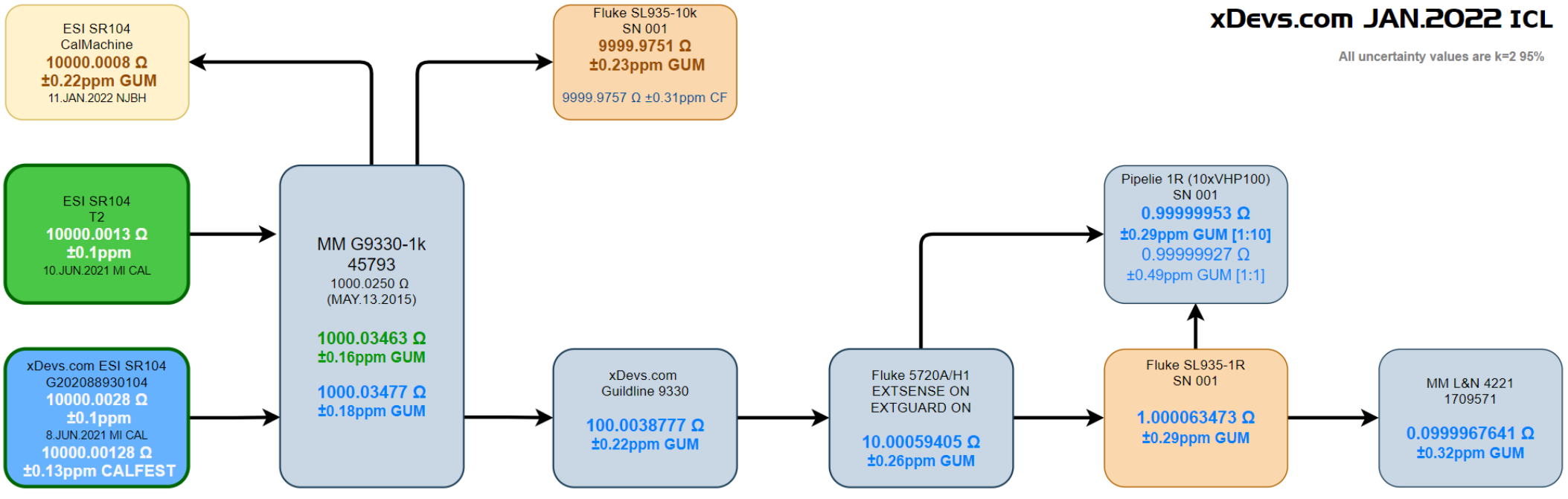
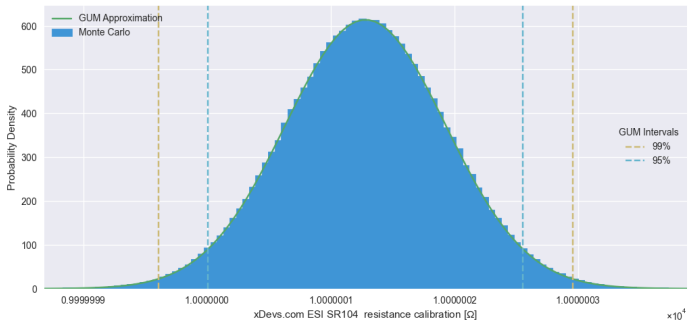
Transfers with resistance standards at xDevs.com NJBH Lab

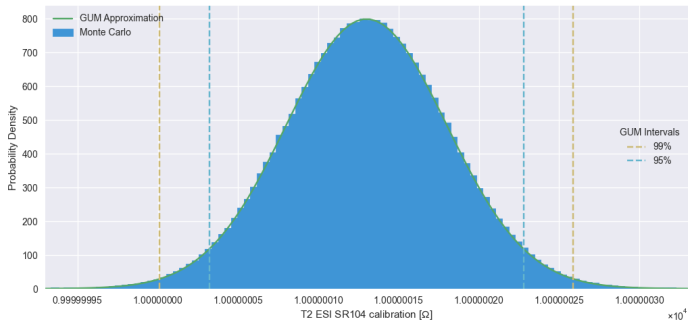


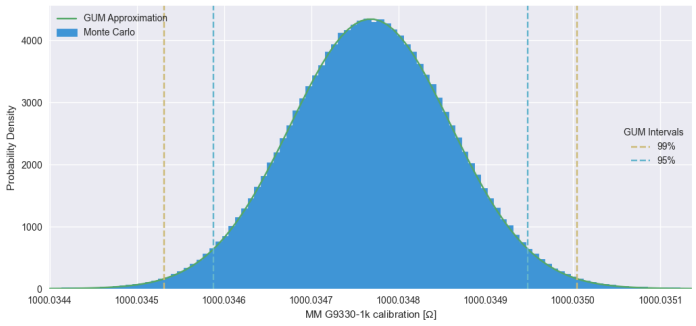
Summary and result analysis

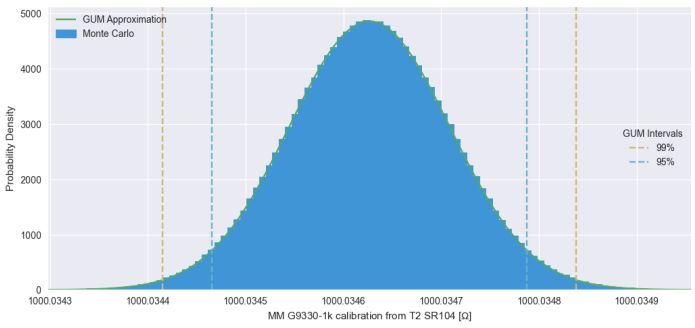
All measurements performed with Measurements International Model 6010B Automatic Resistance Bridge, using DCC technology.
With exception of Fluke 5720A/H1 all measurement devices and standards were thermally stabilized in peltier active thermal chamber.
Temperature of measurement was set at +23.0 °C ±0.2°C . No corrections for thermal coefficients was applied in this report.

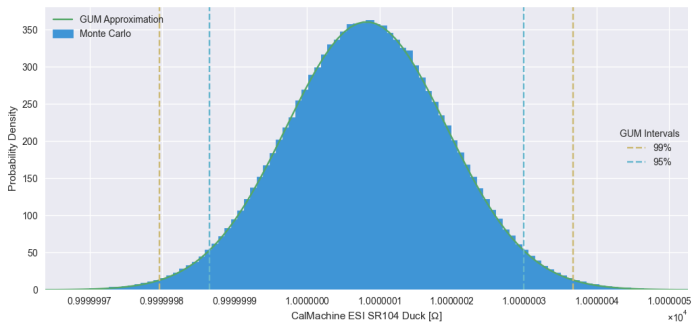
Function	Method	Nominal	Std. Uncertainty	95% Coverage	k	Deg. Freedom
R_{REF}	GUM	10000.00128 Ω	0.00065 Ω	± 0.0013 Ω	1.960	inf
R_{REF}	Monte Carlo	10000.00128 Ω	0.00065 Ω	(10000.00000 Ω, 10000.00255 Ω)	1.962	-
R_{REF2}	GUM	10000.0013 Ω	0.00050 Ω	± 0.00098 Ω	1.960	inf
R_{REF2}	Monte Carlo	10000.0013 Ω	0.00050 Ω	(10000.00032 Ω, 10000.00228 Ω)	1.960	-
R_{1k}	GUM	1000.034768 Ω	0.000092 Ω	± 0.00018 Ω	1.960	1305544786.3
R_{1k}	Monte Carlo	1000.034768 Ω	0.000092 Ω	(1000.034587 Ω, 1000.034949 Ω)	1.962	-
R_{1kT2}	GUM	1000.034627 Ω	0.000082 Ω	± 0.00016 Ω	1.960	inf
R_{1kT2}	Monte Carlo	1000.034627 Ω	0.000082 Ω	(1000.034466 Ω, 1000.034787 Ω)	1.959	-
R_{CMDUCK}	GUM	10000.0008 Ω	0.0011 Ω	± 0.0022 Ω	1.960	122538273.4
R_{CMDUCK}	Monte Carlo	10000.0008 Ω	0.0011 Ω	(9999.9986 Ω, 10000.0030 Ω)	1.959	-
R_{FSL10k}	GUM	9999.9751 Ω	0.0012 Ω	± 0.0023 Ω	1.960	56585304516.7
R_{FSL10k}	Monte Carlo	9999.9751 Ω	0.0012 Ω	(9999.9728 Ω, 9999.9774 Ω)	1.959	-
R_{100}	GUM	100.003878 Ω	0.000011 Ω	± 0.000022 Ω	1.960	2408282652.1
R_{100}	Monte Carlo	100.003878 Ω	0.000011 Ω	(100.003856 Ω, 100.003900 Ω)	1.959	-
R_{10}	GUM	10.0005941 Ω	1.3e-06 Ω	± 2.6e-06 Ω	1.960	25179230.3
R_{10}	Monte Carlo	10.0005940 Ω	1.3e-06 Ω	(10.0005915 Ω, 10.0005966 Ω)	1.961	-
R_{FSL935}	GUM	1.00006347 Ω	1.5e-07 Ω	± 2.9e-07 Ω	1.960	7785363.5
R_{FSL935}	Monte Carlo	1.00006347 Ω	1.5e-07 Ω	(1.00006318 Ω, 1.00006376 Ω)	1.960	-
R_{PP}	GUM	0.99999927 Ω	2.5e-07 Ω	± 4.9e-07 Ω	1.960	8444.6
R_{PP}	Monte Carlo	0.99999927 Ω	2.5e-07 Ω	(0.99999878 Ω, 0.99999975 Ω)	1.959	-
R_{PPH1}	GUM	0.99999953 Ω	1.5e-07 Ω	± 2.9e-07 Ω	1.960	27454495.0
R_{PPH1}	Monte Carlo	0.99999953 Ω	1.5e-07 Ω	(0.99999924 Ω, 0.99999982 Ω)	1.962	-
$R_{MMLN4221}$	GUM	0.099996764 Ω	1.6e-08 Ω	± 3.2e-08 Ω	1.960	2966862.0
$R_{MMLN4221}$	Monte Carlo	0.099996764 Ω	1.6e-08 Ω	(0.099996732 Ω, 0.099996796 Ω)	1.962	-

