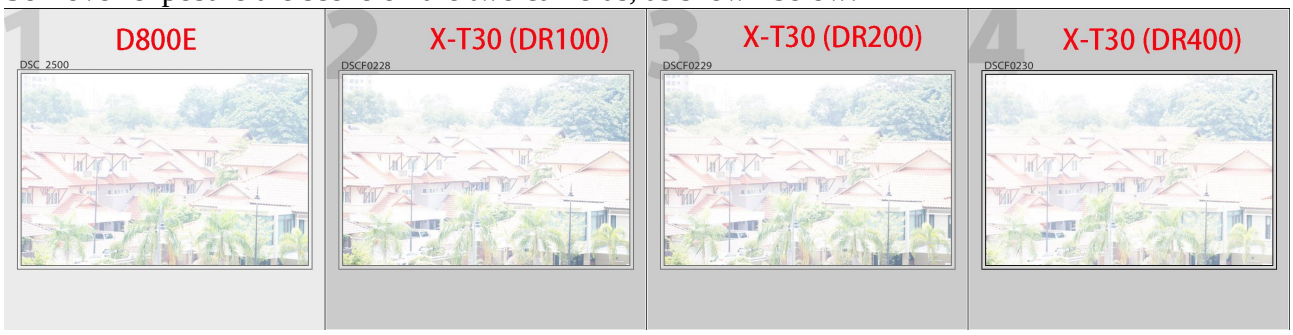
Dynamic Range of Nikon D800E vs Fujifilm X-T30 (in DR100, DR200 and D400 modes)

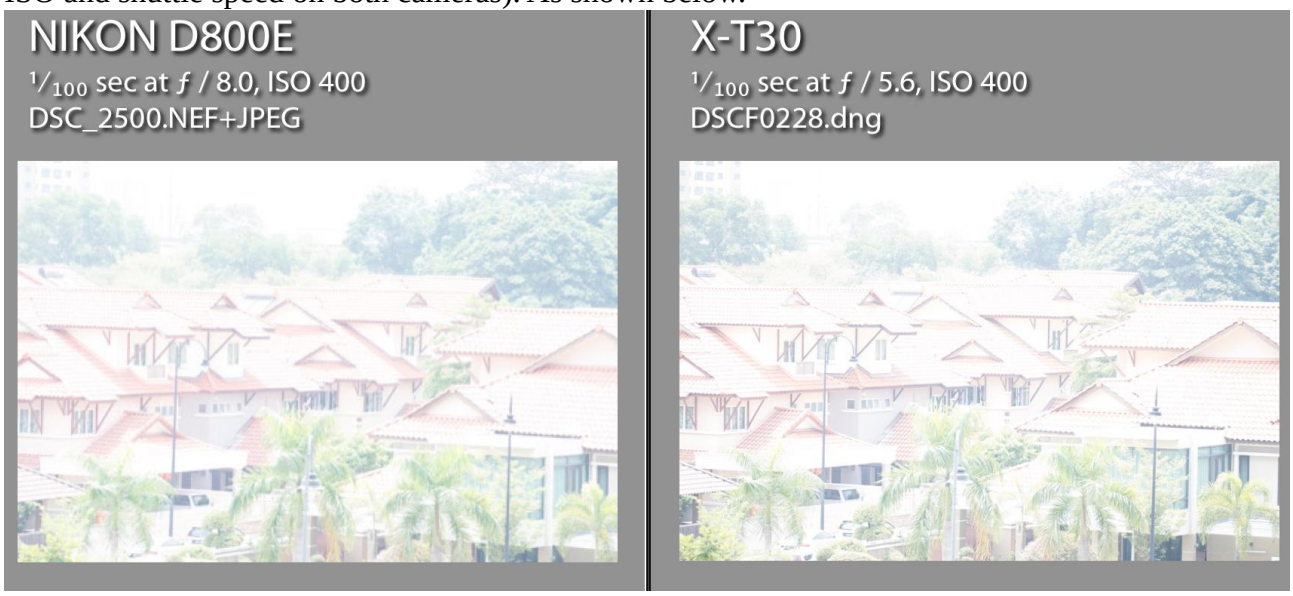
So I did a test comparing the dynamic range, particularly the high-light headroom, of a benchmark full-frame sensor, in a Nikon D800E against that of a Fujifilm X-T30.

All photos were shot in the respective NEF and RAF formats. The X-T30 files were decoded by the X-Transformer raw converter (into DNG files) before being imported into Lightroom CC, while the D800E files were decoded directly by Lightroom. The reason for using the X-Transformer for the X-T30 was because I did not have the support for the camera by Lightroom at the time. I would like to make it clear that the X-Transformer had no advantage in getting extra dynamic range from the RAF files as compared to Lightroom, as recently I have compared the results of the two softwares with a file from a Fujifilm X-T1.

