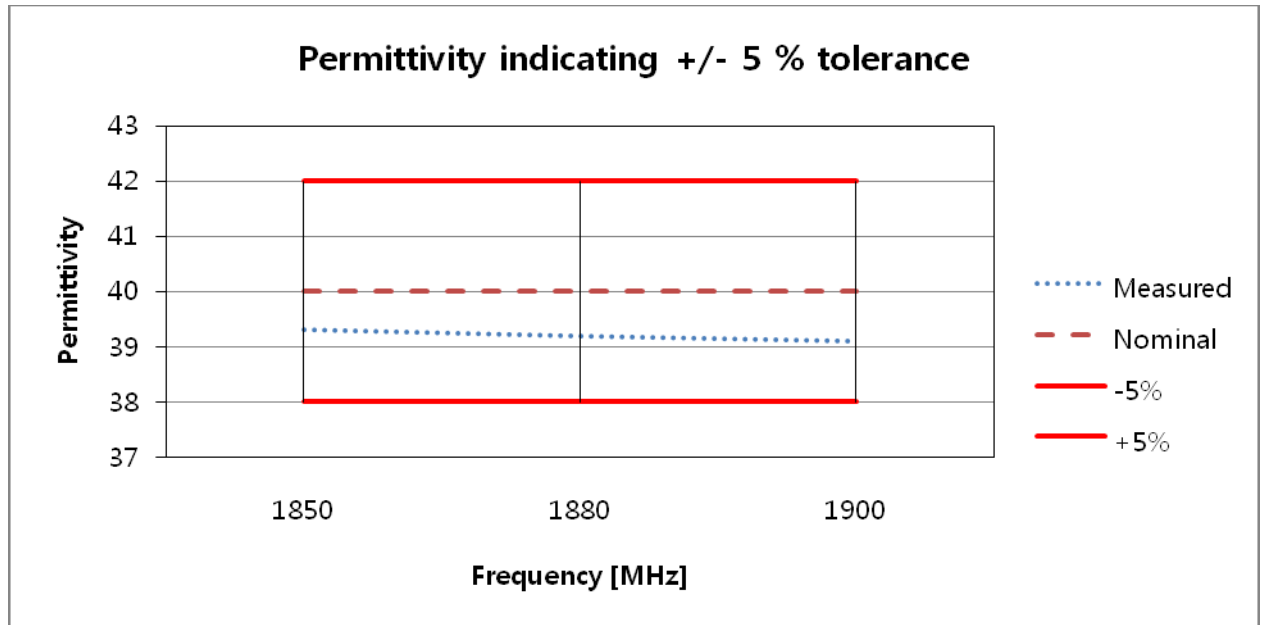
Cellular Band Head



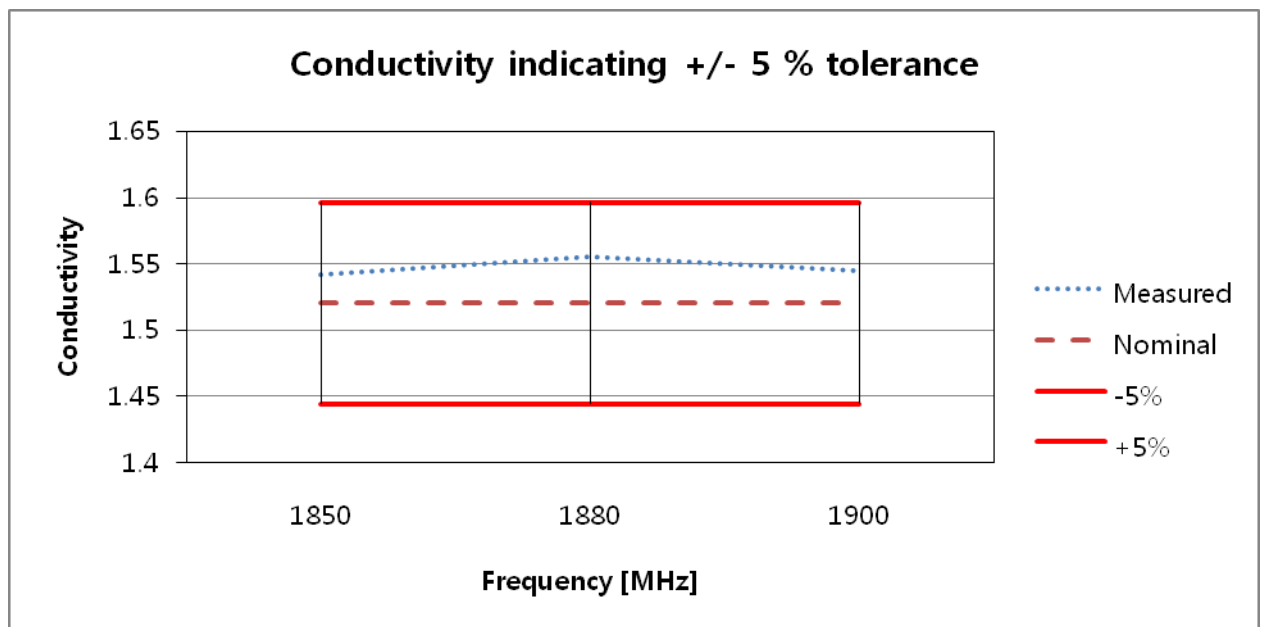
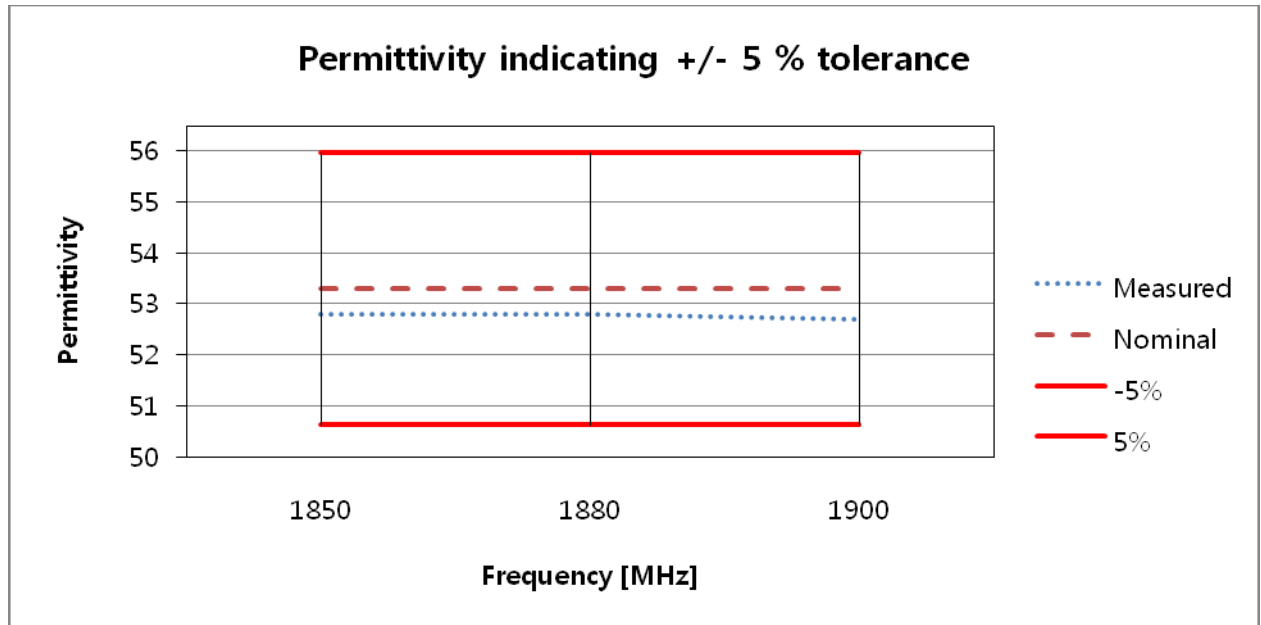
Cellular Band Body



PCS Band Head



PCS Band Body



The probe conversion factor and its frequency response, with respect to the tissue dielectric media used during the probe calibration and routine measurements was examined to determine if the effective frequency interval is adequate for the intended measurements to satisfy protocol requirements. The frequency range at which the probe was calibrated for 900 MHz covered 800 MHz to 1000 MHz and the dielectric parameters required for 824 to 850 MHz were all within the calibrated range of the probe dielectric parameters and at 1810 MHz covered 1710 MHz to 1910 MHz and the dielectric parameters required for 1850 to 1910 MHz were all within the calibrated range of the probe dielectric parameters.

The measurement within the required frequency interval satisfy an expanded probe calibration uncertainty ($k=2$) $\leq 15\%$ for all measurement conditions. Please refer to SAR report for probe and dipole calibration certificates produce by the system manufacturer.

Boundary Effect

TSL		900 MHz	Typical SAR gradient: 5 % per mm	
	Sensor Center to Phantom Surface Distance		2.0 mm	3.0 mm
	SAR _{be} [%]	Without Correction Algorithm	7.3	3.9
	SAR _{be} [%]	With Correction Algorithm	0.6	0.3
TSL		1810 MHz	Typical SAR gradient: 10 % per mm	
	Sensor Center to Phantom Surface Distance		2.0 mm	3.0 mm
	SAR _{be} [%]	Without Correction Algorithm	6.6	3.0
	SAR _{be} [%]	With Correction Algorithm	0.7	0.3

Sensor Offset

Probe Tip to Sensor Center	1.0 mm
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The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.

