Evaluation of the frequency of the H-maser 1401708 by the primary frequency standard NPL-CsF2

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The primary frequency standard NPL-CsF2 was used to measure the frequency of the H-maser HM2 identified by the clock code 1401708 during an evaluation campaign over a period of time in November 2011. The clock 1401708 is a physical realisation of UTC(NPL). The evaluation was performed by measuring mean frequency differences over the reporting periods.

No changes to the physics package of NPL-CsF2 have been introduced since the previous reported evaluation.

Results of the frequency measurements are listed in the table below. Note that a frequency steer was applied to the H-maser HM2 during the evaluation campaign and the reported value of the frequency difference $y(CsF2 - HM2)$ is a weighted average of two values obtained for the periods before and after the steer, respectively.

Period	(date)	30 Oct 2011 – 24 Nov 2011
Start	MJD	55864
Stop	MJD	55889
Duration	days	25
duty cycle	%	96.0
Biases:	$\times 10^{-15}$	
2nd order Zeeman		337.10
BBR shift		−16.61
cold collisions		0.13
gravity		1.30
y(CsF2 - HM2)	$\times 10^{-15}$	**4.90**
u_A	$\times 10^{-15}$	0.22
u_B	$\times 10^{-15}$	0.23
$u_{l/lab}$	$\times 10^{-15}$	0.02
$\boldsymbol{u_{total}}$	$\times 10^{-15}$	**0.31**

Frequency biases are given for information only. The given fractional frequency difference *y(CsF2 – HM2)* is a value corrected for those biases. Note that the values for the collisional shift and its uncertainty vary, and so vary the total type B uncertainties u_B for particular campaigns. The value of collisional shift is a time-averaged value for the high and low densities. The total uncertainty u_{total} of the measurement is defined as:

$$(u_{total})^2 = (u_A)^2 + (u_B)^2 + (u_{l/lab})^2$$