So I over-exposure the scene on the two cameras, as shown below:



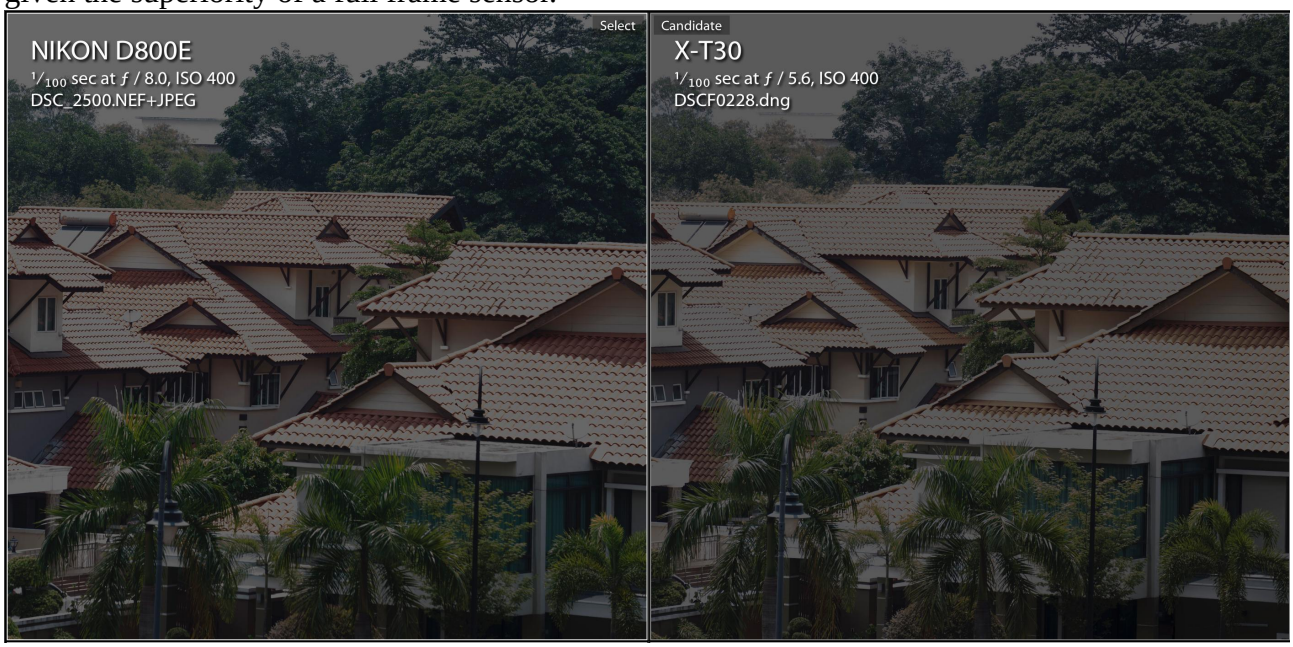
Right off the bat, I noticed that in order to achieve the same degree of over-exposure, the X-T30 required a whole stop more exposure (the aperture size was double that of the D800E, with the same ISO and shuttle speed on both cameras). As shown below.



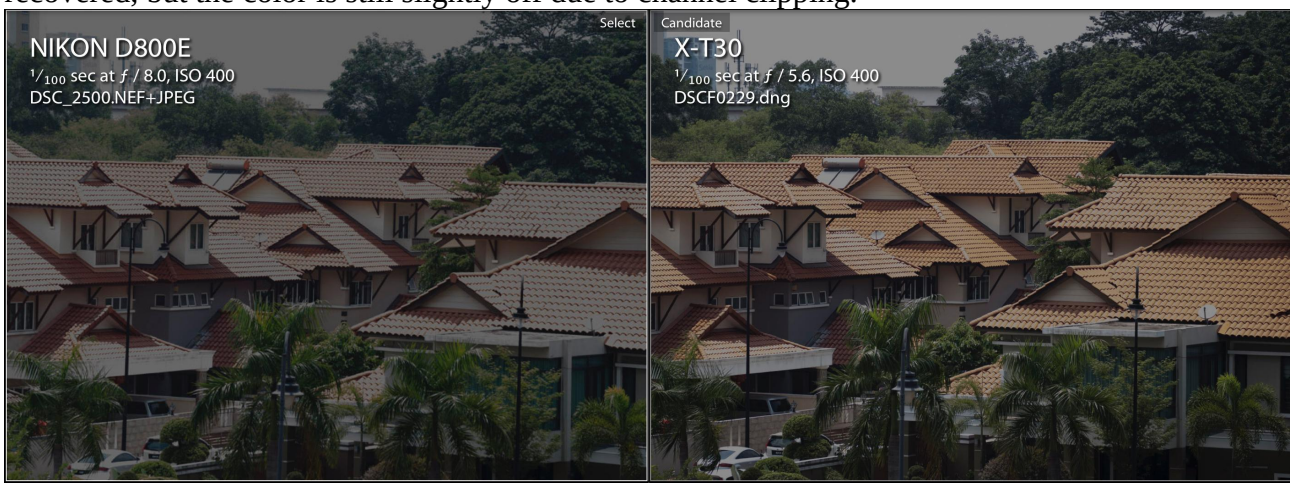
So I think the sensor in the X-T30 is less sensitive by one stop. But that is not important in here.

