## **Electronic Supplementary Information**

## Frequency-triggered circuit transition in organic light-emitting diodes probed by impedance spectroscopy

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**Figure S1.** Energy diagram, L-V, and current efficiency data from the fabricated MADN:DSA-Ph blue fluorescent OLED.



Figure S2. Top: EL spectra of the MADN:DSA-Ph blue fluorescent OLED measured under different  $V_{dc}$  conditions. Bottom: Normalized EL spectra obtained from the same data.



Figure S3. Additional impedance measurement and equivalent-circuit fit data of the OLED.



Figure S4. Impedance data from five consecutive measurements on the same OLED.



**Figure S5.** Top: photograph of the macro circuit constructed for the confirmation of the OLED circuit transitions as internal phenomena. Bottom: comparison between the impedance measured on the OLED and on the macro circuit under the same measurement conditions.



**Figure S6.** Comparison of the normalized EL spectra (at  $V_{dc} = 5.8$  V) and current efficiency data for the doped blue, doped red, and undoped blue OLEDs and the Nyquist plots for the Z measured at different  $V_{dc}$  values in the doped red and undoped blue OLEDs.