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

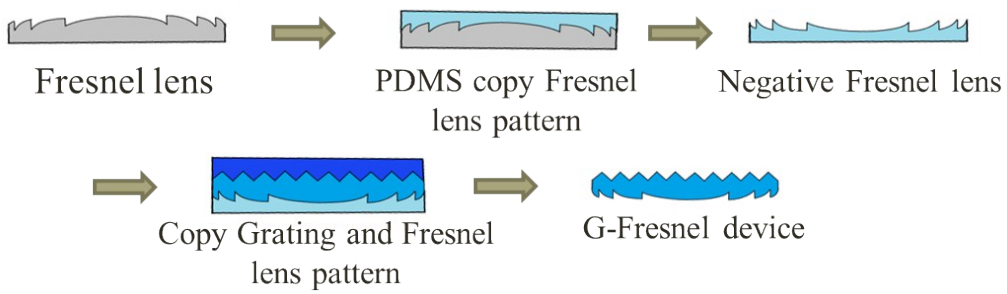

Figure S1 Systematic diagrams of the G-Fresnel fabrication procedure. PDMS (Dow Corning Sylgard 184 Silicone) pre-polymer is poured onto the surface of a Fresnel lens (Edmund Optics 2.0" x 2.0", 1.0" FL, Aspheric Fresnel Lens). After baking the PDMS for 12hours at 60 °C, the PDMS is cured completely and a negative Fresnel lens mold is obtained. The same method is used to fabricate a negative mold of a diffraction grating (Thorlabs Vis Trans Grating, 1200 Grooves/mm, 36.9° Blaze Angle, 12.7 mm x 12.7 mm). Finally, a G-Fresnel can be fabricated by sandwiching PDMS pre-polymer between the grating and the negative Fresnel lens molds followed by curing.

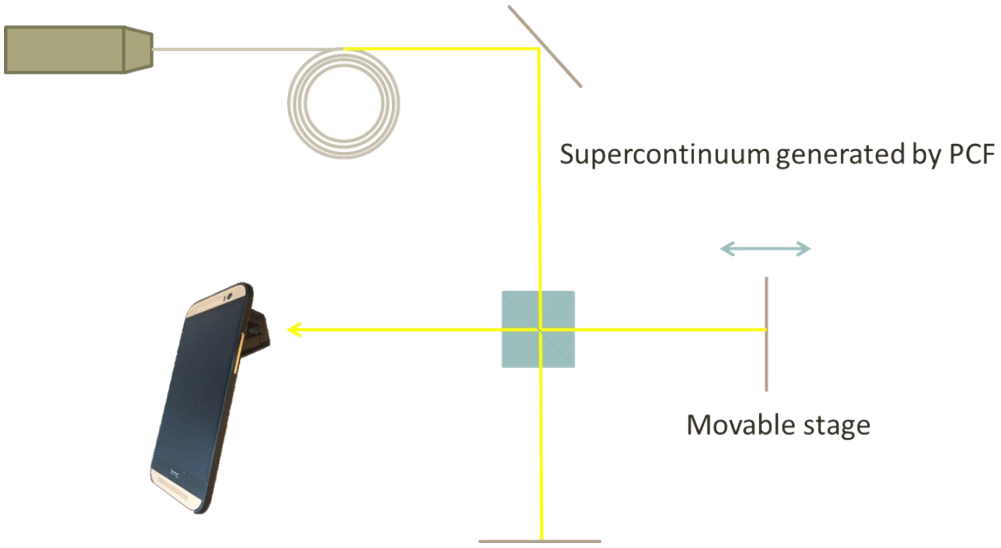

Figure S2 Schematic diagram of the spectral holography setup for characterizing the wavelength resolution of the cellphone camera. A supercontinuum source generated by propagating a 1064nm pulsed laser (JDS Uniphase NanolaseTM NP-10620-100 laser) in a 20-meter long nonlinear photonic crystal fiber (NKT Photonics Highly Nonlinear PCF SC-5.0-1040) was directed to a Michelson interferometer. One arm of the interferometer can be adjusted by a linear translational stage. The resulted spectral interference pattern is measured by using the cellphone spectrometer.

