

Application Note

Mic and Myra in Airport Passenger Screening

As a result of the COVID-19 pandemic, public awareness of PCR as a technique for pathogen detection has become greater than ever, as its status as the “gold standard” continues to be reinforced widely by governments around the world.

Passengers now accept that in order to travel internationally, a negative PCR test is necessary to limit spread of the disease across borders. In many cases this test can be performed up to 72 hours in advance of travel, and in the case of the UK specifically, again on day 2 following their return.

To address this need, diagnostic laboratory providers established networks of brand-new, bespoke on-site testing laboratories at major UK airports. They required a qPCR system that is extremely fast to meet turnaround times, scalable to meet a varying and increasing demand, but above all supremely accurate when used in combination with CE-IVD marked assays available from commercial suppliers who themselves chose to include Mic within their validation.

For this reason, multiple leading laboratory providers selected the Mic qPCR Cycler as their system of choice, with in excess of 150 cyclers now testing passengers across the country.

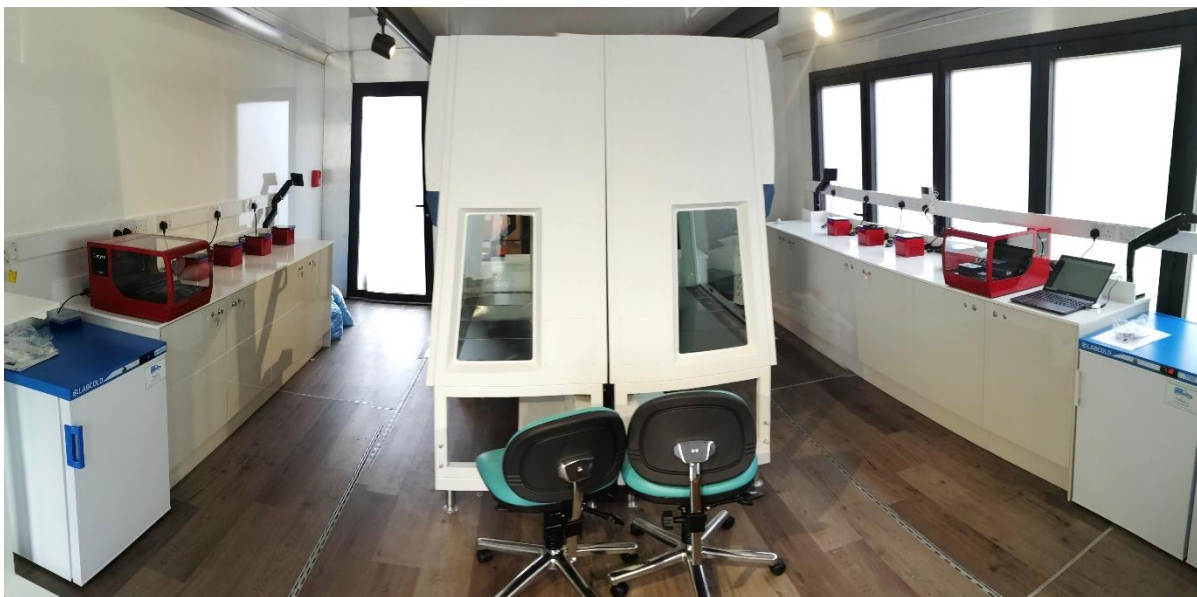


Figure 1 - Mic and Myra ready to screen passengers at Liverpool Airport

As passenger numbers increased rapidly, these providers required a solution to increase the throughput of laboratories by automating the traditionally intensive step of master mix preparation, distribution and addition of samples to the PCR reaction tubes. For this application, the Myra Liquid Handler is ideal. Apart from being fully compatible with traditional 96- and 384-well PCR systems, it is especially integrated with the Mic qPCR Cycler, transferring sample data seamlessly.