The exposure of each files were decreased by -5EV in Lightroom to recover high-light. Here are the results.

In the first comparison, D800E vs X-T30 in DR100 mode. From the tiles on the roofs, it is clear that high-light areas were not recoverable for both, with the D800E fair slightly better. Not surprising, given the superiority of a full frame sensor.



In the second comparison, D800E vs X-T30 in DR200 mode. High-light in the X-T30 file is mostly recovered, but the color is still slightly off due to channel clipping.



In the third comparison, D800E vs X-T30 in DR400 mode. High-light in the X-T30 file is fully recovered, and without clipping in the RGB channels, the color of the photo is now similar to the actual scene.

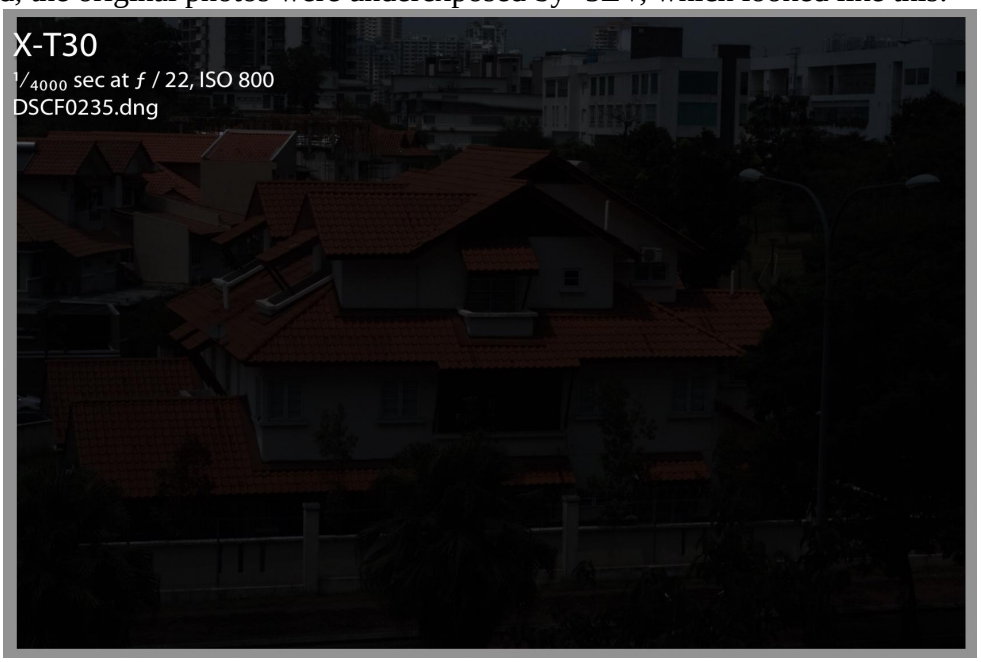
What's the catch? Well, DR200 mode is only available with ISO320 or higher, and DR400 mode is only available with ISO640 or higher. So noise is slightly higher and details slightly reduced, compared to base ISO.

Let's examine the shadow for DR100, DR200 and DR400 modes. 3 photos were taken with -5EV underexposure, and then in Lightroom, +5EV was compensated.

DR100 (left) vs DR200 (right). There is slightly more noise in the shadow in ISO=400 compared to ISO=200.

DR200 (left) vs DR400 (right). There is obviously more noise in the shadow in ISO=800 compared to ISO=400, accompanied by lost in details.

Bear in mind, the original photos were underexposed by -5EV, which looked like this:



In real world, no one will underexpose their photos this much, and no one peeps at their photos that close.

Conclusion: DR200 and DR400 modes in Fujifilm X-T30 (and all other APS-C Fujifilm X cameras) are amazing features in providing amazing high-light recovery capability beyond that of the Nikon D800E, which itself a full frame camera known to be great in delivering great dynamic range. The penalties are increased use of ISO, which lead to loss in detail and increased noise to varying degree depending on which of DR200/DR400 modes is used. All-in-all, the trade off is worthy in high contrast scenes. Sure, we could Expose-To-The-Left for every photos by 1EV or 2EV in our Nikons to prevent over-exposure in the high-lights, but this is a much more convenient approach. While how Fujifilm achieve that is unknown (the Nikon sensor is still superior), still, the result counts.