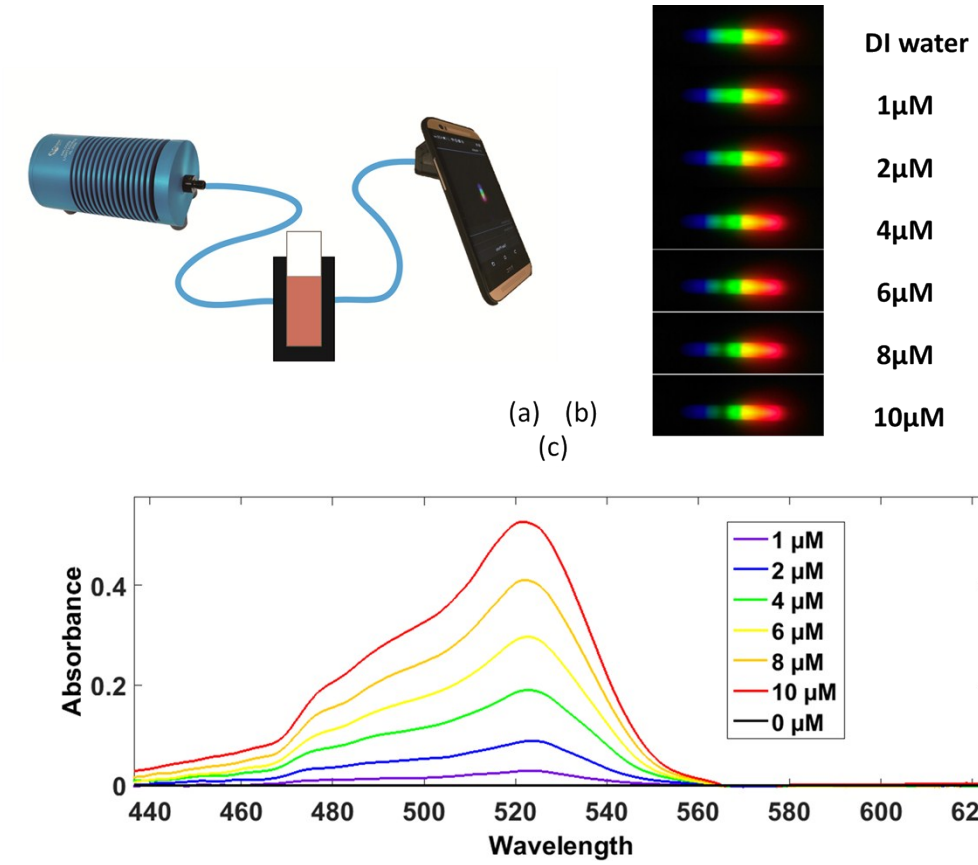

Figure S3 (a) Schematic diagram of the measurement scheme. Source light (Ocean Optics tungsten halogen light source HL-2000-HP) is delivered through an optical fiber to a specimen placed in a sample holder. The transmitted light is collected by another optical fiber and sent to the cellphone spectrometer for analysis. (b) Transmission spectrum images obtained by the cellphone spectrometer for deionized water and specimens with 1 µM – 10 µM Rhodamine 6G (R6G), respectively. (c) Absorbance spectra of dye solutions with different R6G concentrations (1 µM – 10 µM). Each measurement was repeated three times to ensure the accuracy.

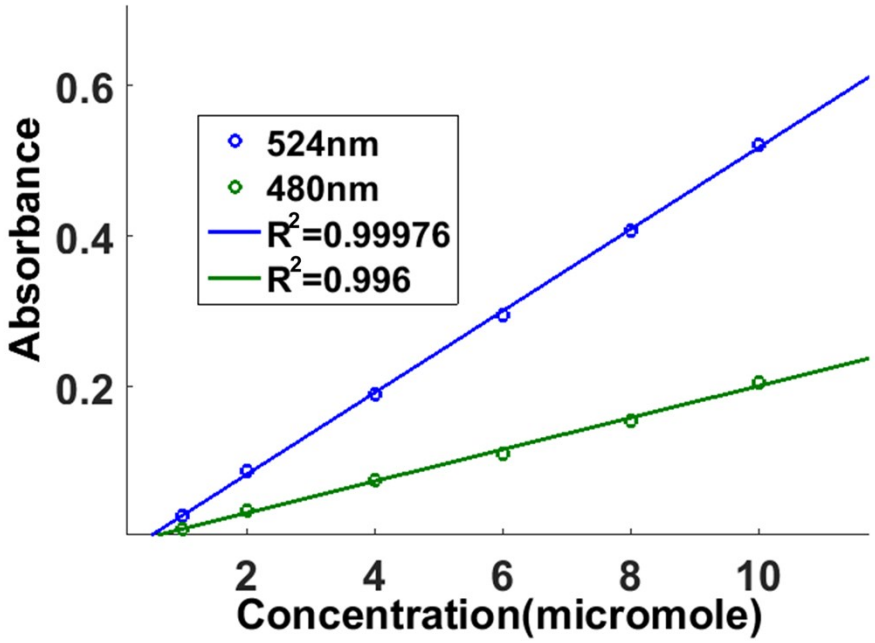

Figure S4 Absorbance at 524nm and 480nm as a function of the concentrations of R6G. The linear regression curves have R^2 values of 0.9995 (524 nm) and 0.9971 (480 nm) respectively, indicating an excellent linear response of the device.