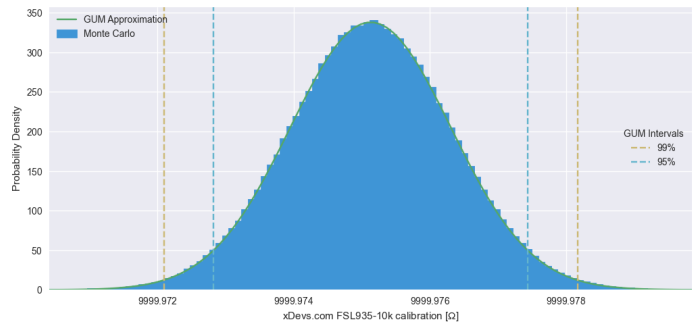


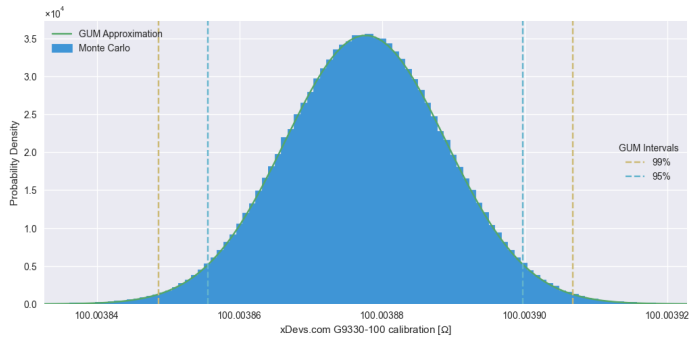


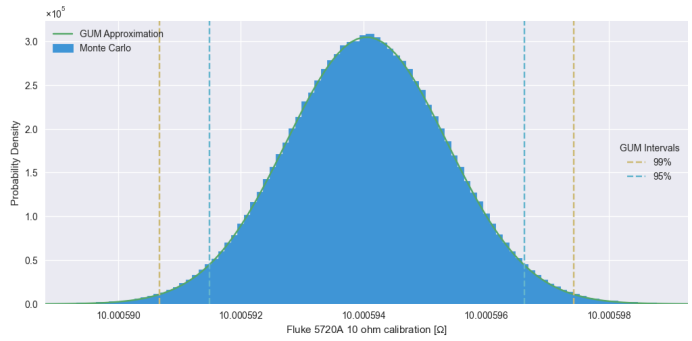


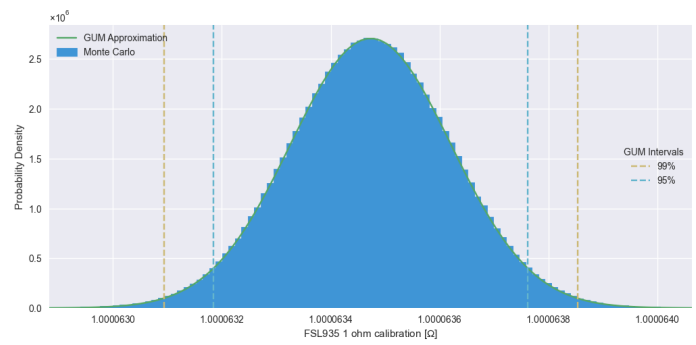


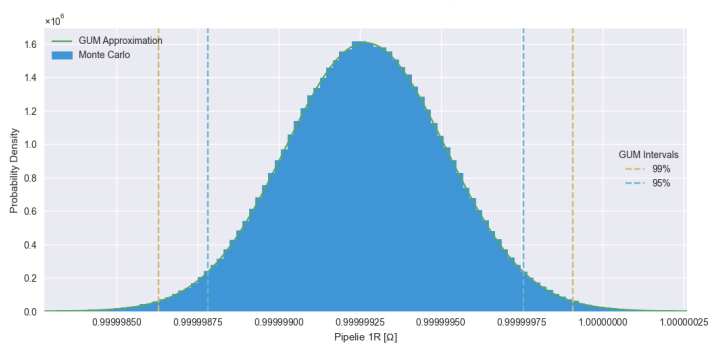


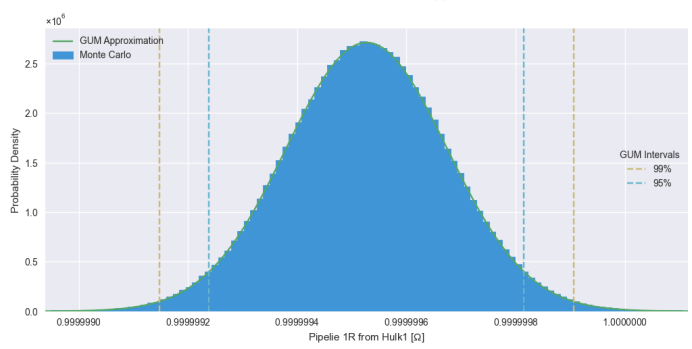


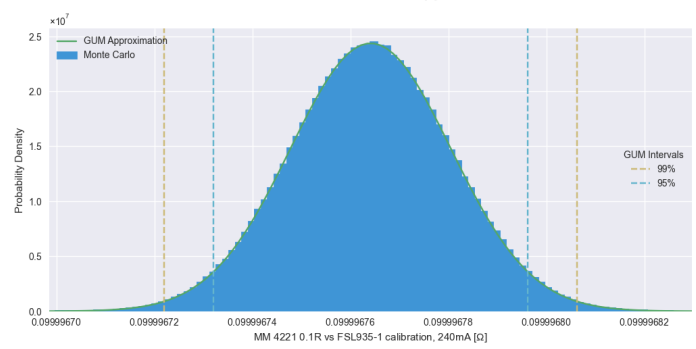












Standardized Input Values

Variable	Mean	Std. Uncertainty	Deg. Freedom	Description
R	10000.00128	0.00065 Ω	inf	xDevs.com SR104 from Calfest
R_2	10000.00130	0.00050 Ω	inf	T2 ESI SR104 from MI CAL
ratio	9.99965361	6.5e-07	3.3e+08	DCC Ratio to MMG9330-1k
$ratio_2$	9.99965505	6.5e-07	inf	DCC Ratio to MMG9330-1k, T2 value
$ratio_{10}$	9.99979373	6.7e-07	1.7e+06	Hulk1 5720A
$ratio_{100}$	9.99995991	6.5e-07	1.5e+09	DCC Ratio to xDevs.com 100 R
$ratio_{cm}$	9.99965386	9.2e-07	5.9e+07	DCC ratio for CM Duck
$ratio_{fsl}$	9.99995932	6.8e-07	4.3e+05	FSL935 from H1-10
$ratio_{fsl10k}$	9.9996282	1.0e-06	inf	DCC ratio for FSL935-10k
$ratio_{mmln4221}$	10.00095835	7.1e-07	1.4e+05	DCC ratio for MM LN4221 0.1R, +23.12°C
$ratio_{pp}$	0.99993580	2.0e-07	3500	DCC ratio of PP to FSL935
$ratio_{pph1}$	10.00059878	6.7e-07	3.7e+06	DCC ratio from Hulk1 10R to PP1R

Uncertainty Budget

Variable	Component	Description	Standard Uncertainty	Deg. Freedom
R	-	xDevs.com SR104 from Calfest	0.00065 Ω	inf
-	$u(R)$	Calibrated OCT/2021	0.00065 Ω	inf
R_2	-	T2 ESI SR104 from MI CAL	0.00050 Ω	inf
-	$u(R2)$	Calibrated JUN/2021	0.00050 Ω	inf
ratio	-	DCC Ratio to MMG9330-1k	6.5e-07	327104479.7

Variable	Component	Description	Standard Uncertainty	Deg. Freedom
-	u(ratio)	XFER to 1000 Ohm	3.1e-08	1579.0
-	u1(ratio)	SR104 U	6.5e-07	inf
$ratio_{2}$	-	DCC Ratio to MMG9330-1k, T2 value	6.5e-07	inf
-	u(ratio2)	XFER to 1000 Ohm T2	4.0e-08	inf
-	u1(ratio2)	SR104 T2 U	6.5e-07	inf
$ratio_{10}$	-	Hulk1 5720A	6.7e-07	1710039.5
-	$u(ratio_{1}0)$	XFER to 10 ohm	1.5e-07	4096.0
-	$u1(ratio_{1}0)$	XFER 100	2.7e-08	inf
-	$u2(ratio_{1}0)$	XFER 1k	3.1e-08	1579.0
-	$u3(ratio_{1}0)$	SR104 U	6.5e-07	inf
$ratio_{100}$	-	DCC Ratio to xDevs.com 100 R	6.5e-07	1478418900.8
-	$u(ratio_{1}00)$	XFER to 100	2.7e-08	4096.0
-	$u1(ratio_{1}00)$	XFER to 1k	3.1e-08	inf
-	$u2(ratio_{1}00)$	SR104 U	6.5e-07	inf
$ratio_{cm}$	-	DCC ratio for CM Duck	9.2e-07	58567283.2
-	$u(ratio_{c}m)$	XFER 1k	4.8e-08	436.0
-	$u1(ratio_{c}m)$	SR104 U T2	6.5e-07	inf
-	$u2(ratio_{c}m)$	SR104 U	6.5e-07	inf
$ratio_{fsl}$	-	FSL935 from H1-10	6.8e-07	428179.5
-	$u(ratio_{f}sl)$	XFER 1R	1.1e-07	305.0
-	$u1(ratio_{f}sl)$	XFER 10	1.5e-07	inf
-	$u2(ratio_{f}sl)$	XFER 100	2.7e-08	4096.0
-	$u3(ratio_{f}sl)$	XFER 1k	3.1e-08	inf
-	$u4(ratio_{f}sl)$	SR104 U	6.5e-07	inf
$ratio_{fsl10k}$	-	DCC ratio for FSL935-10k	1.0e-06	inf
-	$u(ratio_{f}sl10k)$	XFER 10k FSL	4.1e-07	inf
-	$u1(ratio_{f}sl10k)$	SR104 U	6.5e-07	inf
-	$u2(ratio_{f}sl10k)$	SR104 U T2	6.5e-07	inf
$ratio_{mmln4221}$	-	DCC ratio for MM LN4221 0.1R, +23.12°C	7.1e-07	141825.7
-	$u(ratio_{m}mln4221)$	XFER 1R	2.3e-07	1616.0
-	$u1(ratio_{m}mln4221)$	XFER 10R	1.5e-07	inf
-	$u2(ratio_{m}mln4221)$	XFER 100R	2.7e-08	inf
-	$u3(ratio_{m}mln4221)$	XFER 1k	3.1e-08	inf
-	$u4(ratio_{m}mln4221)$	SR104 U	6.5e-07	inf
-	$u5(ratio_{m}mln4221)$	XFER 0.1R	8.7e-08	inf
$ratio_{pp}$	-	DCC ratio of PP to FSL935	2.0e-07	3537.6
-	$u(ratio_{p}p)$	XFER PP1R	4.5e-09	3525.0
-	$u1(ratio_{p}p)$	XFER FSL1	1.1e-07	333.0
-	$u2(ratio_{p}p)$	Hulk 10r	1.5e-07	inf
-	$u3(ratio_{p}p)$	XFER 100	2.7e-08	4096.0
-	$u4(ratio_{p}p)$	XFER 1k	3.1e-08	1579.0
-	$u5(ratio_{p}p)$	SR104 U	6.5e-08	inf
$ratio_{pph1}$	-	DCC ratio from Hulk1 10R to PP1R	6.7e-07	3740928.9

Variable	Component	Description	Standard Uncertainty	Deg. Freedom
-	$u1(ratio_{p}ph1)$	pp1h	4.2e-08	60.0
-	$u2(ratio_{p}ph1)$	10	1.5e-07	inf
-	$u3(ratio_{p}ph1)$	100	2.7e-08	4096.0
-	$u4(ratio_{p}ph1)$	1k	3.1e-08	1579.0
-	$u5(ratio_{p}ph1)$	SR104U	6.5e-07	inf

Sensitivity Coefficients

R_REF_

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	1.0	100.00%	1.00	100.00%
R_2	0.0	0.00%	2.9e-08	0.00%
$ratio$	0.0	0.00%	0.000022 Ω	0.00%
$ratio_{2}$	0.0	0.00%	0.000022 Ω	0.00%
$ratio_{10}$	0.0	0.00%	0.000022 Ω	0.00%
$ratio_{100}$	0.0	0.00%	0.000022 Ω	0.00%
$ratio_{cm}$	0.0	0.00%	0.000016 Ω	0.00%
$ratio_{fsl}$	0.0	0.00%	0.000021 Ω	0.00%
$ratio_{fsl10k}$	0.0	0.00%	0.000014 Ω	0.00%
$ratio_{mmln4221}$	0.0	0.00%	0.000020 Ω	0.00%
$ratio_{pp}$	0.0	0.00%	0.000073 Ω	0.00%
$ratio_{pph1}$	0.0	0.00%	0.000022 Ω	0.00%

R_REF2

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	0.0	0.00%	2.0e-08	0.00%
R_2	1.0	100.00%	1.0	100.00%
$ratio$	0.0	0.00%	0.000020 Ω	0.00%
$ratio_{2}$	0.0	0.00%	0.000020 Ω	0.00%
$ratio_{10}$	0.0	0.00%	0.000019 Ω	0.00%
$ratio_{100}$	0.0	0.00%	0.000020 Ω	0.00%
$ratio_{cm}$	0.0	0.00%	0.000014 Ω	0.00%
$ratio_{fsl}$	0.0	0.00%	0.000019 Ω	0.00%
$ratio_{fsl10k}$	0.0	0.00%	0.000013 Ω	0.00%
$ratio_{mmln4221}$	0.0	0.00%	0.000018 Ω	0.00%
$ratio_{pp}$	0.0	0.00%	0.000064 Ω	0.00%
$ratio_{pph1}$	0.0	0.00%	0.000019 Ω	0.00%