SAR PROBE ISSUE

Dates of Tests: May 20, 2009

< Cellular Head>

The test frequencies are properly matched as this is a cellular band. The probe calibration for permittivity and conductivity is within +/-5%, were the probe calibrated center frequency at 900MHz has permittivity and conductivity of 41.5 and 0.97 respectively. At the probe extreme frequencies the following are true: at 800 MHz the permittivity and conductivity are 39.4 and 0.86 respectively. At 1000 MHz the permittivity and conductivity are 43.6 and 1.03 respectively. The probe was calibrated at these parameters in order to cover the frequency range 800 MHz to 1000 MHz.

The screenshot shows a 'Conversion' dialog box with the following fields and values:

Name:	X:	Y:	Z:
900 (Head)	8.59	8.59	8.59
Alpha:	0.67	0.67	0.67
Delta:	0.62	0.62	0.62

Frequency range:	to	Calibrated for:
800	1000	900

Units: MHz

Permittivity range:	to	Calibrated for:
39.4	43.6	41.5

Conductivity range:	to	Calibrated for:
0.86	1.03	0.97

Units: S/m

Buttons: OK, Cancel

< Cellular Body>

The test frequencies are properly matched as this is a cellular band. The probe calibration for permittivity and conductivity is within +/-5%, were the probe calibrated center frequency at 900MHz has permittivity and conductivity of 55.0 and 1.05 respectively. At the probe extreme frequencies the following are true: at 800 MHz the permittivity and conductivity are 52.3 and 0.92 respectively. At 1000 MHz the permittivity and conductivity are 57.8 and 1.1 respectively. The probe was calibrated at these parameters in order to cover the frequency range 800 MHz to 1000 MHz.

Conversion							
Name:	900 (Body)						OK
	X:	Y:	Z:				
Conversion factor:	8.63	8.63	8.63				
Alpha:	0.36	0.36	0.36				
Delta:	1.01	1.01	1.01				
Frequency range:	800	to	1000	MHz	Calibrated for:	900	MHz
Permittivity range:	52.3	to	57.8		Calibrated for:	55	
Conductivity range:	0.92	to	1.1	S/m	Calibrated for:	1.05	S/m
Cancel							

< PCS Head>

The test frequencies are properly matched as this is a PCS band. The probe calibration for permittivity and conductivity is within +/-5%, were the probe calibrated center frequency at 1810MHz has permittivity and conductivity of 40.0 and 1.4 respectively. At the probe extreme frequencies the following are true: at 1710 MHz the permittivity and conductivity are 38 and 1.29 respectively. At 1910 MHz the permittivity and conductivity are 42.0 and 1.47 respectively. The probe was calibrated at these parameters in order to cover the frequency range 1710 MHz to 1910 MHz.

Conversion							
Name:	1810 (Head)						OK
	X:	Y:	Z:				
Conversion factor:	7.56	7.56	7.56				
Alpha:	0.71	0.71	0.71				
Delta:	0.59	0.59	0.59				
Frequency range:	1710	to	1910	MHz	Calibrated for:	1810	MHz
Permittivity range:	38	to	42		Calibrated for:	40	
Conductivity range:	1.29	to	1.47	S/m	Calibrated for:	1.4	S/m
Cancel							

< PCS Body>

The test frequencies are properly matched as this is a PCS band. The probe calibration for permittivity and conductivity is within +/-5%, were the probe calibrated center frequency at 1810MHz has permittivity and conductivity of 53.3 and 1.52 respectively. At the probe extreme frequencies the following are true: at 1710 MHz the permittivity and conductivity are 50.6 and 1.38 respectively. At 1910 MHz the permittivity and conductivity are 56 and 1.6 respectively. The probe was calibrated at these parameters in order to cover the frequency range 1710 MHz to 1910 MHz.

Conversion									
Name:	1810 (Body)						OK		
	X:		Y:		Z:	Cancel			
Conversion factor:	7.45		7.45		7.45				
Alpha:	0.6		0.6		0.6				
Delta:	0.64		0.64		0.64				
Frequency range:	1710	to	1910	MHz	Calibrated for:	1810	MHz		
Permittivity range:	50.6	to	56		Calibrated for:	53.3			
Conductivity range:	1.38	to	1.6	S/m	Calibrated for:	1.52	S/m		

The target permittivity and conductivity at 835 MHz is 55.2 and 0.97 and at 1900 MHz 53.3 and 1.52 respectively which is within the calibrated range of the probe parameter. The following parameters are declared in the probe calibration certificate on page 8:

Cellular Head : 41.5 and 0.90
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f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.67	0.62	8.59 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.71	0.59	7.56 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.60	0.65	7.27 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.51	0.69	6.92 ± 11.0% (k=2)
2600	± 50 / ± 100	Head	39.0 ± 5%	1.96 ± 5%	0.32	0.91	6.81 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.36	1.01	8.63 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.60	0.64	7.45 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.53	0.68	7.36 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.26	1.15	6.80 ± 11.0% (k=2)
2600	± 50 / ± 100	Body	52.5 ± 5%	2.16 ± 5%	0.27	1.18	6.69 ± 11.0% (k=2)

^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

The system manufacturer has carried out addition steps as detailed on page 4 of KDB450824. This is detailed in the calibration certificates. The measured SAR values in the report are all below 10 % of the SAR limit. The measured fluid dielectric parameters for 835 MHz and 1900 MHz, performed during test values were all within +/- 5 % of the 835 MHz and 1900 MHz Target value.

