Electronic Supplementary Material (ESI) for Lab on a Chip.

Supplementary Information

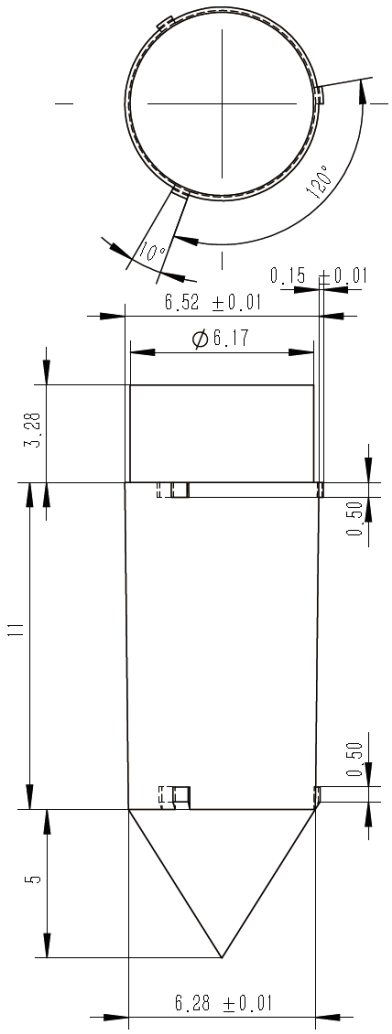


Figure S1 Drawing of Polycarbonate filler. The insert was made by CNC machining of polycarbonate rod, six claws were placed at the upper and lower position of the imaging surface to keep a uniform space between the rod and inner surface of the centrifuge tube, as well as keep the rod's axis in accordance with that of the centrifuge tube.

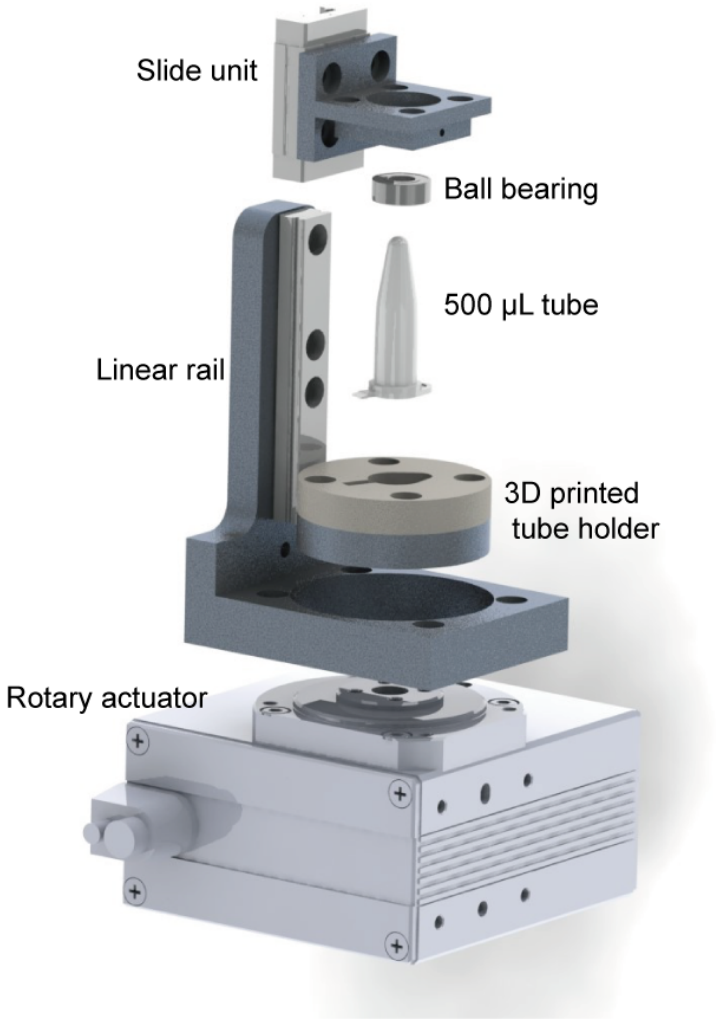
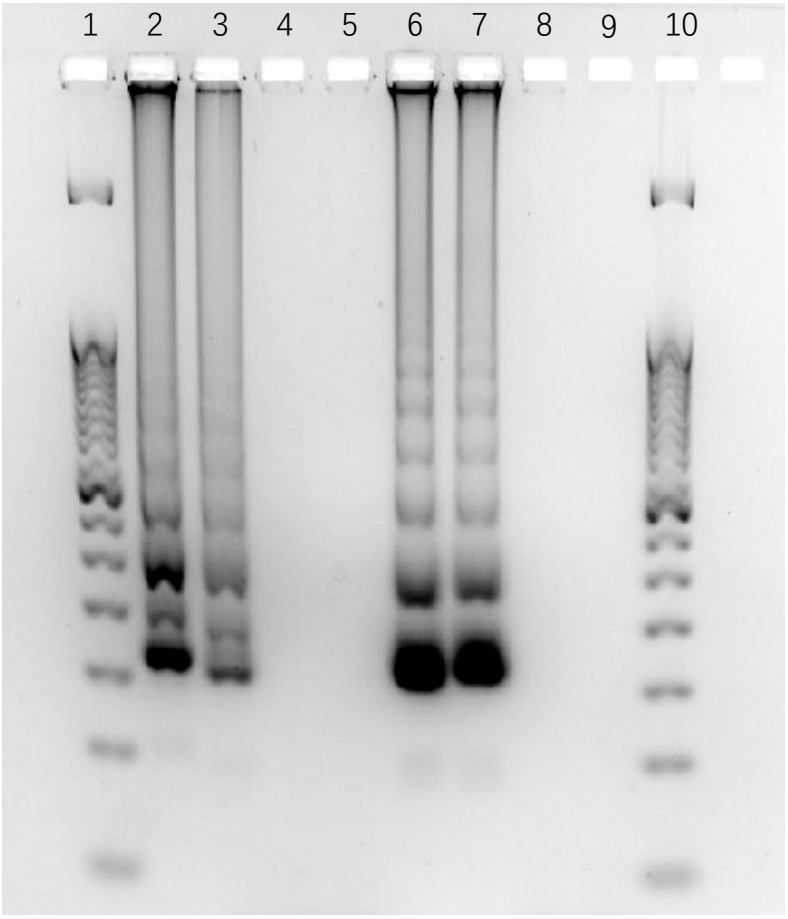