R_1k

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	0.10	49.95%	0.100	49.73%

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R_2	0.0	0.00%	3.2e-09	0.00%
ratio	-100.0 Ω	50.05%	100.2 Ω	50.05%
$ratio_2$	0.0	0.00%	2.4e-06 Ω	0.00%
$ratio_{10}$	0.0	0.00%	2.4e-06 Ω	0.00%
$ratio_{100}$	0.0	0.00%	2.4e-06 Ω	0.00%
$ratio_{cm}$	0.0	0.00%	1.7e-06 Ω	0.00%
$ratio_{fsl}$	0.0	0.00%	2.4e-06 Ω	0.00%
$ratio_{fsl10k}$	0.0	0.00%	1.6e-06 Ω	0.00%
$ratio_{mmln4221}$	0.0	0.00%	2.2e-06 Ω	0.00%
$ratio_{pp}$	0.0	0.00%	8.0e-06 Ω	0.00%
$ratio_{pph1}$	0.0	0.00%	2.4e-06 Ω	0.00%

R_1k_T2

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	0.0	0.00%	2.4e-09	0.00%
R_2	0.10	37.09%	0.10	37.13%
ratio	0.0	0.00%	2.4e-06 Ω	0.00%
$ratio_2$	-100.0 Ω	62.91%	100.0 Ω	62.82%
$ratio_{10}$	0.0	0.00%	2.4e-06 Ω	0.00%
$ratio_{100}$	0.0	0.00%	2.4e-06 Ω	0.00%
$ratio_{cm}$	0.0	0.00%	1.7e-06 Ω	0.00%
$ratio_{fsl}$	0.0	0.00%	2.4e-06 Ω	0.00%
$ratio_{fsl10k}$	0.0	0.00%	1.6e-06 Ω	0.00%
$ratio_{mmln4221}$	0.0	0.00%	2.2e-06 Ω	0.00%
$ratio_{pp}$	0.0	0.00%	8.0e-06 Ω	0.00%
$ratio_{pph1}$	0.0	0.00%	2.4e-06 Ω	0.00%

R_CMDUCK

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	0.50	8.61%	0.50	8.58%
R_2	0.50	5.09%	0.50	5.09%
ratio	-500.0 Ω	8.63%	500.8 Ω	8.64%
$ratio_2$	-500.0 Ω	8.64%	499.9 Ω	8.62%
$ratio_{10}$	0.0	0.00%	0.000019 Ω	0.00%
$ratio_{100}$	0.0	0.00%	0.000020 Ω	0.00%
$ratio_{cm}$	1000.0 Ω	69.04%	1000.3 Ω	68.93%
$ratio_{fsl}$	0.0	0.00%	0.000019 Ω	0.00%
$ratio_{fsl10k}$	0.0	0.00%	0.000013 Ω	0.00%
$ratio_{mmln4221}$	0.0	0.00%	0.000018 Ω	0.00%
$ratio_{pp}$	0.0	0.00%	0.000064 Ω	0.00%
$ratio_{pph1}$	0.0	0.00%	0.000019 Ω	0.00%

R_FSL10k

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	0.50	7.59%	0.50	7.57%
R_2	0.50	4.49%	0.50	4.49%
$ratio$	-500.0 Ω	7.60%	500.8 Ω	7.62%
$ratio_2$	-500.0 Ω	7.62%	499.9 Ω	7.60%
$ratio_{10}$	0.0	0.00%	0.000041 Ω	0.00%
$ratio_{100}$	0.0	0.00%	0.000042 Ω	0.00%
$ratio_{cm}$	0.0	0.00%	0.000030 Ω	0.00%
$ratio_{fsl}$	0.0	0.00%	0.000040 Ω	0.00%
$ratio_{fsl10k}$	1000.0 Ω	72.71%	1000.1 Ω	72.63%
$ratio_{mmln4221}$	0.0	0.00%	0.000038 Ω	0.00%
$ratio_{pp}$	0.0	0.00%	0.00014 Ω	0.00%
$ratio_{pph1}$	0.0	0.00%	0.000041 Ω	0.00%

R100

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	0.010	33.27%	0.0100	33.25%
R_2	0.0	0.00%	1.7e-10	0.00%
$ratio$	-10.0 Ω	33.34%	10.0 Ω	33.46%
$ratio_2$	0.0	0.00%	1.3e-07 Ω	0.00%
$ratio_{10}$	0.0	0.00%	1.3e-07 Ω	0.00%
$ratio_{100}$	-10.0 Ω	33.39%	10.0 Ω	33.31%
$ratio_{cm}$	0.0	0.00%	9.3e-08 Ω	0.00%
$ratio_{fsl}$	0.0	0.00%	1.3e-07 Ω	0.00%
$ratio_{fsl10k}$	0.0	0.00%	8.5e-08 Ω	0.00%
$ratio_{mmln4221}$	0.0	0.00%	1.2e-07 Ω	0.00%
$ratio_{pp}$	0.0	0.00%	4.3e-07 Ω	0.00%
$ratio_{pph1}$	0.0	0.00%	1.3e-07 Ω	0.00%

R_10

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	0.0010	24.62%	0.00100	24.59%
R_2	0.0	0.00%	7.1e-12	0.00%
$ratio$	-1.0 Ω	24.68%	1.0 Ω	24.75%
$ratio_2$	0.0	0.00%	5.5e-09 Ω	0.00%
$ratio_{10}$	-1.0 Ω	25.99%	1.00 Ω	25.94%
$ratio_{100}$	-1.0 Ω	24.72%	1.00 Ω	24.64%
$ratio_{cm}$	0.0	0.00%	3.9e-09 Ω	0.00%
$ratio_{fsl}$	0.0	0.00%	5.2e-09 Ω	0.00%
$ratio_{fsl10k}$	0.0	0.00%	3.5e-09 Ω	0.00%
$ratio_{mmln4221}$	0.0	0.00%	5.0e-09 Ω	0.00%
$ratio_{pp}$	0.0	0.00%	1.8e-08 Ω	0.00%
$ratio_{pph1}$	0.0	0.00%	5.3e-09 Ω	0.00%

R_FSL935

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	0.00010	19.43%	0.000100	19.38%
R_2	0.0	0.00%	4.9e-12	0.00%
$ratio$	-0.10 Ω	19.48%	0.10 Ω	19.51%
$ratio_2$	0.0	0.00%	3.8e-09 Ω	0.00%
$ratio_{10}$	-0.10 Ω	20.51%	0.100 Ω	20.44%
$ratio_{100}$	-0.10 Ω	19.51%	0.100 Ω	19.42%
$ratio_{cm}$	0.0	0.00%	2.7e-09 Ω	0.00%
$ratio_{fsl}$	-0.10 Ω	21.07%	0.10 Ω	21.06%
$ratio_{fsl10k}$	0.0	0.00%	2.4e-09 Ω	0.00%
$ratio_{mmln4221}$	0.0	0.00%	3.4e-09 Ω	0.00%
$ratio_{pp}$	0.0	0.00%	1.2e-08 Ω	0.00%
$ratio_{pph1}$	0.0	0.00%	3.7e-09 Ω	0.00%

R_PP

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	0.000100	6.86%	0.000100	6.86%
R_2	0.0	0.00%	4.0e-12	0.00%
$ratio$	-0.10 Ω	6.87%	0.10 Ω	6.90%
$ratio_2$	0.0	0.00%	3.1e-09 Ω	0.00%
$ratio_{10}$	-0.10 Ω	7.24%	0.100 Ω	7.23%
$ratio_{100}$	-0.10 Ω	6.88%	0.100 Ω	6.87%
$ratio_{cm}$	0.0	0.00%	2.2e-09 Ω	0.00%
$ratio_{fsl}$	-0.10 Ω	7.43%	0.10 Ω	7.45%
$ratio_{fsl10k}$	0.0	0.00%	2.0e-09 Ω	0.00%
$ratio_{mmln4221}$	0.0	0.00%	2.8e-09 Ω	0.00%
$ratio_{pp}$	1.0 Ω	64.72%	1.00 Ω	64.65%
$ratio_{pph1}$	0.0	0.00%	3.0e-09 Ω	0.00%

R_PPH1

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	0.000100	19.53%	0.000100	19.51%
R_2	0.0	0.00%	6.7e-12	0.00%
$ratio$	-0.10 Ω	19.57%	0.10 Ω	19.63%
$ratio_2$	0.0	0.00%	5.1e-09 Ω	0.00%
$ratio_{10}$	-0.10 Ω	20.61%	0.100 Ω	20.57%
$ratio_{100}$	-0.10 Ω	19.60%	0.100 Ω	19.55%
$ratio_{cm}$	0.0	0.00%	3.6e-09 Ω	0.00%
$ratio_{fsl}$	0.0	0.00%	4.9e-09 Ω	0.00%
$ratio_{fsl10k}$	0.0	0.00%	3.3e-09 Ω	0.00%
$ratio_{mmln4221}$	0.0	0.00%	4.7e-09 Ω	0.00%
$ratio_{pp}$	0.0	0.00%	1.7e-08 Ω	0.00%
$ratio_{pph1}$	-0.100 Ω	20.69%	0.100 Ω	20.67%

R_MMLN4221

Variable	GUM Sensitivity	GUM Proportion	MC Sensitivity	MC Proportion
R	1.0e-05	15.75%	1.0e-05	15.70%
R_2	0.0	0.00%	8.3e-14	0.00%
$ratio$	-0.010 Ω	15.79%	0.010 Ω	15.80%
$ratio_2$	0.0	0.00%	6.4e-11 Ω	0.00%
$ratio_{10}$	-0.0100 Ω	16.63%	0.0100 Ω	16.56%
$ratio_{100}$	-0.0100 Ω	15.82%	0.0100 Ω	15.73%
$ratio_{cm}$	0.0	0.00%	4.5e-11 Ω	0.00%
$ratio_{fsl}$	-0.0100 Ω	17.08%	0.010 Ω	17.06%
$ratio_{fsl10k}$	0.0	0.00%	4.1e-11 Ω	0.00%
$ratio_{mmln4221}$	-0.0100 Ω	18.93%	0.0100 Ω	18.85%
$ratio_{pp}$	0.0	0.00%	2.1e-10 Ω	0.00%
$ratio_{pph1}$	0.0	0.00%	6.2e-11 Ω	0.00%