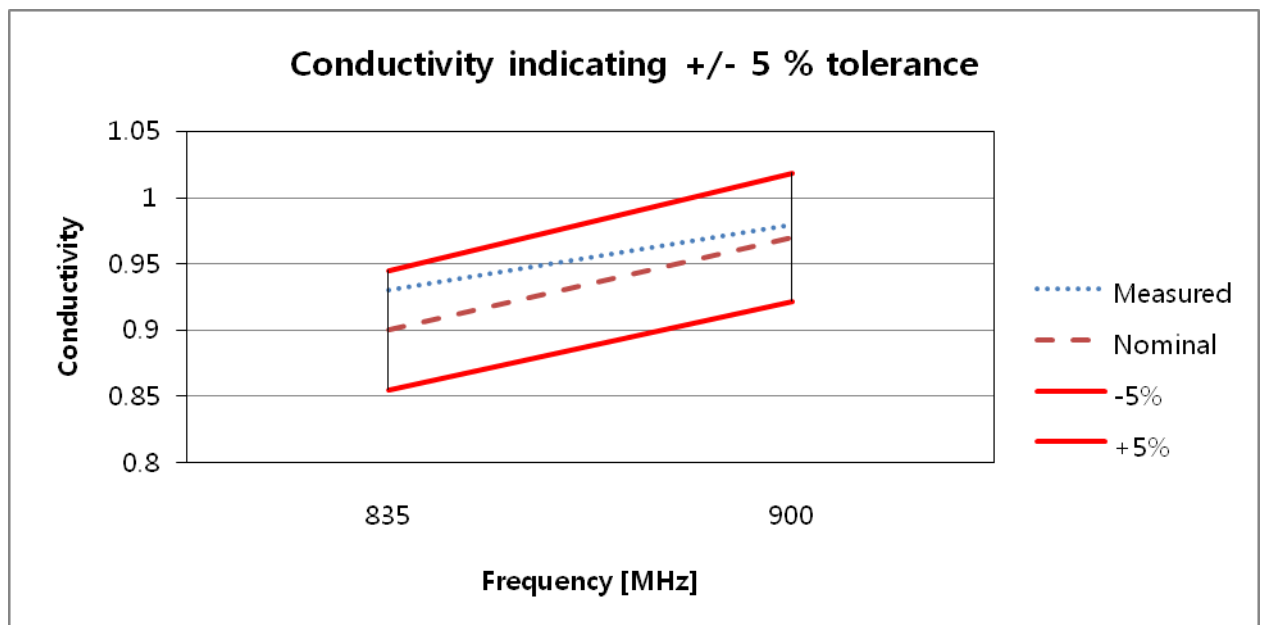
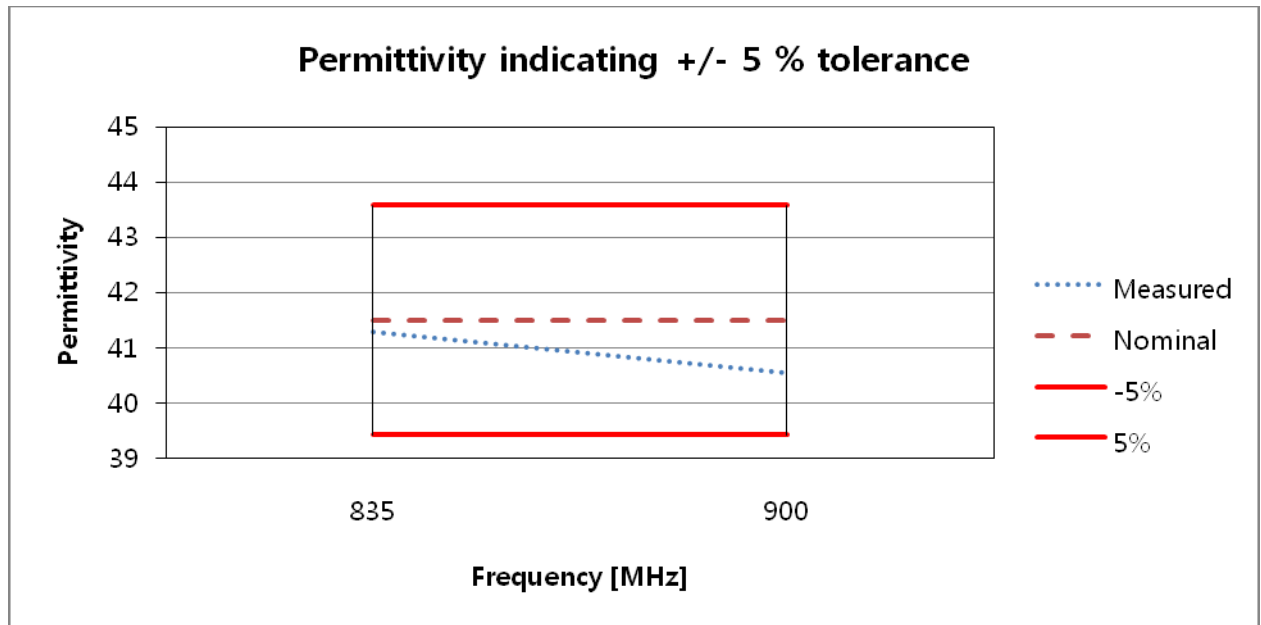
Cellular Body (DUO-2100)

