

Supplementary Information

WATER TURBIDITY SENSING USING A SMARTPHONE

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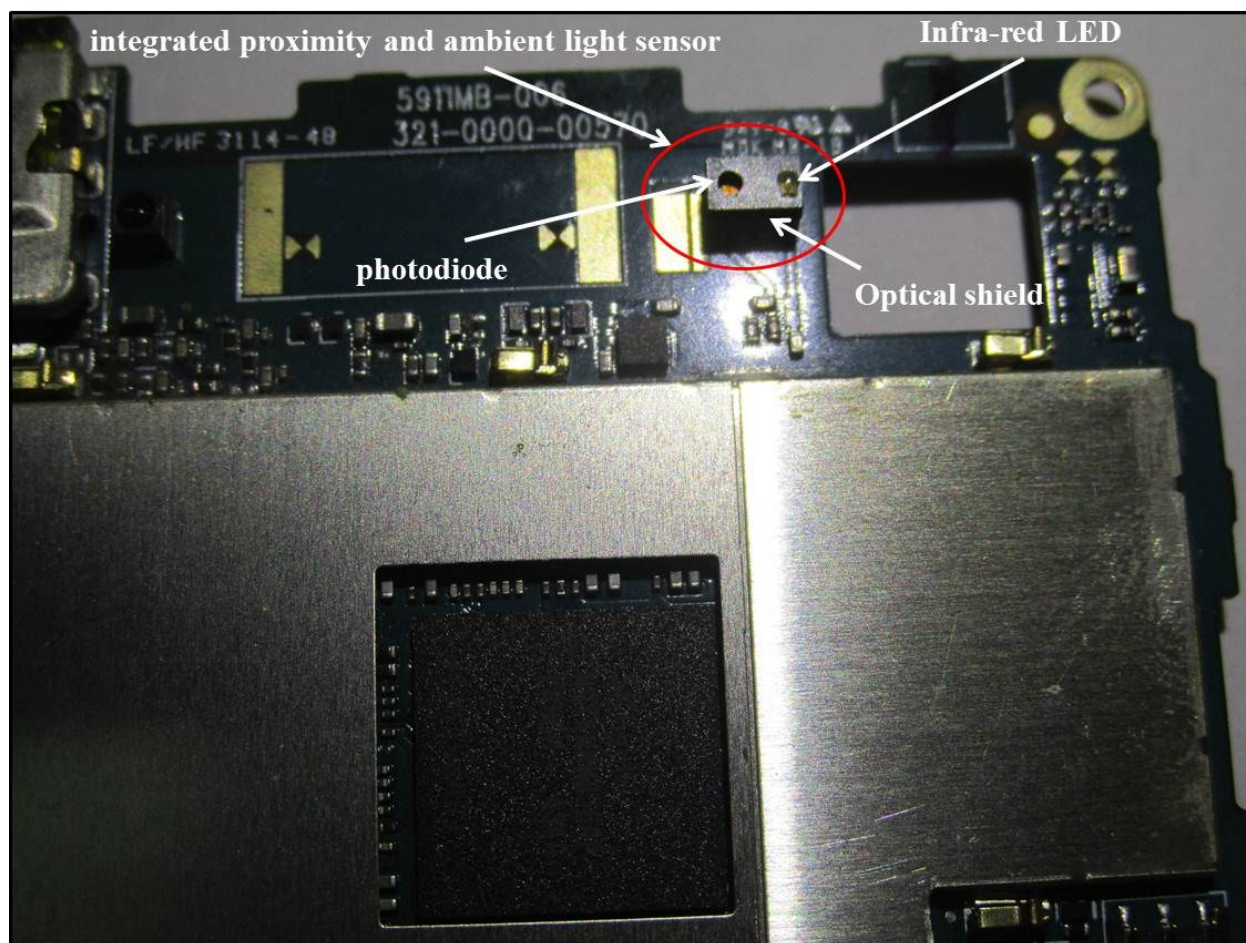
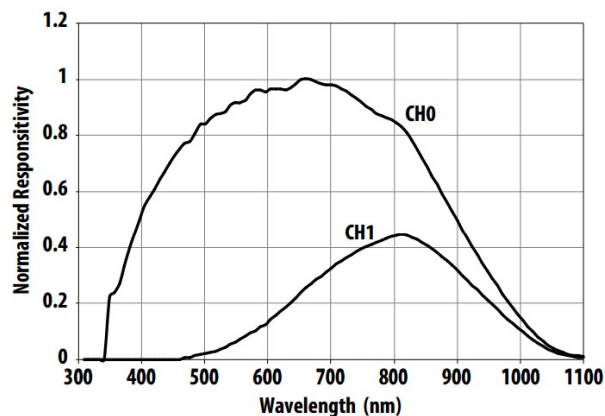
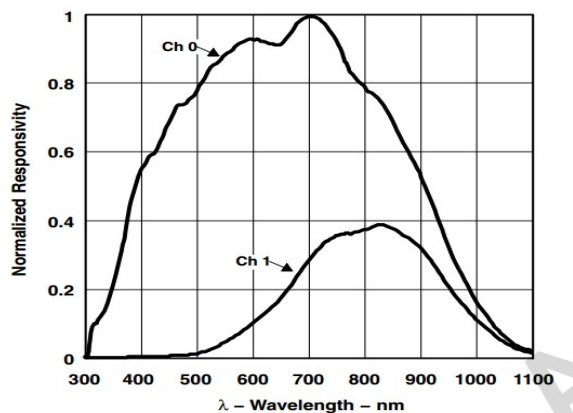


Fig.S1. A Photograph of Sony Xperia E3 sensor chip indicating the built-in integrated proximity and light sensor module.