Expanded Uncertainties

GUM Approximation

Function	Interval	Min	Max	k	Deg. Freedom	Expanded Uncertainty
R_{REF}	99%	10000 Ω	10000 Ω	2.576	inf	0.0017 Ω
-	95%	10000 Ω	10000 Ω	1.960	inf	0.0013 Ω
-	68%	10000 Ω	10000 Ω	0.994	inf	0.00065 Ω
R_{REF2}	99%	10000 Ω	10000 Ω	2.576	inf	0.0013 Ω
-	95%	10000 Ω	10000 Ω	1.960	inf	0.00098 Ω
-	68%	10000 Ω	10000 Ω	0.994	inf	0.00050 Ω
R_{1k}	99%	1000 Ω	1000 Ω	2.576	1305544786.25	0.00024 Ω
-	95%	1000 Ω	1000 Ω	1.960	1305544786.25	0.00018 Ω
-	68%	1000 Ω	1000 Ω	0.994	1305544786.25	0.000091 Ω
R_{1kT2}	99%	1000 Ω	1000 Ω	2.576	inf	0.00021 Ω
-	95%	1000 Ω	1000 Ω	1.960	inf	0.00016 Ω
-	68%	1000 Ω	1000 Ω	0.994	inf	0.000082 Ω
R_{CMDUCK}	99%	10000 Ω	10000 Ω	2.576	122538273.41	0.0029 Ω
-	95%	10000 Ω	10000 Ω	1.960	122538273.41	0.0022 Ω
-	68%	10000 Ω	10000 Ω	0.994	122538273.41	0.0011 Ω
R_{FSL10k}	99%	10000 Ω	10000 Ω	2.576	56585304516.73	0.0030 Ω
-	95%	10000 Ω	10000 Ω	1.960	56585304516.73	0.0023 Ω
-	68%	10000 Ω	10000 Ω	0.994	56585304516.73	0.0012 Ω
R_{100}	99%	100 Ω	100 Ω	2.576	2408282652.10	0.000029 Ω
-	95%	100 Ω	100 Ω	1.960	2408282652.10	0.000022 Ω
-	68%	100 Ω	100 Ω	0.994	2408282652.10	0.000011 Ω
R_{10}	99%	10 Ω	10 Ω	2.576	25179230.33	3.4e-06 Ω
-	95%	10 Ω	10 Ω	1.960	25179230.33	2.6e-06 Ω
-	68%	10 Ω	10 Ω	0.994	25179230.33	1.3e-06 Ω
R_{FSL935}	99%	1.0 Ω	1.0 Ω	2.576	7785363.55	3.8e-07 Ω
-	95%	1.0 Ω	1.0 Ω	1.960	7785363.55	2.9e-07 Ω
-	68%	1.0 Ω	1.0 Ω	0.994	7785363.55	1.5e-07 Ω
R_{PP}	99%	1.00 Ω	1.00 Ω	2.576	8444.55	6.4e-07 Ω
-	95%	1.00 Ω	1.00 Ω	1.960	8444.55	4.9e-07 Ω
-	68%	1.00 Ω	1.00 Ω	0.995	8444.55	2.5e-07 Ω
R_{PPH1}	99%	1.00 Ω	1.00 Ω	2.576	27454495.01	3.8e-07 Ω
-	95%	1.00 Ω	1.00 Ω	1.960	27454495.01	2.9e-07 Ω
-	68%	1.00 Ω	1.00 Ω	0.994	27454495.01	1.5e-07 Ω

Function	Interval	Min	Max	k	Deg. Freedom	Expanded Uncertainty
$R_{MMLN4221}$	99%	0.100 Ω	0.100 Ω	2.576	2966861.96	4.2e-08 Ω
-	95%	0.100 Ω	0.100 Ω	1.960	2966861.96	3.2e-08 Ω
-	68%	0.100 Ω	0.100 Ω	0.994	2966861.96	1.6e-08 Ω

Monte Carlo

Symmetric Coverage Intervals

Function	Interval	Min	Max	k
R_{REF}	99%	10000 Ω	10000 Ω	2.573
-	95%	10000 Ω	10000 Ω	1.962
-	68%	10000 Ω	10000 Ω	0.994
R_{REF2}	99%	10000 Ω	10000 Ω	2.577
-	95%	10000 Ω	10000 Ω	1.960
-	68%	10000 Ω	10000 Ω	0.995
R_{1k}	99%	1000 Ω	1000 Ω	2.575
-	95%	1000 Ω	1000 Ω	1.962
-	68%	1000 Ω	1000 Ω	0.994
R_{1kT2}	99%	1000 Ω	1000 Ω	2.572
-	95%	1000 Ω	1000 Ω	1.959
-	68%	1000 Ω	1000 Ω	0.994
R_{CMDUCK}	99%	10000 Ω	10000 Ω	2.580
-	95%	10000 Ω	10000 Ω	1.959
-	68%	10000 Ω	10000 Ω	0.995
R_{FSL10k}	99%	10000 Ω	10000 Ω	2.574
-	95%	10000 Ω	10000 Ω	1.959
-	68%	10000 Ω	10000 Ω	0.995
R_{100}	99%	100 Ω	100 Ω	2.576
-	95%	100 Ω	100 Ω	1.959
-	68%	100 Ω	100 Ω	0.995
R_{10}	99%	10 Ω	10 Ω	2.577
-	95%	10 Ω	10 Ω	1.961
-	68%	10 Ω	10 Ω	0.994
R_{FSL935}	99%	1.0 Ω	1.0 Ω	2.574
-	95%	1.0 Ω	1.0 Ω	1.960
-	68%	1.0 Ω	1.0 Ω	0.995
R_{PP}	99%	1.00 Ω	1.00 Ω	2.581
-	95%	1.00 Ω	1.00 Ω	1.959
-	68%	1.00 Ω	1.00 Ω	0.995
R_{PPH1}	99%	1.00 Ω	1.00 Ω	2.577
-	95%	1.00 Ω	1.00 Ω	1.962
-	68%	1.00 Ω	1.00 Ω	0.993
$R_{MMLN4221}$	99%	0.100 Ω	0.100 Ω	2.574
-	95%	0.100 Ω	0.100 Ω	1.962
-	68%	0.100 Ω	0.100 Ω	0.993

GUM Derivation

Measurement Model:

$$R_{REF} = R$$

$$R_{REF2} = R_2$$

$$R_{1k} = \frac{R_{REF}}{ratio}$$

$$R_{1kT2} = \frac{R_{REF2}}{ratio_2}$$

$$R_{CMDUCK} = ratio_{cm}\left(\frac{R_{1k}}{2} + \frac{R_{1kT2}}{2}\right)$$

$$R_{FSL10k} = ratio_{fsl10k}\left(\frac{R_{1k}}{2} + \frac{R_{1kT2}}{2}\right)$$

$$R_{100} = \frac{R_{1k}}{ratio_{100}}$$

$$R_{10} = \frac{R_{100}}{ratio_{10}}$$

$$R_{FSL935} = \frac{R_{10}}{ratio_{fsl}}$$

$$R_{PP} = R_{FSL935} ratio_{pp}$$

$$R_{PPH1} = \frac{R_{10}}{ratio_{pph1}}$$

$$R_{MMLN4221} = \frac{R_{FSL935}}{ratio_{mmln4221}}$$

Input Covariance Matrix [Ux]:

-	R	R_2	$ratio$	$ratio_2$	$ratio_{10}$	$ratio_{100}$	$ratio_{cm}$	$ratio_{fsl}$	$ratio_{fsl10k}$	$ratio_{mmln4221}$	$ratio_{pp}$	$ratio_{pph1}$
R	u_R^2	$\sigma_{RR2} u_R u_{R2}$	$\sigma_{Rratio} u_R u_{ratio}$	$\sigma_{Rratio2} u_R u_{ratio2}$	$\sigma_{Rratio10} u_R u_{ratio10}$	$\sigma_{Rratio100} u_R u_{ratio100}$	$\sigma_{Rratiocm} u_R u_{ratiocm}$	$\sigma_{Rratiofsl} u_R u_{ratiofsl}$	$\sigma_{Rratiofsl10k} u_R u_{ratiofsl10k}$	$\sigma_{Rratiommln4221} u_R u_{ratiommln4221}$	$\sigma_{Rratiopp} u_R u_{ratiopp}$	$\sigma_{Rratiopph1} u_R u_{ratiopph1}$
R_2	$\sigma_{RR2} u_R u_{R2}$	u_{R2}^2	$\sigma_{R2ratio} u_{R2} u_{ratio}$	$\sigma_{R2ratio2} u_{R2} u_{ratio2}$	$\sigma_{R2ratio10} u_{R2} u_{ratio10}$	$\sigma_{R2ratio100} u_{R2} u_{ratio100}$	$\sigma_{R2ratiocm} u_{R2} u_{ratiocm}$	$\sigma_{R2ratiofsl} u_{R2} u_{ratiofsl}$	$\sigma_{R2ratiofsl10k} u_{R2} u_{ratiofsl10k}$	$\sigma_{R2ratiommln4221} u_{R2} u_{ratiommln4221}$	$\sigma_{R2ratiopp} u_{R2} u_{ratiopp}$	$\sigma_{R2ratiopph1} u_{R2} u_{ratiopph1}$
$ratio$	$\sigma_{Rratio} u_R u_{ratio}$	$\sigma_{R2ratio} u_{R2} u_{ratio}$	u_{ratio}^2	$\sigma_{ratioratio2} u_{ratio} u_{ratio2}$	$\sigma_{ratioratio10} u_{ratio} u_{ratio10}$	$\sigma_{ratioratio100} u_{ratio} u_{ratio100}$	$\sigma_{ratioratiocm} u_{ratio} u_{ratiocm}$	$\sigma_{ratioratiofsl} u_{ratio} u_{ratiofsl}$	$\sigma_{ratioratiofsl10k} u_{ratio} u_{ratiofsl10k}$	$\sigma_{ratioratiommln4221} u_{ratio} u_{ratiommln4221}$	$\sigma_{ratioratiopp} u_{ratio} u_{ratiopp}$	$\sigma_{ratioratiopph1} u_{ratio} u_{ratiopph1}$
$ratio_2$	$\sigma_{Rratio2} u_R u_{ratio2}$	$\sigma_{R2ratio2} u_{R2} u_{ratio2}$	$\sigma_{ratioratio2} u_{ratio} u_{ratio2}$	u_{ratio2}^2	$\sigma_{ratio2ratio10} u_{ratio2} u_{ratio10}$	$\sigma_{ratio2ratio100} u_{ratio2} u_{ratio100}$	$\sigma_{ratio2ratiocm} u_{ratio2} u_{ratiocm}$	$\sigma_{ratio2ratiofsl} u_{ratio2} u_{ratiofsl}$	$\sigma_{ratio2ratiofsl10k} u_{ratio2} u_{ratiofsl10k}$	$\sigma_{ratio2ratiommln4221} u_{ratio2} u_{ratiommln4221}$	$\sigma_{ratio2ratiopp} u_{ratio2} u_{ratiopp}$	$\sigma_{ratio2ratiopph1} u_{ratio2} u_{ratiopph1}$
$ratio_{10}$	$\sigma_{Rratio10} u_R u_{ratio10}$	$\sigma_{R2ratio10} u_{R2} u_{ratio10}$	$\sigma_{ratioratio10} u_{ratio} u_{ratio10}$	$\sigma_{ratio2ratio10} u_{ratio2} u_{ratio10}$	$u_{ratio10}^2$	$\sigma_{ratio10ratio100} u_{ratio10} u_{ratio100}$	$\sigma_{ratio10ratiocm} u_{ratio10} u_{ratiocm}$	$\sigma_{ratio10ratiofsl} u_{ratio10} u_{ratiofsl}$	$\sigma_{ratio10ratiofsl10k} u_{ratio10} u_{ratiofsl10k}$	$\sigma_{ratio10ratiommln4221} u_{ratio10} u_{ratiommln4221}$	$\sigma_{ratio10ratiopp} u_{ratio10} u_{ratiopp}$	$\sigma_{ratio10ratiopph1} u_{ratio10} u_{ratiopph1}$
$ratio_{100}$	$\sigma_{Rratio100} u_R u_{ratio100}$	$\sigma_{R2ratio100} u_{R2} u_{ratio100}$	$\sigma_{ratioratio100} u_{ratio} u_{ratio100}$	$\sigma_{ratio2ratio100} u_{ratio2} u_{ratio100}$	$\sigma_{ratio10ratio100} u_{ratio10} u_{ratio100}$	$u_{ratio100}^2$	$\sigma_{ratio100ratiocm} u_{ratio100} u_{ratiocm}$	$\sigma_{ratio100ratiofsl} u_{ratio100} u_{ratiofsl}$	$\sigma_{ratio100ratiofsl10k} u_{ratio100} u_{ratiofsl10k}$	$\sigma_{ratio100ratiommln4221} u_{ratio100} u_{ratiommln4221}$	$\sigma_{ratio100ratiopp} u_{ratio100} u_{ratiopp}$	$\sigma_{ratio100ratiopph1} u_{ratio100} u_{ratiopph1}$
$ratio_{cm}$	$\sigma_{Rratiocm} u_R u_{ratiocm}$	$\sigma_{R2ratiocm} u_{R2} u_{ratiocm}$	$\sigma_{ratioratiocm} u_{ratio} u_{ratiocm}$	$\sigma_{ratio2ratiocm} u_{ratio2} u_{ratiocm}$	$\sigma_{ratio10ratiocm} u_{ratio10} u_{ratiocm}$	$\sigma_{ratio100ratiocm} u_{ratio100} u_{ratiocm}$	$u_{ratiocm}^2$	$\sigma_{ratiocmratiofsl} u_{ratiocm} u_{ratiofsl}$	$\sigma_{ratiocmratiofsl10k} u_{ratiocm} u_{ratiofsl10k}$	$\sigma_{ratiocmratiommln4221} u_{ratiocm} u_{ratiommln4221}$	$\sigma_{ratiocmratiopp} u_{ratiocm} u_{ratiopp}$	$\sigma_{ratiocmratiopph1} u_{ratiocm} u_{ratiopph1}$
$ratio_{fsl}$	$\sigma_{Rratiofsl} u_R u_{ratiofsl}$	$\sigma_{R2ratiofsl} u_{R2} u_{ratiofsl}$	$\sigma_{ratioratiofsl} u_{ratio} u_{ratiofsl}$	$\sigma_{ratio2ratiofsl} u_{ratio2} u_{ratiofsl}$	$\sigma_{ratio10ratiofsl} u_{ratio10} u_{ratiofsl}$	$\sigma_{ratio100ratiofsl} u_{ratio100} u_{ratiofsl}$	$\sigma_{ratiocmratiofsl} u_{ratiocm} u_{ratiofsl}$	$u_{ratiofsl}^2$	$\sigma_{ratiofslratiofsl10k} u_{ratiofsl} u_{ratiofsl10k}$	$\sigma_{ratiofslratiommln4221} u_{ratiofsl} u_{ratiommln4221}$	$\sigma_{ratiofslratiopp} u_{ratiofsl} u_{ratiopp}$	$\sigma_{ratiofslratiopph1} u_{ratiofsl} u_{ratiopph1}$
$ratio_{fsl10k}$	$\sigma_{Rratiofsl10k} u_R u_{ratiofsl10k}$	$\sigma_{R2ratiofsl10k} u_{R2} u_{ratiofsl10k}$	$\sigma_{ratioratiofsl10k} u_{ratio} u_{ratiofsl10k}$	$\sigma_{ratio2ratiofsl10k} u_{ratio2} u_{ratiofsl10k}$	$\sigma_{ratio10ratiofsl10k} u_{ratio10} u_{ratiofsl10k}$	$\sigma_{ratio100ratiofsl10k} u_{ratio100} u_{ratiofsl10k}$	$\sigma_{ratiocmratiofsl10k} u_{ratiocm} u_{ratiofsl10k}$	$\sigma_{ratiofslratiofsl10k} u_{ratiofsl} u_{ratiofsl10k}$	$u_{ratiofsl10k}^2$	$\sigma_{ratiofsl10kratiommln4221} u_{ratiofsl10k} u_{ratiommln4221}$	$\sigma_{ratiofsl10kratiopp} u_{ratiofsl10k} u_{ratiopp}$	$\sigma_{ratiofsl10kratiopph1} u_{ratiofsl10k} u_{ratiopph1}$
$ratio_{mmln4221}$	$\sigma_{Rratiommln4221} u_R u_{ratiommln4221}$	$\sigma_{R2ratiommln4221} u_{R2} u_{ratiommln4221}$	$\sigma_{ratioratiommln4221} u_{ratio} u_{ratiommln4221}$	$\sigma_{ratio2ratiommln4221} u_{ratio2} u_{ratiommln4221}$	$\sigma_{ratio10ratiommln4221} u_{ratio10} u_{ratiommln4221}$	$\sigma_{ratio100ratiommln4221} u_{ratio100} u_{ratiommln4221}$	$\sigma_{ratiocmratiommln4221} u_{ratiocm} u_{ratiommln4221}$	$\sigma_{ratiofslratiommln4221} u_{ratiofsl} u_{ratiommln4221}$	$\sigma_{ratiofsl10kratiommln4221} u_{ratiofsl10k} u_{ratiommln4221}$	$u_{ratiommln4221}^2$	$\sigma_{ratiommln4221ratiopp} u_{ratiommln4221} u_{ratiopp}$	$\sigma_{ratiommln4221ratiopph1} u_{ratiommln4221} u_{ratiopph1}$
$ratio_{pp}$	$\sigma_{Rratiopp} u_R u_{ratiopp}$	$\sigma_{R2ratiopp} u_{R2} u_{ratiopp}$	$\sigma_{ratioratiopp} u_{ratio} u_{ratiopp}$	$\sigma_{ratio2ratiopp} u_{ratio2} u_{ratiopp}$	$\sigma_{ratio10ratiopp} u_{ratio10} u_{ratiopp}$	$\sigma_{ratio100ratiopp} u_{ratio100} u_{ratiopp}$	$\sigma_{ratiocmratiopp} u_{ratiocm} u_{ratiopp}$	$\sigma_{ratiofslratiopp} u_{ratiofsl} u_{ratiopp}$	$\sigma_{ratiofsl10kratiopp} u_{ratiofsl10k} u_{ratiopp}$	$\sigma_{ratiommln4221ratiopp} u_{ratiommln4221} u_{ratiopp}$	$u_{ratiopp}^2$	$\sigma_{ratioppratiopph1} u_{ratiopp} u_{ratiopph1}$
$ratio_{pph1}$	$\sigma_{Rratiopph1} u_R u_{ratiopph1}$	$\sigma_{R2ratiopph1} u_{R2} u_{ratiopph1}$	$\sigma_{ratioratiopph1} u_{ratio} u_{ratiopph1}$	$\sigma_{ratio2ratiopph1} u_{ratio2} u_{ratiopph1}$	$\sigma_{ratio10ratiopph1} u_{ratio10} u_{ratiopph1}$	$\sigma_{ratio100ratiopph1} u_{ratio100} u_{ratiopph1}$	$\sigma_{ratiocmratiopph1} u_{ratiocm} u_{ratiopph1}$	$\sigma_{ratiofslratiopph1} u_{ratiofsl} u_{ratiopph1}$	$\sigma_{ratiofsl10kratiopph1} u_{ratiofsl10k} u_{ratiopph1}$	$\sigma_{ratiommln4221ratiopph1} u_{ratiommln4221} u_{ratiopph1}$	$\sigma_{ratioppratiopph1} u_{ratiopp} u_{ratiopph1}$	$u_{ratiopph1}^2$

-	R	R_2	$ratio$	$ratio_2$	$ratio_{10}$	$ratio_{100}$	$ratio_{cm}$	$ratio_{fsl}$	$ratio_{fsl10k}$	$ratio_{mmln4221}$	$ratio_{pp}$	$ratio_{pph1}$
R	4.2e-07 Ω^2	0.0 Ω^2	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω
R_2	0.0 Ω^2	2.5e-07 Ω^2	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω	0.0 Ω
$ratio$	0.0 Ω	0.0 Ω	4.2e-13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$ratio_2$	0.0 Ω	0.0 Ω	0.0	4.2e-13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$ratio_{10}$	0.0 Ω	0.0 Ω	0.0	0.0	4.5e-13	0.0	0.0	0.0	0.0	0.0	0.0	0.0
$ratio_{100}$	0.0 Ω	0.0 Ω	0.0	0.0	0.0	4.2e-13	0.0	0.0	0.0	0.0	0.0	0.0
$ratio_{cm}$	0.0 Ω	0.0 Ω	0.0	0.0	0.0	0.0	8.5e-13	0.0	0.0	0.0	0.0	0.0
$ratio_{fsl}$	0.0 Ω	0.0 Ω	0.0	0.0	0.0	0.0	0.0	4.6e-13	0.0	0.0	0.0	0.0
$ratio_{fsl10k}$	0.0 Ω	0.0 Ω	0.0	0.0	0.0	0.0	0.0	0.0	1.0e-12	0.0	0.0	0.0
$ratio_{mmln4221}$	0.0 Ω	0.0 Ω	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1e-13	0.0	0.0
$ratio_{pp}$	0.0 Ω	0.0 Ω	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0e-14	0.0
$ratio_{pph1}$	0.0 Ω	0.0 Ω	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5e-13

Sensitivity Matrix [Cx]:

-	R	R_2	ratio	$ratio_2$	$ratio_{10}$	$ratio_{100}$	$ratio_{cm}$	$ratio_{fsl}$	$ratio_{fsl10k}$	$ratio_{mmln4221}$	$ratio_{pp}$	$ratio_{pph1}$
R_{REF}	$\frac{\partial}{\partial R}R_{REF}$	$\frac{\partial}{\partial R_2}R_{REF}$	$\frac{\partial}{\partial ratio}R_{REF}$	$\frac{\partial}{\partial ratio_2}R_{REF}$	$\frac{\partial}{\partial ratio_{10}}R_{REF}$	$\frac{\partial}{\partial ratio_{100}}R_{REF}$	$\frac{\partial}{\partial ratio_{cm}}R_{REF}$	$\frac{\partial}{\partial ratio_{fsl}}R_{REF}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{REF}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{REF}$	$\frac{\partial}{\partial ratio_{pp}}R_{REF}$	$\frac{\partial}{\partial ratio_{pph1}}R_{REF}$
R_{REF2}	$\frac{\partial}{\partial R}R_{REF2}$	$\frac{\partial}{\partial R_2}R_{REF2}$	$\frac{\partial}{\partial ratio}R_{REF2}$	$\frac{\partial}{\partial ratio_2}R_{REF2}$	$\frac{\partial}{\partial ratio_{10}}R_{REF2}$	$\frac{\partial}{\partial ratio_{100}}R_{REF2}$	$\frac{\partial}{\partial ratio_{cm}}R_{REF2}$	$\frac{\partial}{\partial ratio_{fsl}}R_{REF2}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{REF2}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{REF2}$	$\frac{\partial}{\partial ratio_{pp}}R_{REF2}$	$\frac{\partial}{\partial ratio_{pph1}}R_{REF2}$
R_{1k}	$\frac{\partial}{\partial R}R_{1k}$	$\frac{\partial}{\partial R_2}R_{1k}$	$\frac{\partial}{\partial ratio}R_{1k}$	$\frac{\partial}{\partial ratio_2}R_{1k}$	$\frac{\partial}{\partial ratio_{10}}R_{1k}$	$\frac{\partial}{\partial ratio_{100}}R_{1k}$	$\frac{\partial}{\partial ratio_{cm}}R_{1k}$	$\frac{\partial}{\partial ratio_{fsl}}R_{1k}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{1k}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{1k}$	$\frac{\partial}{\partial ratio_{pp}}R_{1k}$	$\frac{\partial}{\partial ratio_{pph1}}R_{1k}$
R_{1kT2}	$\frac{\partial}{\partial R}R_{1kT2}$	$\frac{\partial}{\partial R_2}R_{1kT2}$	$\frac{\partial}{\partial ratio}R_{1kT2}$	$\frac{\partial}{\partial ratio_2}R_{1kT2}$	$\frac{\partial}{\partial ratio_{10}}R_{1kT2}$	$\frac{\partial}{\partial ratio_{100}}R_{1kT2}$	$\frac{\partial}{\partial ratio_{cm}}R_{1kT2}$	$\frac{\partial}{\partial ratio_{fsl}}R_{1kT2}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{1kT2}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{1kT2}$	$\frac{\partial}{\partial ratio_{pp}}R_{1kT2}$	$\frac{\partial}{\partial ratio_{pph1}}R_{1kT2}$
R_{CMDUCK}	$\frac{\partial}{\partial R}R_{CMDUCK}$	$\frac{\partial}{\partial R_2}R_{CMDUCK}$	$\frac{\partial}{\partial ratio}R_{CMDUCK}$	$\frac{\partial}{\partial ratio_2}R_{CMDUCK}$	$\frac{\partial}{\partial ratio_{10}}R_{CMDUCK}$	$\frac{\partial}{\partial ratio_{100}}R_{CMDUCK}$	$\frac{\partial}{\partial ratio_{cm}}R_{CMDUCK}$	$\frac{\partial}{\partial ratio_{fsl}}R_{CMDUCK}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{CMDUCK}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{CMDUCK}$	$\frac{\partial}{\partial ratio_{pp}}R_{CMDUCK}$	$\frac{\partial}{\partial ratio_{pph1}}R_{CMDUCK}$
R_{FSL10k}	$\frac{\partial}{\partial R}R_{FSL10k}$	$\frac{\partial}{\partial R_2}R_{FSL10k}$	$\frac{\partial}{\partial ratio}R_{FSL10k}$	$\frac{\partial}{\partial ratio_2}R_{FSL10k}$	$\frac{\partial}{\partial ratio_{10}}R_{FSL10k}$	$\frac{\partial}{\partial ratio_{100}}R_{FSL10k}$	$\frac{\partial}{\partial ratio_{cm}}R_{FSL10k}$	$\frac{\partial}{\partial ratio_{fsl}}R_{FSL10k}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{FSL10k}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{FSL10k}$	$\frac{\partial}{\partial ratio_{pp}}R_{FSL10k}$	$\frac{\partial}{\partial ratio_{pph1}}R_{FSL10k}$
R_{100}	$\frac{\partial}{\partial R}R_{100}$	$\frac{\partial}{\partial R_2}R_{100}$	$\frac{\partial}{\partial ratio}R_{100}$	$\frac{\partial}{\partial ratio_2}R_{100}$	$\frac{\partial}{\partial ratio_{10}}R_{100}$	$\frac{\partial}{\partial ratio_{100}}R_{100}$	$\frac{\partial}{\partial ratio_{cm}}R_{100}$	$\frac{\partial}{\partial ratio_{fsl}}R_{100}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{100}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{100}$	$\frac{\partial}{\partial ratio_{pp}}R_{100}$	$\frac{\partial}{\partial ratio_{pph1}}R_{100}$
R_{10}	$\frac{\partial}{\partial R}R_{10}$	$\frac{\partial}{\partial R_2}R_{10}$	$\frac{\partial}{\partial ratio}R_{10}$	$\frac{\partial}{\partial ratio_2}R_{10}$	$\frac{\partial}{\partial ratio_{10}}R_{10}$	$\frac{\partial}{\partial ratio_{100}}R_{10}$	$\frac{\partial}{\partial ratio_{cm}}R_{10}$	$\frac{\partial}{\partial ratio_{fsl}}R_{10}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{10}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{10}$	$\frac{\partial}{\partial ratio_{pp}}R_{10}$	$\frac{\partial}{\partial ratio_{pph1}}R_{10}$
R_{FSL935}	$\frac{\partial}{\partial R}R_{FSL935}$	$\frac{\partial}{\partial R_2}R_{FSL935}$	$\frac{\partial}{\partial ratio}R_{FSL935}$	$\frac{\partial}{\partial ratio_2}R_{FSL935}$	$\frac{\partial}{\partial ratio_{10}}R_{FSL935}$	$\frac{\partial}{\partial ratio_{100}}R_{FSL935}$	$\frac{\partial}{\partial ratio_{cm}}R_{FSL935}$	$\frac{\partial}{\partial ratio_{fsl}}R_{FSL935}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{FSL935}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{FSL935}$	$\frac{\partial}{\partial ratio_{pp}}R_{FSL935}$	$\frac{\partial}{\partial ratio_{pph1}}R_{FSL935}$
R_{PP}	$\frac{\partial}{\partial R}R_{PP}$	$\frac{\partial}{\partial R_2}R_{PP}$	$\frac{\partial}{\partial ratio}R_{PP}$	$\frac{\partial}{\partial ratio_2}R_{PP}$	$\frac{\partial}{\partial ratio_{10}}R_{PP}$	$\frac{\partial}{\partial ratio_{100}}R_{PP}$	$\frac{\partial}{\partial ratio_{cm}}R_{PP}$	$\frac{\partial}{\partial ratio_{fsl}}R_{PP}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{PP}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{PP}$	$\frac{\partial}{\partial ratio_{pp}}R_{PP}$	$\frac{\partial}{\partial ratio_{pph1}}R_{PP}$
R_{PPH1}	$\frac{\partial}{\partial R}R_{PPH1}$	$\frac{\partial}{\partial R_2}R_{PPH1}$	$\frac{\partial}{\partial ratio}R_{PPH1}$	$\frac{\partial}{\partial ratio_2}R_{PPH1}$	$\frac{\partial}{\partial ratio_{10}}R_{PPH1}$	$\frac{\partial}{\partial ratio_{100}}R_{PPH1}$	$\frac{\partial}{\partial ratio_{cm}}R_{PPH1}$	$\frac{\partial}{\partial ratio_{fsl}}R_{PPH1}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{PPH1}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{PPH1}$	$\frac{\partial}{\partial ratio_{pp}}R_{PPH1}$	$\frac{\partial}{\partial ratio_{pph1}}R_{PPH1}$
$R_{MMLN4221}$	$\frac{\partial}{\partial R}R_{MMLN4221}$	$\frac{\partial}{\partial R_2}R_{MMLN4221}$	$\frac{\partial}{\partial ratio}R_{MMLN4221}$	$\frac{\partial}{\partial ratio_2}R_{MMLN4221}$	$\frac{\partial}{\partial ratio_{10}}R_{MMLN4221}$	$\frac{\partial}{\partial ratio_{100}}R_{MMLN4221}$	$\frac{\partial}{\partial ratio_{cm}}R_{MMLN4221}$	$\frac{\partial}{\partial ratio_{fsl}}R_{MMLN4221}$	$\frac{\partial}{\partial ratio_{fsl10k}}R_{MMLN4221}$	$\frac{\partial}{\partial ratio_{mmln4221}}R_{MMLN4221}$	$\frac{\partial}{\partial ratio_{pp}}R_{MMLN4221}$	$\frac{\partial}{\partial ratio_{pph1}}R_{MMLN4221}$

-	R	R_2	ratio	$ratio_2$	$ratio_{10}$	$ratio_{100}$	$ratio_{cm}$	$ratio_{fsl}$	$ratio_{fsl10k}$	$ratio_{mmln4221}$	$ratio_{pp}$	$ratio_{pph1}$
R_{REF}	1	0	0	0	0	0	0	0	0	0	0	0
R_{REF2}	0	1	0	0	0	0	0	0	0	0	0	0
R_{1k}	$\frac{1}{ratio}$	0	$-\frac{R}{ratio^2}$	0	0	0	0	0	0	0	0	0
R_{1kT2}	0	$\frac{1}{ratio_2}$	0	$-\frac{R_2}{ratio_2^2}$	0	0	0	0	0	0	0	0
R_{CMDUCK}	$\frac{ratio_{cm}}{2ratio}$	$\frac{ratio_{cm}}{2ratio_2}$	$-\frac{Rratio_{cm}}{2ratio^2}$	$-\frac{R_2 ratio_{cm}}{2ratio_2^2}$	0	0	$\frac{R}{2ratio}+\frac{R_2}{2ratio_2}$	0	0	0	0	0
R_{FSL10k}	$\frac{ratio_{fsl10k}}{2ratio}$	$\frac{ratio_{fsl10k}}{2ratio_2}$	$-\frac{Rratio_{fsl10k}}{2ratio^2}$	$-\frac{R_2 ratio_{fsl10k}}{2ratio_2^2}$	0	0	0	0	$\frac{R}{2ratio}+\frac{R_2}{2ratio_2}$	0	0	0
R_{100}	$\frac{1}{ratioratio_{100}}$	0	$-\frac{R}{ratio^2 ratio_{100}}$	0	0	$-\frac{R}{ratioratio_{100}^2}$	0	0	0	0	0	0
R_{10}	$\frac{1}{ratioratio_{10}ratio_{100}}$	0	$-\frac{R}{ratio^2 ratio_{10}ratio_{100}}$	0	$-\frac{R}{ratioratio_{10}^2 ratio_{100}}$	$-\frac{R}{ratioratio_{10}ratio_{100}^2}$	0	0	0	0	0	0
R_{FSL935}	$\frac{1}{ratioratio_{10}ratio_{100}ratio_{fsl}}$	0	$-\frac{R}{ratio^2 ratio_{10}ratio_{100}ratio_{fsl}}$	0	$-\frac{R}{ratioratio_{10}^2 ratio_{100}ratio_{fsl}}$	$-\frac{R}{ratioratio_{10}ratio_{100}^2 ratio_{fsl}}$	0	$-\frac{R}{ratioratio_{10}ratio_{100}ratio_{fsl}^2}$	0	0	0	0
R_{PP}	$\frac{ratio_{pp}}{ratioratio_{10}ratio_{100}ratio_{fsl}}$	0	$-\frac{Rratio_{pp}}{ratio^2 ratio_{10}ratio_{100}ratio_{fsl}}$	0	$-\frac{Rratio_{pp}}{ratioratio_{10}^2 ratio_{100}ratio_{fsl}}$	$-\frac{Rratio_{pp}}{ratioratio_{10}ratio_{100}^2 ratio_{fsl}}$	0	$-\frac{Rratio_{pp}}{ratioratio_{10}ratio_{100}ratio_{fsl}^2}$	0	0	$\frac{R}{ratioratio_{10}ratio_{100}ratio_{fsl}}$	0
R_{PPH1}	$\frac{1}{ratioratio_{10}ratio_{100}ratio_{pph1}}$	0	$-\frac{R}{ratio^2 ratio_{10}ratio_{100}ratio_{pph1}}$	0	$-\frac{R}{ratioratio_{10}^2 ratio_{100}ratio_{pph1}}$	$-\frac{R}{ratioratio_{10}ratio_{100}^2 ratio_{pph1}}$	0	0	0	0	0	$-\frac{R}{ratioratio_{10}ratio_{100}ratio_{pph1}^2}$
$R_{MMLN4221}$	$\frac{1}{ratioratio_{10}ratio_{100}ratio_{fsl}ratio_{mmln4221}}$	0	$-\frac{R}{ratio^2 ratio_{10}ratio_{100}ratio_{fsl}ratio_{mmln4221}}$	0	$-\frac{R}{ratioratio_{10}^2 ratio_{100}ratio_{fsl}ratio_{mmln4221}}$	$-\frac{R}{ratioratio_{10}ratio_{100}^2 ratio_{fsl}ratio_{mmln4221}}$	0	$-\frac{R}{ratioratio_{10}ratio_{100}ratio_{fsl}^2 ratio_{mmln4221}}$	0	$-\frac{R}{ratioratio_{10}ratio_{100}ratio_{fsl}ratio_{mmln4221}^2}$	0	0

-	R	R_2	ratio	$ratio_2$	$ratio_{10}$	$ratio_{100}$	$ratio_{cm}$	$ratio_{fsl}$	$ratio_{fsl10k}$	$ratio_{mmln4221}$	$ratio_{pp}$	$ratio_{pph1}$
R_{REF}	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
R_{REF2}	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
R_{1k}	0.10	0.0	-100 Ω	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
R_{1kT2}	0.0	0.10	0.0	-100 Ω	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
R_{CMDUCK}	0.50	0.50	-500 Ω	-500 Ω	0.0	0.0	1000 Ω	0.0	0.0	0.0	0.0	0.0
R_{FSL10k}	0.50	0.50	-500 Ω	-500 Ω	0.0	0.0	0.0	0.0	1000 Ω	0.0	0.0	0.0
R_{100}	0.010	0.0	-10 Ω	0.0	0.0	-10 Ω	0.0	0.0	0.0	0.0	0.0	0.0
R_{10}	0.0010	0.0	-1.0 Ω	0.0	-1.0 Ω	-1.0 Ω	0.0	0.0	0.0	0.0	0.0	0.0
R_{FSL935}	0.00010	0.0	-0.10 Ω	0.0	-0.10 Ω	-0.10 Ω	0.0	-0.10 Ω	0.0	0.0	0.0	0.0
R_{PP}	0.000100	0.0	-0.10 Ω	0.0	-0.10 Ω	-0.10 Ω	0.0	-0.10 Ω	0.0	0.0	1.0 Ω	0.0
R_{PPH1}	0.000100	0.0	-0.10 Ω	0.0	-0.10 Ω	-0.10 Ω	0.0	0.0	0.0	0.0	0.0	-0.100 Ω
$R_{MMLN4221}$	1.0e-05	0.0	-0.010 Ω	0.0	-0.0100 Ω	-0.0100 Ω	0.0	-0.0100 Ω	0.0	-0.0100 Ω	0.0	0.0