Figure S2 Mechanical design of rotation system. An RCP2 rotary actuator from IAI Inc. was used as rotation stage. A 3D printed holder was used to fit the cap of the centrifuge holder. A ball bearing (MR106ZZ bearing, NSK Inc.), a slide unit and linear rail (ML9C1S1, IKO Inc.), together with customized CNC parts held the hemisphere bottom of the tube, keeping rotation axis coincide with the tube axis.



Lane	1	2	3	4	5	6	7	8	9	10
Primer	50 bp ladder	Lambda	Lambda	Lambda	Lambda	M13	M13	M13	M13	50 bp ladder
Template		Lambda-1	Lambda-2	M13-1	NC	M13-1	M13-2	Lambda-1	NC	

Figure S3 Agarose gel electrophoresis of the RS-dLAMP results. Two sets of primer and template were used to validate the selectivity of the amplification. Primer and template of each lane are listed in the following table.

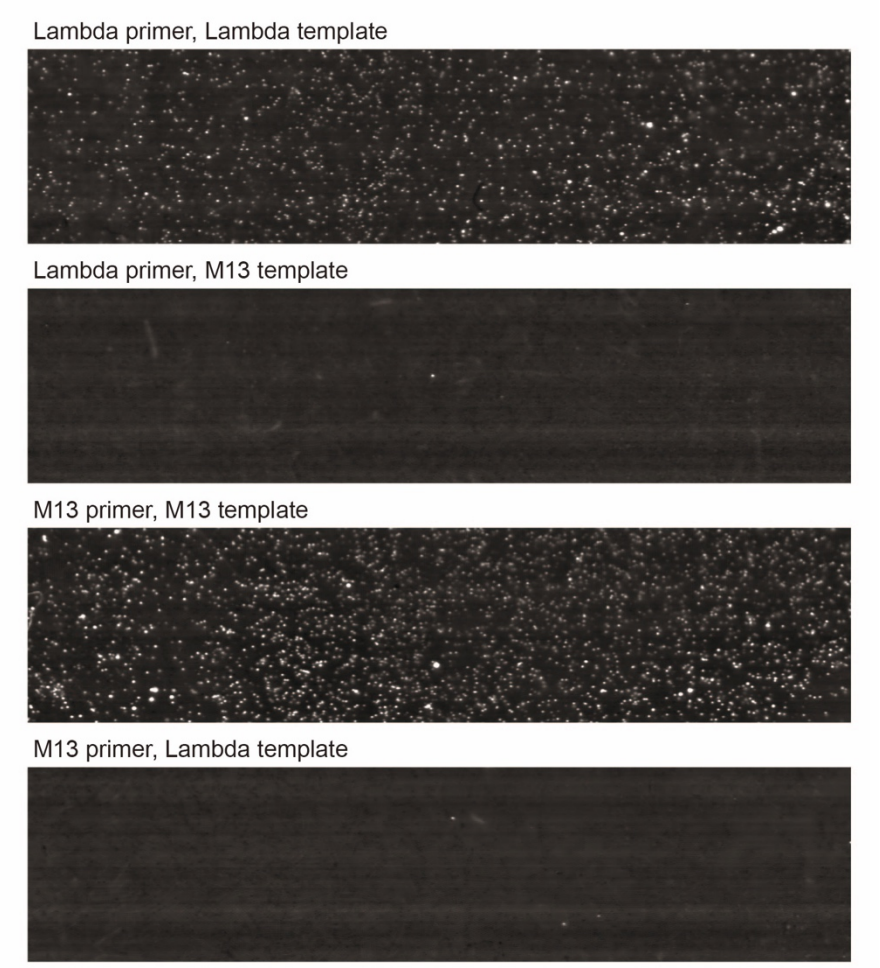


Figure S4 Specificity of RS-dLAMP. Cross validation of M13/Lambda primer and templates was performed following the RS-dLAMP protocol. The results showed good specificity of both M13 and Lambda primer sets.

Table S1 Oligo DNA Sequences for LAMP

Oligo-DNAs	Sequence
M13 Primer F3	ACCCCGCTAATCCTAATCCT
M13 Primer B3	GGAAAGCGCAGTCTCTGAA
M13 Primer FIP	ATGCCCCCTGCCTATTTCGGTTTTCTTGAGGAGTCTCAGCCTC T
