The Clarity™ Digital PCR Reader

Clarity™ Digital PCR System

With digital PCR this fast and easy, the choice is now clear.

Adopting an innovative tube strip design, the Clarity™ system brings digital PCR analysis to the next level by significantly reducing its preparation time and simplifying its workflow. Capable of running parallel reactions, more samples can now be analysed in a day to provide unsurpassed digital PCR throughput. It is now possible to do more with less – run more reactions in shorter time with less effort.

Advantages

EASE OF USE	Unique chip-in-a-tube design simplifies cumbersome workflow typically associated with digital PCR
FAST	Performs up to 96 digital PCR reactions per experiment Well-suited for high throughput analysis
CHIP-BASED PARTITIONING	Stable with minimal sample loss
CLOSE TUBE FORMAT	Prevents cross contamination among reactions
FLEXIBLE	Compatible with conventional thermal cyclers Optimised for both TaqMan® probe-based and EvaGreen® dye-based assays
AFFORDABLE	Unrivalled system and sample cost

System Workflow

The Clarity™ system adopts a unique chip-in-a-tube design which allows digital PCR to be performed with ease and speed. The workflow begins with preparation of the reaction mixture, which can either be TaqMan® probe- or EvaGreen® dye-based. Each reaction mixture is partitioned into 10,000 reactions by a high-density chip within each tube. After partitioning, the reactions are subjected to thermal cycling, followed by partition detection using the Clarity™ Reader. By analysing the number of partitions that are positive or negative for PCR products, the DNA copy number is then determined based on Poisson statistics.

Figure 1. Clarity™ digital PCR system workflow.

System Performance

The accuracy and precision of Clarity™ digital PCR system in absolute quantification of nucleic acid target were assessed by quantifying the single-copy human RNase P gene. Both the TaqMan® probe-based and EvaGreen® dye-based digital PCR assays were evaluated. As summarized in Table 1, both assays showed concordance between the expected and measured concentrations of the target DNA. In addition, the system demonstrated excellent linearity (R^2>0.999) across a dynamic range of over 4 orders of magnitude (Figure 2). Together with the capacity to detect and quantify down to <1 copy of DNA per microliter of reaction, Clarity™ offers a high level of precision and sensitivity required for demanding applications such as rare mutant detection and copy number variation.

	TaqMan®-based Assay		EvaGreen®-dye based Assay	
Expected Concentration (copies/µl)	Measured Concentration (copies/µl)	Relative Uncertainty (%)	Measured Concentration (copies/µl)	Relative Uncertainty (%)
2240	2400	1.7	2370	1.8
560	630	3.1	601	4.3
140	140	3.6	143	4.5
35	36	3.9	36	4.8
8.75	8.30	2.9	7.31	10.6
2.19	2.04	5.3	1.95	13.7
0.73	0.78	10.3	0.74	10.6
0.38	0.37	15.1	0.38	18.3

Table 1. Accurate and precise quantification by Clarity™ digital PCR system. The accuracy and precision of Clarity™ were assessed by quantifying the single-copy RNase P gene from 8 dilutions of human genomic DNA at known concentrations (Promega, Singapore). Digital PCR reactions were assayed in quintuplicates using either the TaqMan® probe- or EvaGreen® dye-based detection. The expected and mean measured concentrations are presented as copies per microliter of reaction. Relative uncertainty is obtained by dividing standard deviation by the mean measured concentration in each data set.

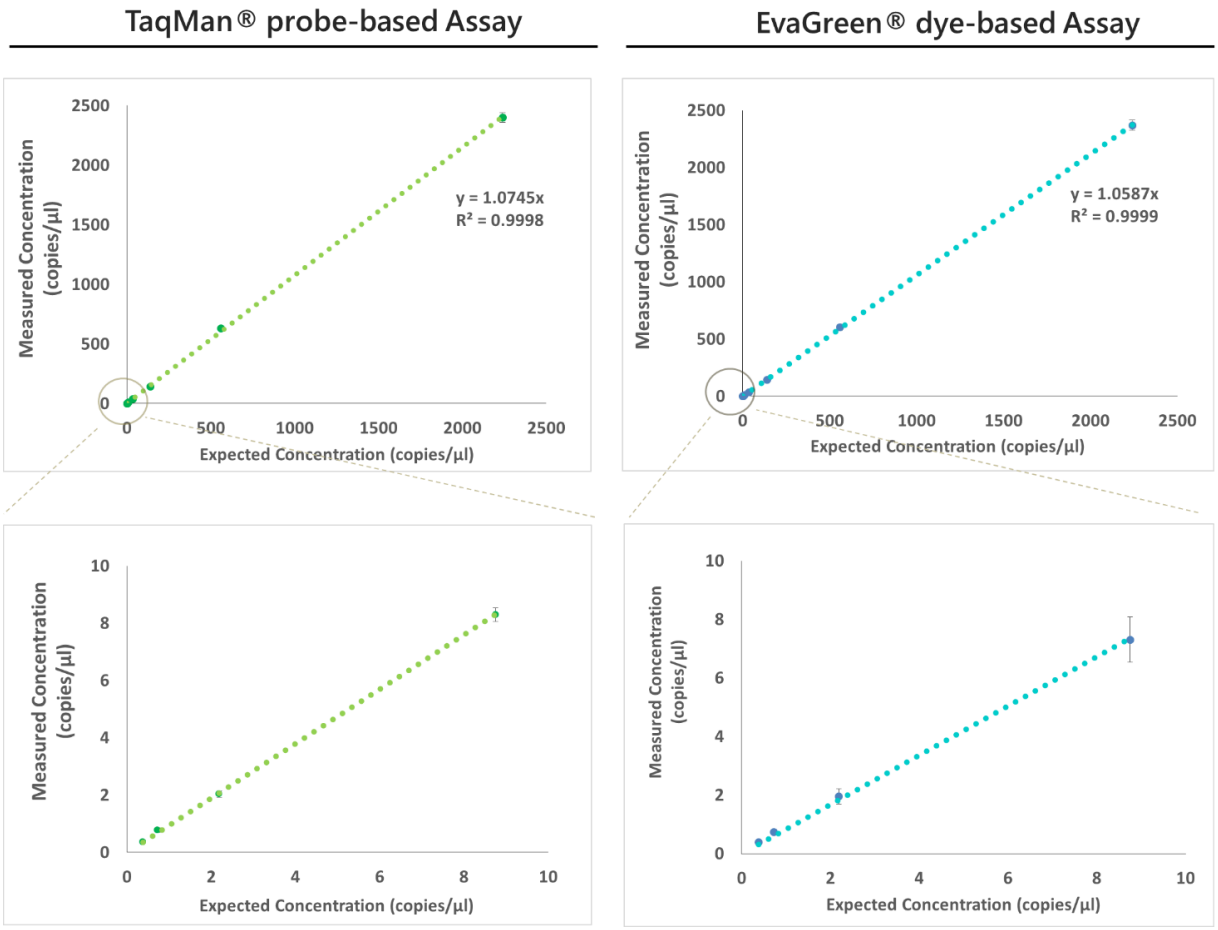

Figure 2. Plotted graphs of the measured concentration of RNase P against its expected concentration for the TaqMan® probe-based (left) and EvaGreen® dye-based (right) assays. Both assays showed excellent linearity (R^2>0.999) across a dynamic range of over 4 orders of magnitude. The lower limit of detection was found to be <1 copy per microliter of reaction. Error bars correspond to the standard deviation of each data set.

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