Supporting Information:

Trace Analysis of Emerging Virus: An Ultrasensitive ECL-Scan Imaging System for Viral Infectious Disease

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Figure S1. Principle of probe assembly via the addition reaction between sulphydryl and double bond.

Figure S2. Synthetic routes of Ru(bpy)$_3^{2+}$.

Figure S3. Stability of dendritic Ru(bpy)$_3^{2+}$-polymer probe under 95 °C.
Figure S4. Stability of dendritic Ru(bpy)$_3^{2+}$-polymer probe in different pH.

Figure S5. Stability of dendritic Ru(bpy)$_3^{2+}$-polymer probe in different buffer.

Figure S6. Stability of dendritic Ru(bpy)$_3^{2+}$-polymer probe in blood, urine and saliva.
Figure S7. Result details of low concentration samples in Figure 6A.

Figure S8. Result details of low concentration samples in Figure 7B.

Figure S9. Result details of low concentration samples in Figure 7B.
Table S1. Sequence from the HBsAg gene of the Hepatitis B virus (HBV) and the Sequence of probes and random sequence.

| Note                  | Sequence(5’-3’)                                                                 | Modification |
|-----------------------|-------------------------------------------------------------------------------|--------------|
| Target                | ACTAGTAAACTGAGCATACTGGCCAGGACACGTGGTGCC                                      | label-free   |
| Capture probe         | GCTCAGTTTACTAGTGCCATT                                                         | 3’-biotin    |
| Signal probe          | GGAGCAGGAGCACCACGTGTCTGGCC                                                    | 5’-maleimide |
| Sequence 1            | CTATCCATTTGTAGCAGTGTAATGGGATTAGCTCCACCTCG                                    | label-free   |
| Sequence 2            | CGTGGTAGGGCAGGTTGGGTACCTGGTTGGTG TGGTTGG                                    | label-free   |
| Random sequence 1 (RS1) | CACCAGCTACATCGGATCCCGAGCTCAT ACGAATATCCAC                                   | label-free   |
| Random sequence 2 (RS2) | CATCAGATGATGAGTTGAACGCGTTGAGCGGTGTA GTCTCA                                   | label-free   |

Table S2. Sequence of Target ZIKV RNA and Probes.

| Note      | Sequence(5’-3’)                                                                 | Modification |
|-----------|-------------------------------------------------------------------------------|--------------|
| Target RNA| GUUGGUAUGGAAUGGAGAUAGGCCCAGGAAAGA CCAGA                                      | Label-free   |
| Capture probe | TATCTCCATTCATAACCCAGA                                                          | Biotin       |
| Signal probe | TCTGGTCTTCTTCTGGCCT                                                           | Maleimide    |
Table S3. Sequence of Target SARS-Cov2 RNA and Probes.

| Note            | Sequence(5’-3’)                     | Modification    |
|-----------------|-------------------------------------|-----------------|
| **S Protein**   | TTATCAGACTCAGACTAAATTCTCCTCGGCAGCAG | Label-free      |
| sequence of SARS-CoV2 | AGT                                |                 |
| **Capture probe** | AATTAGTCTGAGTTGATGATGAA            | 3‘-biotin       |
| **Signal probe** | ACTACGTGCCCAGCCGAGGAG              | 5‘-maleimide    |
| **N Protein**   | CGGGAACGTGTTGTACCTACAGGTGCACATCAAT | Label-free      |
| sequence of SARS-CoV2 | TGGA                          |                 |
| **Capture probe** | GTAGGTCAACCACGTTCGCG            | 3‘-biotin       |
| **Signal probe** | TCAAATTTGATGGCCACCTGT             | 5‘-maleimide    |