M13 Primer BIP	AGGCACTGACCCCGTTAAAACTTTTTCCGTTCCAGTAAGCGTC AT
M13 Primer F1c	ATGCCCCCTGCCTATTTCGG
M13 Primer B1c	AGGCACTGACCCCGTTAAAACT
Lambda Primer F3	CCCGTGTCGGTTATTCCAA
Lambda Primer B3	CGCCCATTAGTGAAACGCTT
Lambda Primer FIP	GTTCTCGGCATCACCATCCGTCTTTTGCTGGGTGTTTATGCCTA CT
Lambda Primer BIP	ACCCACGTTGAGCCGACTATTCTTTTGGTGCTTTTTGCCATACC AC
Lambda Primer F1c	GTTCTCGGCATCACCATCCGTC
Lambda Primer B1c	ACCCACGTTGAGCCGACTATTC

Table S2 Reagents protocol for LAMP

For 100 µL 2x premix	**Vol./ µL**	**Stock Conc.**	**Final Conc.**
Isothermal Amplification Buffer	20	10x	2x
dNTP	28	10 mM each	2.8 mM each
MgSO4	4	100 mM	8mM (including 4 mM in Buffer)
Bst 3.0 polymerase	1	120,000 U/mL	1.2 U/µL
FIP/BIP	4	100 µM	4µM
F3/B3	4	10 µM	0.4µM
F1c/B1c	8	10 µM	0.8µM
SYTO-9	8	100 µM	8 µM
Nuclease free water	7	--	--

Table S3 Oligo DNA sequences for ddPCR

Oligo-DNAs	Sequence
M13 Forward Primer	GACCGAAAATGCCGATGAAA
M13 Reverse Primer	CGACAGAATCAAGTTTGCCTTTAG
M13 Probe	6-FAM-CGCGCTACAGTCTG-MGB

Table S4 Reagents protocol for Bio-Rad QX200 ddPCR

For 100 μL mix	Vol./ μL	Stock Conc.	Final Conc.
2x ddPCR sumpermix for probes (No dUTP)	50	2x	1x
M13 Forward Primer	10	10 mM	1 μM
M13 Reverse Primer	10	10 mM	1 μM
M13 Probe	3	10 mM	300 nM
Sample	10	Variable	--
Nuclease free water	17	--	--