Combined Covariance:

$$U_y = C_x \cdot U_x \cdot C_x^T$$

Uncertainties:

$$u_{RREF} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{REF}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{REF}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{REF}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{REF}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{REF}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{REF}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{REF}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{REF}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{REF}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{REF}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{REF}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{REF}\right)^2}$$

$$u_{RREF2} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{REF2}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{REF2}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{REF2}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{REF2}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{REF2}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{REF2}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{REF2}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{REF2}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{REF2}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{REF2}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{REF2}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{REF2}\right)^2}$$

$$u_{R1k} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{1k}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{1k}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{1k}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{1k}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{1k}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{1k}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{1k}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{1k}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{1k}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{1k}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{1k}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{1k}\right)^2}$$

$$u_{R1kT2} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{1kT2}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{1kT2}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{1kT2}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{1kT2}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{1kT2}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{1kT2}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{1kT2}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{1kT2}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{1kT2}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{1kT2}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{1kT2}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{1kT2}\right)^2}$$

$$u_{RCMDUCK} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{CMDUCK}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{CMDUCK}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{CMDUCK}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{CMDUCK}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{CMDUCK}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{CMDUCK}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{CMDUCK}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{CMDUCK}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{CMDUCK}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{CMDUCK}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{CMDUCK}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{CMDUCK}\right)^2}$$

$$u_{RFSL10k} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{FSL10k}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{FSL10k}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{FSL10k}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{FSL10k}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{FSL10k}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{FSL10k}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{FSL10k}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{FSL10k}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{FSL10k}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{FSL10k}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{FSL10k}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{FSL10k}\right)^2}$$

$$u_{R100} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{100}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{100}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{100}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{100}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{100}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{100}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{100}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{100}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{100}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{100}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{100}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{100}\right)^2}$$

$$u_{R10} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{10}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{10}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{10}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{10}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{10}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{10}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{10}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{10}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{10}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{10}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{10}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{10}\right)^2}$$

$$u_{RFSL935} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{FSL935}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{FSL935}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{FSL935}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{FSL935}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{FSL935}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{FSL935}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{FSL935}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{FSL935}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{FSL935}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{FSL935}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{FSL935}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{FSL935}\right)^2}$$

$$u_{RPP} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{PP}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{PP}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{PP}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{PP}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{PP}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{PP}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{PP}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{PP}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{PP}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{PP}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{PP}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{PP}\right)^2}$$

$$u_{RPPH1} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{PPH1}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{PPH1}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{PPH1}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{PPH1}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{PPH1}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{PPH1}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{PPH1}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{PPH1}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{PPH1}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{PPH1}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{PPH1}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{PPH1}\right)^2}$$

$$u_{RMMLN4221} = \sqrt{u_R^2\left(\frac{\partial}{\partial R}R_{MMLN4221}\right)^2 + u_{R2}^2\left(\frac{\partial}{\partial R_2}R_{MMLN4221}\right)^2 + u_{ratio}^2\left(\frac{\partial}{\partial ratio}R_{MMLN4221}\right)^2 + u_{ratio2}^2\left(\frac{\partial}{\partial ratio_2}R_{MMLN4221}\right)^2 + u_{ratio10}^2\left(\frac{\partial}{\partial ratio_{10}}R_{MMLN4221}\right)^2 + u_{ratio100}^2\left(\frac{\partial}{\partial ratio_{100}}R_{MMLN4221}\right)^2 + u_{ratiocm}^2\left(\frac{\partial}{\partial ratio_{cm}}R_{MMLN4221}\right)^2 + u_{ratiofsl}^2\left(\frac{\partial}{\partial ratio_{fsl}}R_{MMLN4221}\right)^2 + u_{ratiofsl10k}^2\left(\frac{\partial}{\partial ratio_{fsl10k}}R_{MMLN4221}\right)^2 + u_{ratiommln4221}^2\left(\frac{\partial}{\partial ratio_{mmln4221}}R_{MMLN4221}\right)^2 + u_{ratiopp}^2\left(\frac{\partial}{\partial ratio_{pp}}R_{MMLN4221}\right)^2 + u_{ratiopph1}^2\left(\frac{\partial}{\partial ratio_{pph1}}R_{MMLN4221}\right)^2}$$

Simplified:

$$u_{RREF} = \sqrt{u_R^2} = 0.00065\,\Omega$$

$$u_{RREF2} = \sqrt{u_{R2}^2} = 0.0005\,\Omega$$

$$u_{R1k} = \sqrt{\frac{R^2 u_{ratio}^2 + ratio^2 u_R^2}{ratio^4}} = 9.198 \cdot 10^{-5}\,\Omega$$

$$u_{R1kT2} = \sqrt{\frac{R_2^2 u_{ratio2}^2 + ratio_2^2 u_{R2}^2}{ratio_2^4}} = 8.211 \cdot 10^{-5}\,\Omega$$

$$u_{RCMDUCK} = \frac{\sqrt{\frac{R^2 ratio_{cm}^2 u_{ratio}^2}{ratio^4} + \frac{R_2^2 ratio_{cm}^2 u_{ratio2}^2}{ratio_2^4} + \frac{ratio_{cm}^2 u_{R2}^2}{ratio_2^2} + \frac{ratio_{cm}^2 u_R^2}{ratio^2} + \frac{u_{ratiocm}^2 (R ratio_2 + R_2 ratio)^2}{ratio^2 ratio_2^2}}}{2} = 0.001108\,\Omega$$

$$u_{RFSL10k} = \frac{\sqrt{\frac{R^2 ratio_{fsl10k}^2 u_{ratio}^2}{ratio^4} + \frac{R_2^2 ratio_{fsl10k}^2 u_{ratio2}^2}{ratio_2^4} + \frac{ratio_{fsl10k}^2 u_{R2}^2}{ratio_2^2} + \frac{ratio_{fsl10k}^2 u_R^2}{ratio^2} + \frac{u_{ratiofsl10k}^2 (R ratio_2 + R_2 ratio)^2}{ratio^2 ratio_2^2}}}{2} = 0.00118\,\Omega$$

$$u_{R100} = \sqrt{\frac{R^2 ratio^2 u_{ratio100}^2 + R^2 ratio_{100}^2 u_{ratio}^2 + ratio^2 ratio_{100}^2 u_R^2}{ratio^4 ratio_{100}^4}} = 1.127 \cdot 10^{-5}\,\Omega$$

$$u_{R10} = \sqrt{\frac{R^2 ratio^2 ratio_{10}^2 u_{ratio100}^2 + R^2 ratio^2 ratio_{100}^2 u_{ratio10}^2 + R^2 ratio_{10}^2 ratio_{100}^2 u_{ratio}^2 + ratio^2 ratio_{10}^2 ratio_{100}^2 u_R^2}{ratio^4 ratio_{10}^4 ratio_{100}^4}} = 1.31 \cdot 10^{-6}\,\Omega$$

$$u_{RFSL935} = \sqrt{\frac{R^2 ratio^2 ratio_{10}^2 ratio_{100}^2 u_{ratiofsl}^2 + R^2 ratio^2 ratio_{10}^2 ratio_{fsl}^2 u_{ratio100}^2 + R^2 ratio^2 ratio_{100}^2 ratio_{fsl}^2 u_{ratio10}^2 + R^2 ratio_{10}^2 ratio_{100}^2 ratio_{fsl}^2 u_{ratio}^2 + ratio^2 ratio_{10}^2 ratio_{100}^2 ratio_{fsl}^2 u_R^2}{ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^4}} = 1.475 \cdot 10^{-7}\,\Omega$$

$$u_{RPP} = \sqrt{\frac{R^2 ratio^2 ratio_{10}^2 ratio_{100}^2 ratio_{pp}^2 u_{ratiofsl}^2 + R^2 ratio^2 ratio_{10}^2 ratio_{fsl}^2 ratio_{pp}^2 u_{ratio100}^2 + R^2 ratio^2 ratio_{100}^2 ratio_{fsl}^2 ratio_{pp}^2 u_{ratio10}^2 + R^2 ratio_{10}^2 ratio_{100}^2 ratio_{fsl}^2 ratio_{pp}^2 u_{ratio}^2 + ratio^2 ratio_{10}^2 ratio_{100}^2 ratio_{fsl}^2 \left(R^2 u_{ratiopp}^2 + ratio_{pp}^2 u_R^2\right)}{ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^4}} = 2.482 \cdot 10^{-7}\,\Omega$$

$$u_{RPPH1} = \sqrt{\frac{R^2 ratio^2 ratio_{10}^2 ratio_{100}^2 u_{ratiopph1}^2 + R^2 ratio^2 ratio_{10}^2 ratio_{pph1}^2 u_{ratio100}^2 + R^2 ratio^2 ratio_{100}^2 ratio_{pph1}^2 u_{ratio10}^2 + R^2 ratio_{10}^2 ratio_{100}^2 ratio_{pph1}^2 u_{ratio}^2 + ratio^2 ratio_{10}^2 ratio_{100}^2 ratio_{pph1}^2 u_R^2}{ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{pph1}^4}} = 1.471 \cdot 10^{-7}\,\Omega$$

$$u_{RMMLN4221} = \sqrt{\frac{R^2 ratio^2 ratio_{10}^2 ratio_{100}^2 ratio_{fsl}^2 u_{ratiommln4221}^2 + R^2 ratio^2 ratio_{10}^2 ratio_{100}^2 ratio_{mmln4221}^2 u_{ratiofsl}^2 + R^2 ratio^2 ratio_{10}^2 ratio_{fsl}^2 ratio_{mmln4221}^2 u_{ratio100}^2 + R^2 ratio^2 ratio_{100}^2 ratio_{fsl}^2 ratio_{mmln4221}^2 u_{ratio10}^2 + R^2 ratio_{10}^2 ratio_{100}^2 ratio_{fsl}^2 ratio_{mmln4221}^2 u_{ratio}^2 + ratio^2 ratio_{10}^2 ratio_{100}^2 ratio_{fsl}^2 ratio_{mmln4221}^2 u_R^2}{ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^4 ratio_{mmln4221}^4}} = 1.638 \cdot 10^{-8}\,\Omega$$