Frequency (MHz)	Tissue type	Measured Fluid Parameter Date: 20/05/2009				Nominal fluid Parameter used Manufacturer in Cal certificate	
		ϵ	Deviation (%)	σ	Deviation (%)	ϵ	σ
835	Head	41.3	- 0.48	0.930	+ 3.33	41.5	0.90
900		40.5	- 2.41	0.979	+ 0.93	41.5	0.97
835	Body	53.9	- 2.36	1.004	+ 3.51	55.20	0.97
900		53.2	- 3.27	1.056	+ 0.57	55.0	1.05

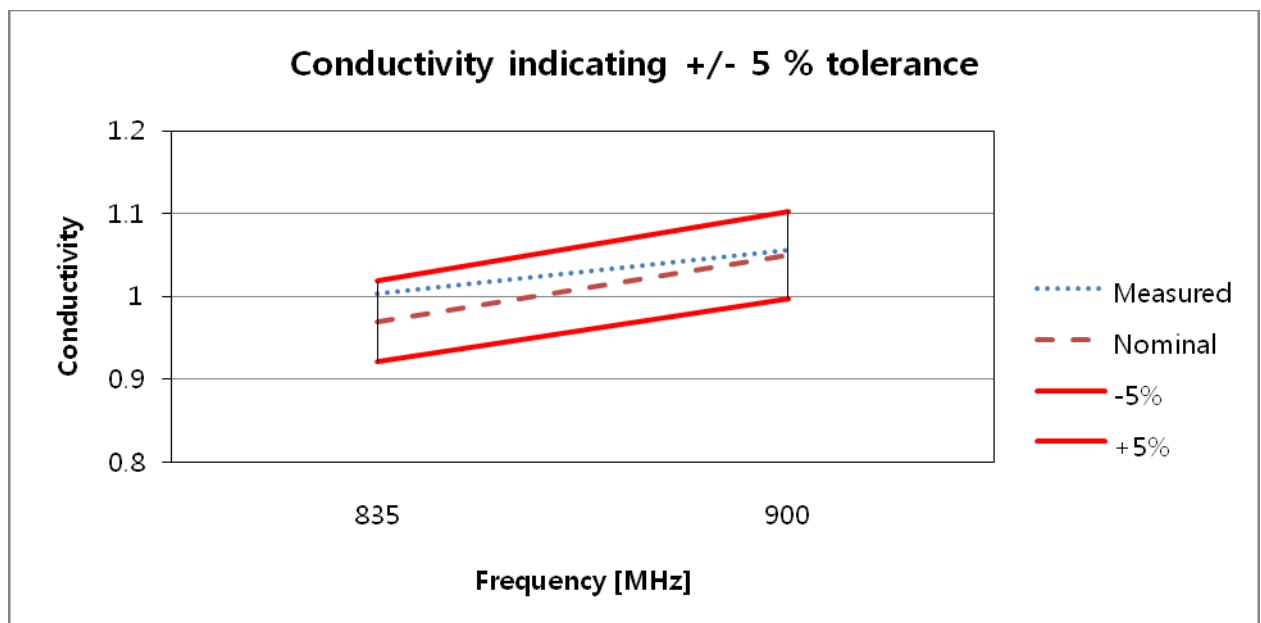
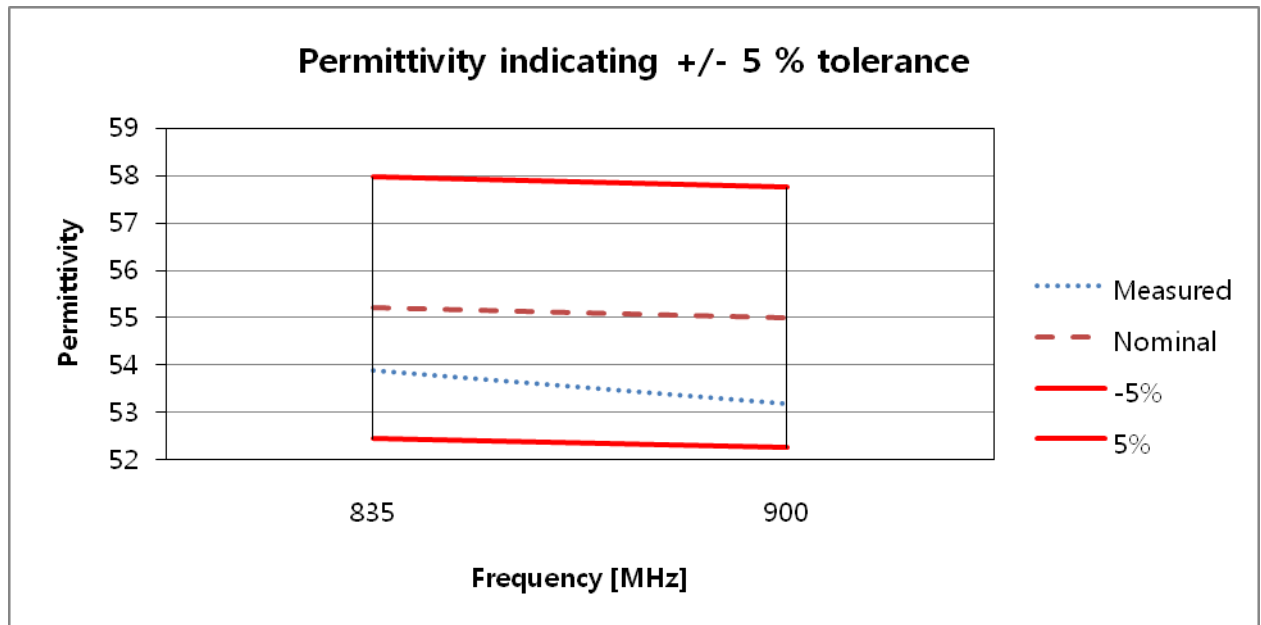
PCS Body (DUO-2100)