(a)



(b)

Fig.S2. Spectral response curve of Avago APDS-9930 and (b) ams AG (TAOS) TMD2771 integrated proximity and ambient light sensor where Ch0 photodiode is both visible and infrared and Ch1 is infrared-responding photodiode.

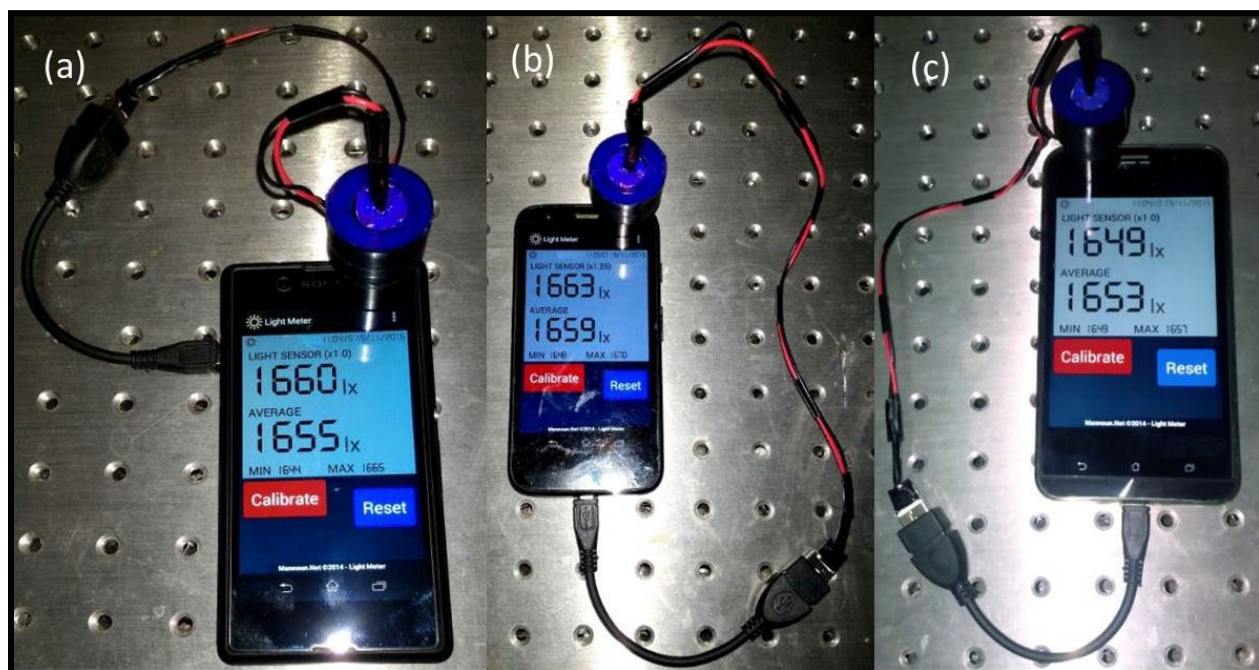


Fig.S3. A Photograph of Smartphones with installed light meter app for intensity measurement (a) Sony Xperia E3, Android OS, v4.4.2 (KitKat), (b) Moto G xt1033, Android OS, v4.3 and (c) Asus Zenfone2 Android OS, v5.0 (Lollipop).

Table S1 Specification of the phone used (Sony Xperia E3)

ITEM	SPECIFICATION
Model	D2202
Operating system	Android OS, v4.4.2 (KitKat)
Chipset	Qualcomm MSM8926-2 Snapdragon 400
CPU	Quad-core 1.2 GHz Cortex-A7
Ram	1 GB
USB	Micro USB v2.0, USB Host
Sensors	Accelerometer, proximity, compass
Battery	Non-removable Li-Ion 2330 mAh battery
Dimension	137.1 x 69.4 x 8.5 mm
Weight	143.8 g

Table S2 List of optical components and their cost involved

COMPONENTS	SUPPLIER/PARTS NO.	COST (U.S. \$)
1. Infra-red LED	Product no. L12756 Hamamatsu	3.29
2. Plano-Convex Lens	product no.32-404 Edmund Optics	25
3. USB-OTG cable	Ebay.in	0.59
4. 1 mm pinhole	product no.56-291 Edmund Optics	57.00
		Total = \$ 85.88

Calculations for scattering angle: Considering a particle P at the centre of the sample holder. The distance between the 1 mm pinhole and particle is 25 mm. The maximum deviation of scattered light from its 90° path is given by :

$$\tan^{-1}(\text{Radius of the pinhole} / \text{distance between pin hole and the particle}) = \pm \tan^{-1}(0.5 \text{ mm} / 25\text{mm})$$
$$= \pm 1.14^{\circ}$$

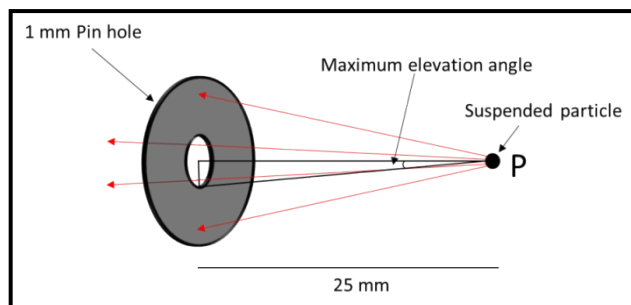


Fig.S4. Schematic diagram for calculation of scattering angle in the present work.