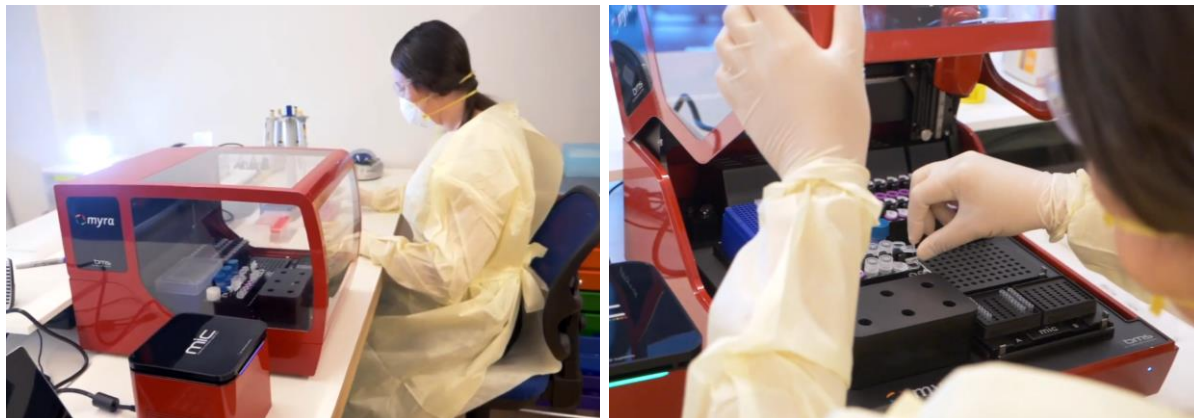


Figure 2 - Mic and Myra on the bench

Example Workflow

<i>Workflow Step</i>	<i>Approximate Timing</i>
Sample Prep using Direct Lysis Reagent <i>e.g. Microlysis, QIAprep</i>	20 minutes
Preparation of 48 Mic qPCR Tubes <i>Automated on Myra Liquid Handling System</i>	12 minutes
Rapid CE-IVD qPCR Assay <i>Running on Mic qPCR Cycler</i> <i>e.g. geneMAP™ 2019-nCoV</i>	45 minutes
Automatic qPCR Analysis using Identifier mode <i>Results presented to user on completion of the run</i>	0 minutes
Total	1 hour, 12 minutes

Example Results

Mic qPCR Cycler is able to display cycling data in various formats, as you require. CE-IVD marked assays typically present their result calling criteria in terms of Cq values within a multiplex reaction (also referred to as *Ct* or *Cp* – the point at which the PCR curve crosses the pre-set Threshold). In the case of a COVID-19 assay, an example configuration is as follows.

Targets

Name	Reporter Dye		
▶ RdRp	FAM™	▼	×
N Gene	Cy™ 5	▼	×
Internal Control	VIC®	▼	×
* Type here to add a new target		▼	

Figure 3 - qPCR Target List as displayed in Mic qPCR software

Here two targets are used to identify the pathogen (RdRp and N Gene in this case), and a third channel used to check the success of the PCR reaction (Internal Control).

Cycling Analysis

Specific settings to interpret each channel may be saved into the software by the user to be applied consistently on completion of every run:

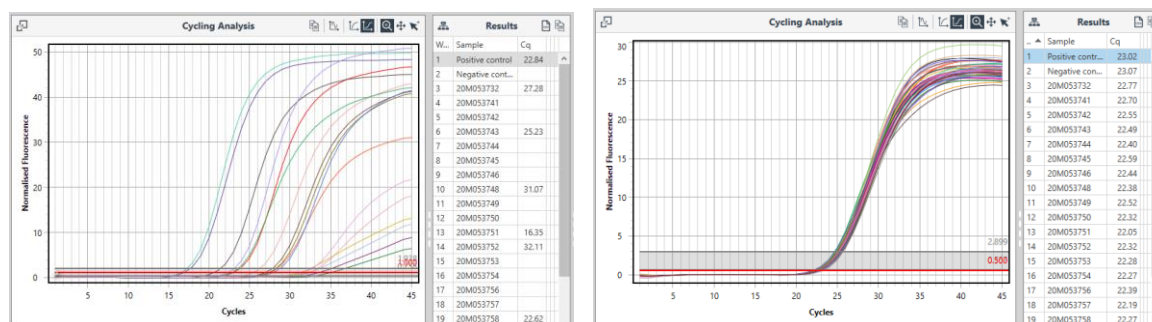


Figure 4 - Example Cycling analysis from Mic qPCR, with Cq values presented

Cq values are then manually compared with the validated criteria provided by the assay manufacturer, to create a result call for each sample.