Frequency (MHz)	Tissue type	Measured Fluid Parameter Date: 20/05/2009				Nominal fluid Parameter used Manufacturer in Cal certificate	
		ϵ	Deviation (%)	σ	Deviation (%)	ϵ	σ
1850	Head	39.6	- 1.00	1.407	+ 0.50	40.0	1.40
1880		39.3	- 1.75	1.432	+ 2.29	40.0	1.40
1900		39.2	- 2.00	1.450	+ 3.57	40.0	1.40
1850	Body	53.0	- 0.56	1.525	+ 0.33	53.3	1.52
1880		52.9	- 0.75	1.560	+ 2.63	53.3	1.52
1900		52.8	- 0.94	1.583	+ 4.14	53.3	1.52

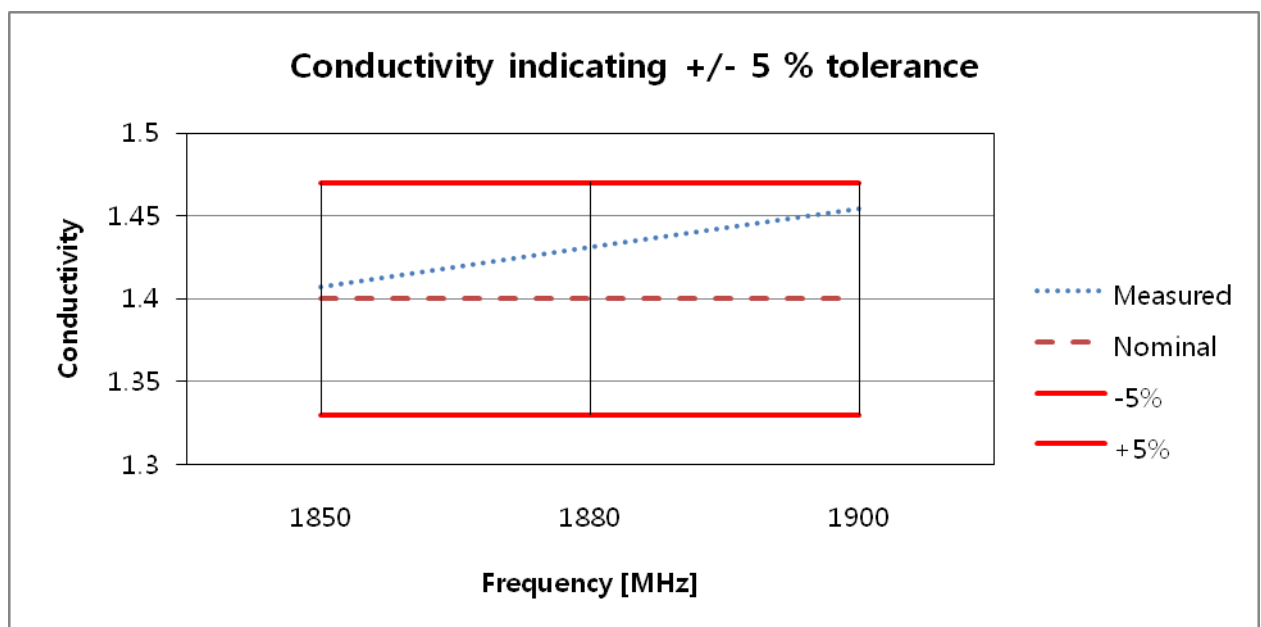
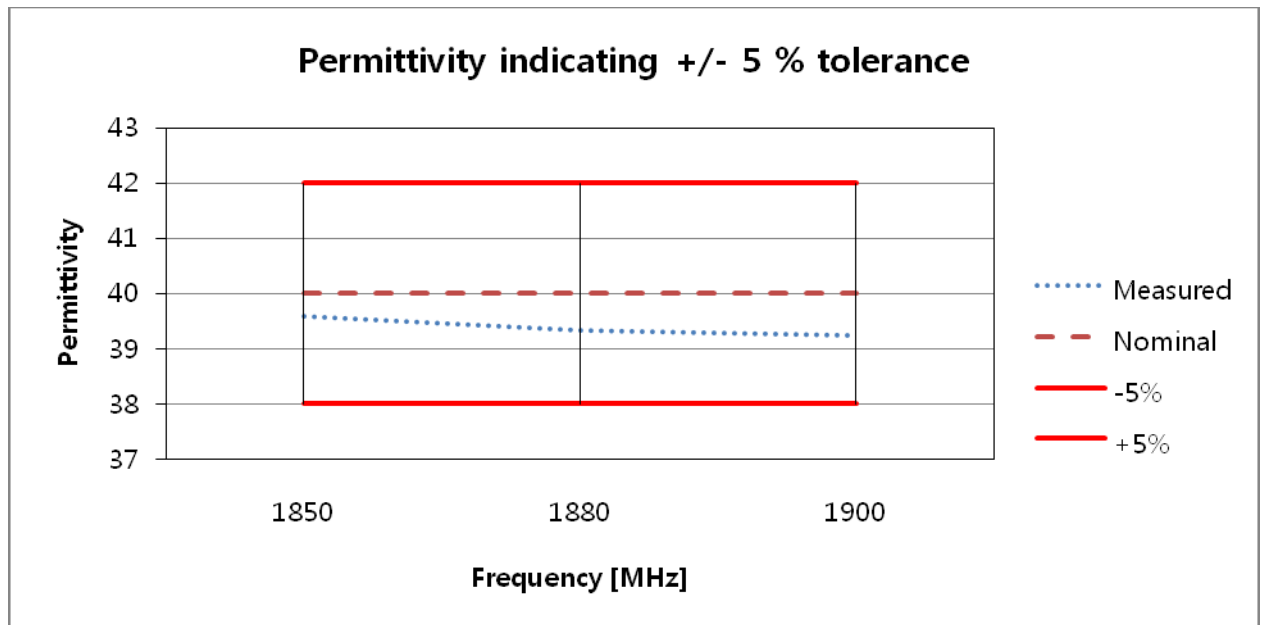
Cellular Band Head



