

## RLU Comparison of Three Hygiena® Luminometers

### Introduction

Hygiena® offers a wide range of ATP detection devices and luminometers to help the user achieve the optimum sensitivity needed to include the right system in their ATP monitoring program. This document compares the Relative Light Units (RLU) results achieved with dilutions of known ATP concentrations using the UltraSnap® ATP devices in combination with EnSURE® Touch, EnSURE® and SystemSURE Plus™ luminometers.

### Methods and Reagents

#### Summary

The EnSURE TOUCH, EnSURE, and SystemSURE Plus luminometers were compared for RLU output using UltraSnap swabs and pure ATP at a range of dilutions from 10 – 15,000 femtomoles.

### Results

#### RLU values

Each ATP dilution was tested 5 times in each luminometer. Average RLU readings are given in Table 1 below. Table 2 shows the resulting conversion factors when switching instruments.

**Table 1.** Hygiena Luminometer RLU Comparison – Average RLU results from 5 replicate reads are displayed for each luminometer and ATP level tested.

ATP (fmoles)	EnSURE TOUCH	EnSURE	SystemSURE Plus
15,000	10,901	8,507	6,794
10,000	11,024	8,080	6,390
8,000	10,637	7,971	5,621
6,000	10,341	7,554	4,980
4,000	7,142	5,943	3,455
2,000	3,734	3,855	1,771
1,000	2,217	2,117	899
500	944	932	460
200	395	392	203
100	200	213	102
50	93	97	48
20	37	39	20
10	21	20	10

**Table 2.** Average RLU Conversion Factors Calculated for EnSURE and SystemSURE Plus.

	EnSURE TOUCH vs EnSURE	EnSURE TOUCH vs SystemSURE Plus
Average Conversion Factor – All Data Points	1.11	1.98
Average Conversion Factor – 10 - 1,000 femtomoles	0.99	2.03

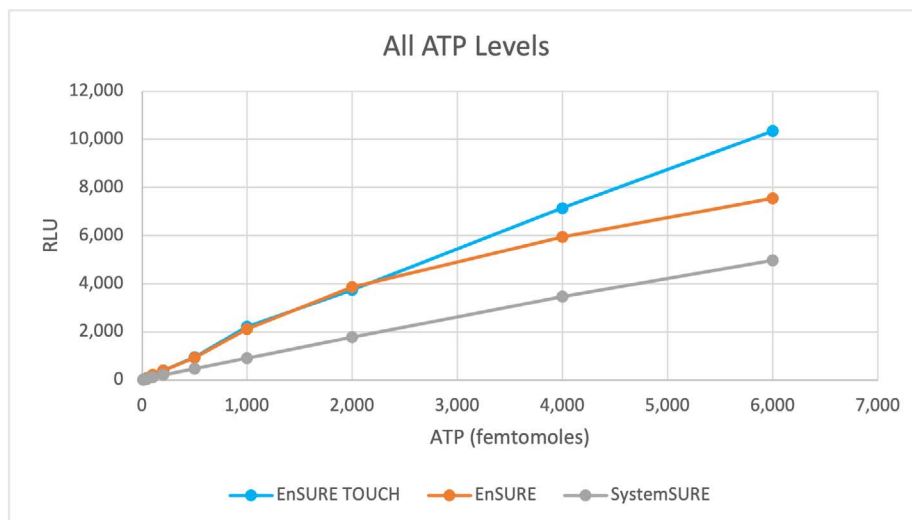
## Linearity

### Analysis

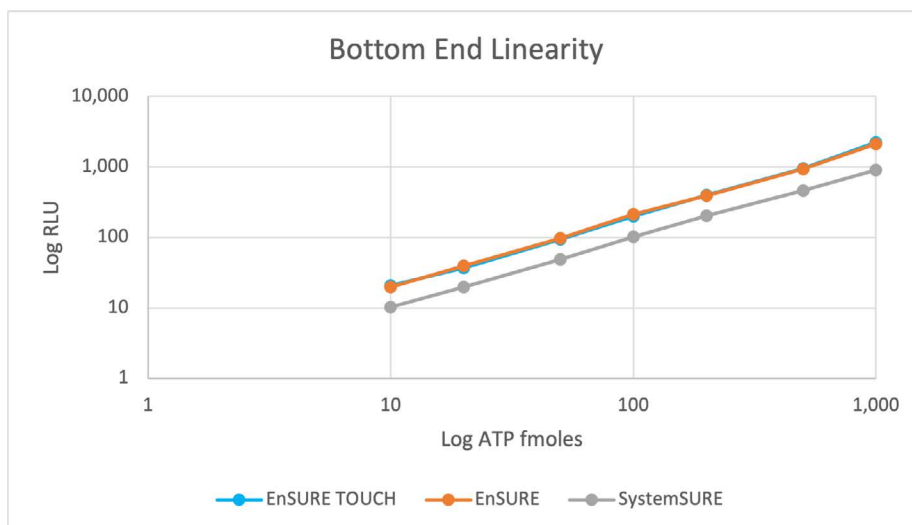
Average RLU readings from all three instruments are also plotted in Figure 1 and Figure 2 below. The full dataset can be seen graphically in Figure 1 and shows that the EnSURE luminometer starts to top out sooner than the EnSURE TOUCH. This begins to decrease the 2x conversion factor for RLU results between SystemSURE and EnSURE in samples of 4,000 femtomoles and above. The EnSURE TOUCH has a similar effect which begins at around 8,000 femtomoles. This topping out at the high end slightly pushes the RLU conversion factor below 2 (see Table 2 above).

In most real-world ATP hygiene monitoring applications, RLU results will be well below these levels and the 2x conversion will hold true for both EnSURE and EnSURE TOUCH. Most customers focus at the lower end of the ATP concentration range where they are attempting to keep surfaces as clean as possible. Figure 2 below shows the ATP concentrations from 10 – 1,000 femtomoles which is a more realistic real-world functional range for most hygiene monitoring applications. In this plot, it is clear to see the linearity of RLU output from all three systems across the functional ATP concentration range. The RLU conversion factor from this reduced data set comes out very close to 2x from SystemSURE and very close to 1x for EnSURE.

**Figure 1.** Plot of all ATP concentrations compared across three Hygiena Luminometers – Average RLU results from 5 replicate readings.



**Figure 2.** Plot of the lowest 7 ATP concentrations compared across three Hygiena Luminometers – Average RLU results from 5 replicate readings, both RLU and ATP values have been logged to more clearly show all 7 data points.



## Conclusions

As demonstrated in this study, Hygiena ATP monitoring systems detect low concentrations of ATP, even to 10 femtomoles (and lower, not shown). Conversion factors can be used to compare the RLU results for EnSURE Touch, EnSURE and SystemSURE Plus, allowing an easy transition from one instrument to another. In addition, linearity can be seen at very low levels of ATP (10 – 1,000 femtomoles), representative of what would be seen in real-world facilities where cleaning keeps contamination at very low levels. As a result, this linearity allows for extrapolation of RLU counts when using any luminometer in a consistent manner at any site within a facility.