Identifier Analysis

This final step may however be automated by another mode of the Mic software, *Identifier*. This takes the Cq values of each channel generated by the Cycling analysis, and applies a rule set either validated by the assay manufacturer or specified by the user, to generate a results table – the final product of a qPCR workflow.

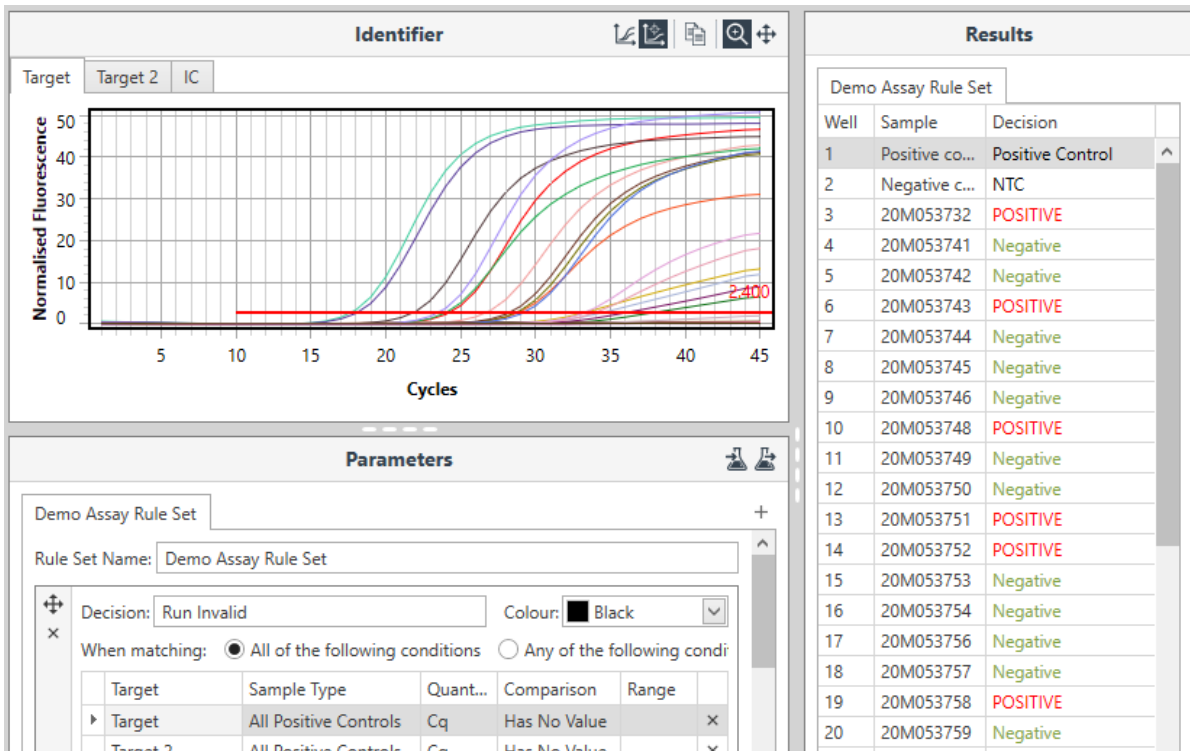


Figure 5 - Example Identifier results table

This mode may also be configured to apply automatically on completion of each run, which offers additional options for standardization within the lab.

Summary

Mic and Myra have proven to be an ideal workflow solution for remote deployment of qPCR testing outside of the traditional laboratory setting, due to their portability, reliability and above all ease of use in screening large numbers of samples in as short a turnaround time as possible.

For further information or demonstration, please contact your local BMS representative or sales@biomolecularsystems.com.