Effective degrees of freedom:

$$v_{RREF} = \frac{v_R u_{RREF}^4}{u_R^4} = \infty$$

$$v_{RREF2} = \frac{v_{R2} u_{RREF2}^4}{u_{R2}^4} = \infty$$

$$v_{R1k} = \frac{u_{R1k}^4}{\frac{R^4 u_{ratio}^4}{v_{ratio} ratio^8} + \frac{u_R^4}{v_R ratio^4}} = 1.306 \cdot 10^9$$

$$v_{R1kT2} = \frac{u_{R1kT2}^4}{\frac{R_2^4 u_{ratio2}^4}{v_{ratio2} ratio_2^8} + \frac{u_{R2}^4}{v_{R2} ratio_2^4}} = \infty$$

$$v_{RCMDUCK} = \frac{u_{RCMDUCK}^4}{\frac{R^4 ratio_{cm}^4 u_{ratio}^4}{16 v_{ratio} ratio^8} + \frac{R_2^4 ratio_{cm}^4 u_{ratio2}^4}{16 v_{ratio2} ratio_2^8} + \frac{u_{ratiocm}^4 \left(\frac{R}{2ratio} + \frac{R_2}{2ratio_2}\right)^4}{v_{ratiocm}} + \frac{ratio_{cm}^4 u_{R2}^4}{16 v_{R2} ratio_2^4} + \frac{ratio_{cm}^4 u_R^4}{16 v_R ratio^4}} = 1.225 \cdot 10^8$$

$$v_{RFSL10k} = \frac{u_{RFSL10k}^4}{\frac{R^4 ratio_{fsl10k}^4 u_{ratio}^4}{16 v_{ratio} ratio^8} + \frac{R_2^4 ratio_{fsl10k}^4 u_{ratio2}^4}{16 v_{ratio2} ratio_2^8} + \frac{u_{ratiofsl10k}^4 \left(\frac{R}{2ratio} + \frac{R_2}{2ratio_2}\right)^4}{v_{ratiofsl10k}} + \frac{ratio_{fsl10k}^4 u_{R2}^4}{16 v_{R2} ratio_2^4} + \frac{ratio_{fsl10k}^4 u_R^4}{16 v_R ratio^4}} = 5.659 \cdot 10^{10}$$

$$v_{R100} = \frac{u_{R100}^4}{\frac{R^4 u_{ratio100}^4}{v_{ratio100} ratio^4 ratio_{100}^8} + \frac{R^4 u_{ratio}^4}{v_{ratio} ratio^8 ratio_{100}^4} + \frac{u_R^4}{v_R ratio^4 ratio_{100}^4}} = 2.408 \cdot 10^9$$

$$v_{R10} = \frac{u_{R10}^4}{\frac{R^4 u_{ratio100}^4}{v_{ratio100} ratio^4 ratio_{10}^4 ratio_{100}^8} + \frac{R^4 u_{ratio10}^4}{v_{ratio10} ratio^4 ratio_{10}^8 ratio_{100}^4} + \frac{R^4 u_{ratio}^4}{v_{ratio} ratio^8 ratio_{10}^4 ratio_{100}^4} + \frac{u_R^4}{v_R ratio^4 ratio_{10}^4 ratio_{100}^4}} = 2.518 \cdot 10^7$$

$$v_{RFSL935} = \frac{u_{RFSL935}^4}{\frac{R^4 u_{ratiofsl}^4}{v_{ratiofsl} ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^8} + \frac{R^4 u_{ratio100}^4}{v_{ratio100} ratio^4 ratio_{10}^4 ratio_{100}^8 ratio_{fsl}^4} + \frac{R^4 u_{ratio10}^4}{v_{ratio10} ratio^4 ratio_{10}^8 ratio_{100}^4 ratio_{fsl}^4} + \frac{R^4 u_{ratio}^4}{v_{ratio} ratio^8 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^4} + \frac{u_R^4}{v_R ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^4}} = 7.785 \cdot 10^6$$

$$v_{RPP} = \frac{u_{RPP}^4}{\frac{R^4 u_{ratiopp}^4}{v_{ratiopp} ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^4} + \frac{R^4 ratio_{pp}^4 u_{ratiofsl}^4}{v_{ratiofsl} ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^8} + \frac{R^4 ratio_{pp}^4 u_{ratio100}^4}{v_{ratio100} ratio^4 ratio_{10}^4 ratio_{100}^8 ratio_{fsl}^4} + \frac{R^4 ratio_{pp}^4 u_{ratio10}^4}{v_{ratio10} ratio^4 ratio_{10}^8 ratio_{100}^4 ratio_{fsl}^4} + \frac{R^4 ratio_{pp}^4 u_{ratio}^4}{v_{ratio} ratio^8 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^4} + \frac{ratio_{pp}^4 u_R^4}{v_R ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^4}} = 8445.0$$

$$v_{RPPH1} = \frac{u_{RPPH1}^4}{\frac{R^4 u_{ratiopph1}^4}{v_{ratiopph1} ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{pph1}^8} + \frac{R^4 u_{ratio100}^4}{v_{ratio100} ratio^4 ratio_{10}^4 ratio_{100}^8 ratio_{pph1}^4} + \frac{R^4 u_{ratio10}^4}{v_{ratio10} ratio^4 ratio_{10}^8 ratio_{100}^4 ratio_{pph1}^4} + \frac{R^4 u_{ratio}^4}{v_{ratio} ratio^8 ratio_{10}^4 ratio_{100}^4 ratio_{pph1}^4} + \frac{u_R^4}{v_R ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{pph1}^4}} = 2.745 \cdot 10^7$$

$$v_{RMMLN4221} = \frac{u_{RMMLN4221}^4}{\frac{R^4 u_{ratiommln4221}^4}{v_{ratiommln4221} ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^4 ratio_{mmln4221}^8} + \frac{R^4 u_{ratiofsl}^4}{v_{ratiofsl} ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^8 ratio_{mmln4221}^4} + \frac{R^4 u_{ratio100}^4}{v_{ratio100} ratio^4 ratio_{10}^4 ratio_{100}^8 ratio_{fsl}^4 ratio_{mmln4221}^4} + \frac{R^4 u_{ratio10}^4}{v_{ratio10} ratio^4 ratio_{10}^8 ratio_{100}^4 ratio_{fsl}^4 ratio_{mmln4221}^4} + \frac{R^4 u_{ratio}^4}{v_{ratio} ratio^8 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^4 ratio_{mmln4221}^4} + \frac{u_R^4}{v_R ratio^4 ratio_{10}^4 ratio_{100}^4 ratio_{fsl}^4 ratio_{mmln4221}^4}} = 2.967 \cdot 10^6$$

GUM Validity

Comparison to Monte Carlo 95.00% Coverage

1 significant digit. δ = 0.000050 Ω.

R_REF_

95.00% Coverage	Lower Limit	Upper Limit
GUM	10000.00001 Ω	10000.00255 Ω
MC	10000.00001 Ω	10000.00256 Ω
abs(GUM - MC)	5.7e-06 Ω	6.1e-06 Ω
abs(GUM - MC) < δ	PASS	PASS

1 significant digit. δ = 0.000050 Ω.

R_REF2

95.00% Coverage	Lower Limit	Upper Limit
GUM	10000.00032 Ω	10000.00228 Ω
MC	10000.00032 Ω	10000.00228 Ω
abs(GUM - MC)	7.0e-07 Ω	1.3e-06 Ω
abs(GUM - MC) < δ	PASS	PASS

1 significant digit. δ = 5.0e-06 Ω.

R_1k

95.00% Coverage	Lower Limit	Upper Limit
GUM	1000.034588 Ω	1000.034948 Ω
MC	1000.034588 Ω	1000.034949 Ω
abs(GUM - MC)	7.4e-08 Ω	9.1e-07 Ω
abs(GUM - MC) < δ	PASS	PASS

1 significant digit. δ = 5.0e-06 Ω.

R_1k_T2

95.00% Coverage	Lower Limit	Upper Limit
GUM	1000.034466 Ω	1000.034788 Ω
MC	1000.034466 Ω	1000.034788 Ω
abs(GUM - MC)	2.5e-07 Ω	3.2e-07 Ω
abs(GUM - MC) < δ	PASS	PASS

1 significant digit. δ = 0.00050 Ω.

R_CMDUCK

95.00% Coverage	Lower Limit	Upper Limit
GUM	9999.998649 Ω	10000.00299 Ω
MC	9999.998635 Ω	10000.00298 Ω
abs(GUM - MC)	0.000014 Ω	0.000012 Ω
abs(GUM - MC) < δ	PASS	PASS

1 significant digit. δ = 0.00050 Ω.

R_FSL10k

95.00% Coverage	Lower Limit	Upper Limit
GUM	9999.972817 Ω	9999.977443 Ω
MC	9999.972832 Ω	9999.977457 Ω
abs(GUM - MC)	0.000015 Ω	0.000014 Ω
abs(GUM - MC) < δ	PASS	PASS

1 significant digit. δ = 5.0e-06 Ω.

R100

95.00% Coverage	Lower Limit	Upper Limit
GUM	100.0038556 Ω	100.0038998 Ω
MC	100.0038555 Ω	100.0038996 Ω
abs(GUM - MC)	8.4e-08 Ω	1.3e-07 Ω
abs(GUM - MC) < δ	PASS	PASS

1 significant digit. δ = 5.0e-07 Ω.

R_10

95.00% Coverage	Lower Limit	Upper Limit
GUM	10.00059148 Ω	10.00059662 Ω
MC	10.00059148 Ω	10.00059662 Ω
abs(GUM - MC)	1.7e-09 Ω	4.1e-10 Ω
abs(GUM - MC) < δ	PASS	PASS

1 significant digit. δ = 5.0e-08 Ω.

R_FSL935

95.00% Coverage	Lower Limit	Upper Limit
GUM	1.000063184 Ω	1.000063762 Ω
MC	1.000063183 Ω	1.000063762 Ω
abs(GUM - MC)	1.1e-09 Ω	7.8e-10 Ω
abs(GUM - MC) < δ	PASS	PASS

1 significant digit. δ = 5.0e-08 Ω.

R_PP

95.00% Coverage	Lower Limit	Upper Limit
GUM	0.9999987812 Ω	0.9999997544 Ω
MC	0.9999987805 Ω	0.9999997526 Ω
abs(GUM - MC)	7.0e-10 Ω	1.8e-09 Ω
abs(GUM - MC) < δ	PASS	PASS

1 significant digit. δ = 5.0e-08 Ω.

R_PPH1

95.00% Coverage	Lower Limit	Upper Limit
GUM	0.9999992387 Ω	0.9999998153 Ω
MC	0.9999992371 Ω	0.9999998141 Ω
abs(GUM - MC)	1.6e-09 Ω	1.2e-09 Ω
abs(GUM - MC) < δ	PASS	PASS

1 significant digit. δ = 5.0e-09 Ω.

R_MMLN4221

95.00% Coverage	Lower Limit	Upper Limit
GUM	0.09999673205 Ω	0.09999679624 Ω
MC	0.09999673178 Ω	0.09999679611 Ω
abs(GUM - MC)	2.7e-10 Ω	1.3e-10 Ω
abs(GUM - MC) < δ	PASS	PASS

Monte Carlo Inputs


DCC ratio for FSL935-10k
9.999624
9.999626
9.999628
9.999630
9.999632
DCC ratio for MM LN4221 0.1R, +23.12°C
10.000955
10.000956
10.000957
10.000958
10.000959
10.000960
10.000961
10.000962
DCC ratio of PP to FSL935
0.9999350
0.9999352
0.9999355
0.9999357
0.9999360
0.9999362
0.9999365
0.9999367
DCC ratio from Hulk1 10R to PP1R
10.000596
10.000597
10.000598
10.000599
10.000600
10.000601
10.000602
xDevs.com SR104 from Caltest [Ω]
0.9999998
1.0000000
1.0000001
1.0000002
1.0000003
1.0000004
×10⁴
T2 ESI SR104 from MI CAL [Ω]
0.9999999
1.0000000
1.0000001
1.0000002
1.0000003
1.0000004
×10⁴
DCC ratio to MMG330-1k
9.999651
9.999652
9.999653
9.999654
9.999655
9.999656
DCC Ratio to MMG330-1k. T2 value
9.999652
9.999653
9.999654
9.999655
9.999656
9.999657
9.999658
Hulk1 5.720A
9.999791
9.999792
9.999793
9.999794
9.999795
9.999796
9.999797
DCC Ratio to xDevs.com 100 R
9.999957
9.999958
9.999959
9.999960
9.999961
9.999962
9.999963
DCC ratio for CM Duck
9.999650
9.999652
9.999654
9.999656
9.999658
FSL935 from H1-10
9.999956
9.999957
9.999958
9.999959
9.999960
9.999961
9.999962