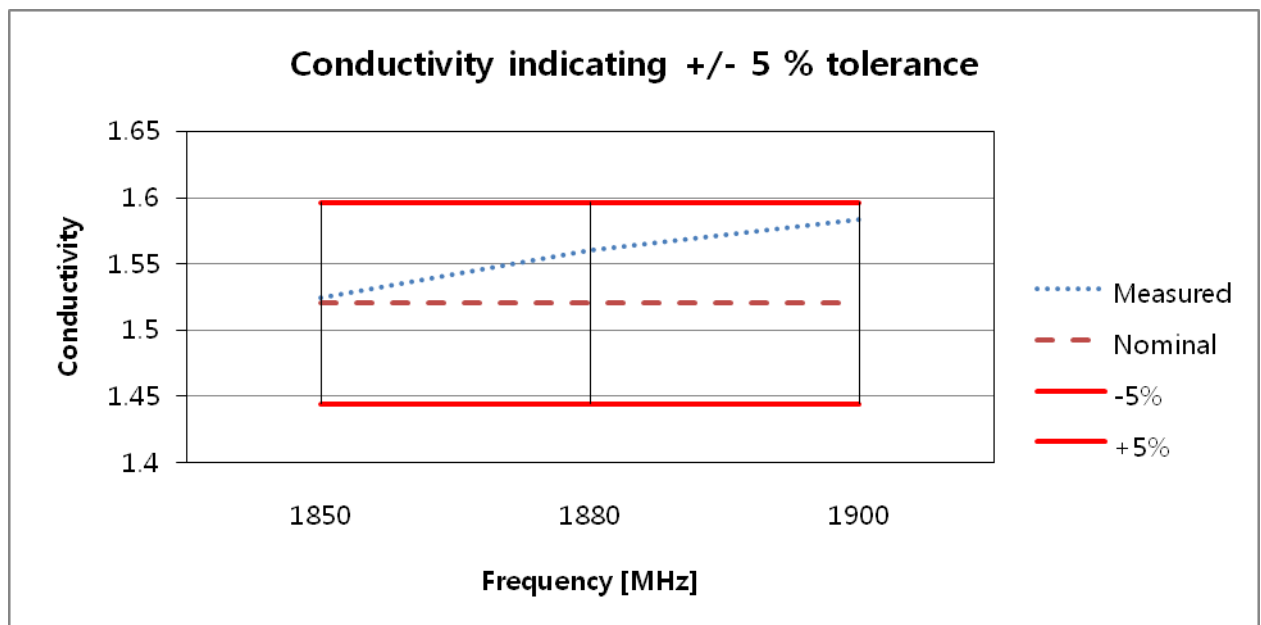
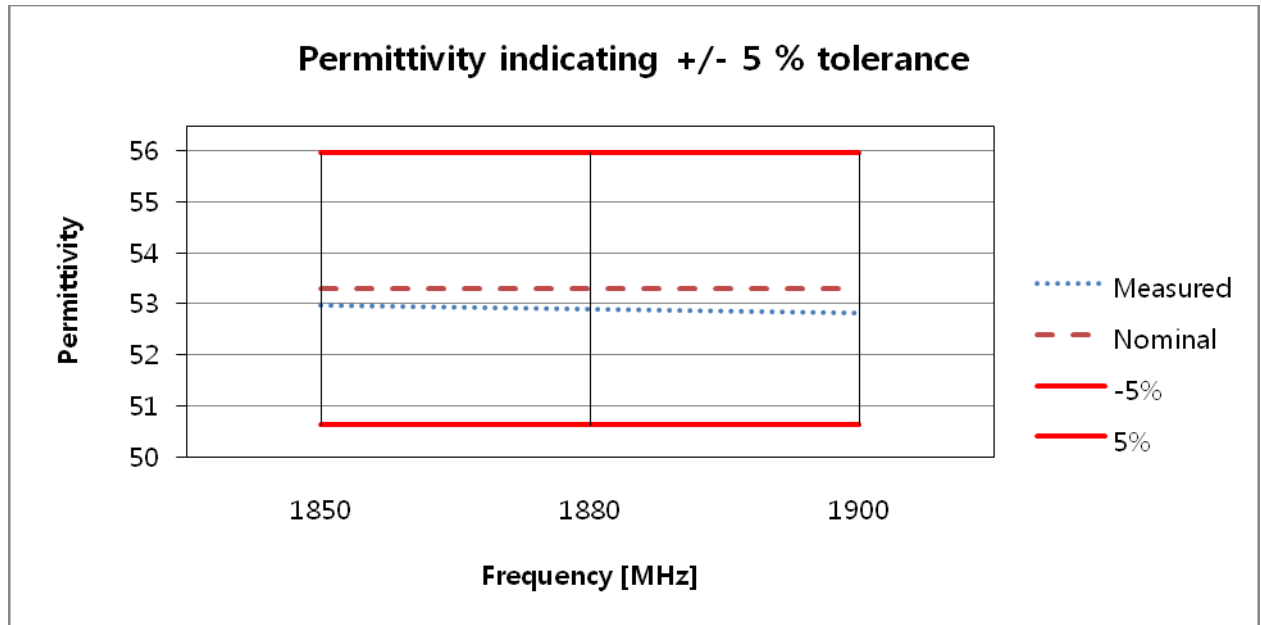
Cellular Band Body



PCS Band Head



PCS Band Body



The probe conversion factor and its frequency response, with respect to the tissue dielectric media used during the probe calibration and routine measurements was examined to determine if the effective frequency interval is adequate for the intended measurements to satisfy protocol requirements. The frequency range at which the probe was calibrated for 900 MHz covered 800 MHz to 1000 MHz and the dielectric parameters required for 824 to 850 MHz were all within the calibrated range of the probe dielectric parameters and at 1810 MHz covered 1710 MHz to 1910 MHz and the dielectric parameters required for 1850 to 1910 MHz were all within the calibrated range of the probe dielectric parameters.

The measurement within the required frequency interval satisfy an expanded probe calibration uncertainty ($k=2$) $\leq 15\%$ for all measurement conditions. Please refer to SAR report for probe and dipole calibration certificates produce by the system manufacturer.

Boundary Effect

TSL		900 MHz	Typical SAR gradient: 5 % per mm	
	Sensor Center to Phantom Surface Distance		2.0 mm	3.0 mm
	SAR _{be} [%]	Without Correction Algorithm	7.3	3.9
	SAR _{be} [%]	With Correction Algorithm	0.6	0.3
TSL		1810 MHz	Typical SAR gradient: 10 % per mm	
	Sensor Center to Phantom Surface Distance		2.0 mm	3.0 mm
	SAR _{be} [%]	Without Correction Algorithm	6.6	3.0
	SAR _{be} [%]	With Correction Algorithm	0.7	0.3

Sensor Offset

Probe Tip to Sensor Center	1.0 mm
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The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Page 8).

^B Numerical linearization parameter: uncertainty not required.