The Baire property and precompact duality

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We prove that if G is a totally bounded abelian group such that its dual group $\widehat{G}_p$ equipped with the finite-open topology is a Baire group, then every compact subset of G must be finite. Among other consequences, we obtain an example of a group that is g-dense in its completion but is not g-barrelled. These results solve two open questions in the literature.