P2 CR for llquantexp invalid case

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C FP Group

TS 18661-2 CR nn
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Reference Document: TS 18661-2

Subject: llquantexp invalid case

Summary

The **`llquantexp`** functions in 12.4.1 of TS 18661-2 compute the quantum exponent of a finite argument (of decimal floating type). Infinities and NaNs don't have a quantum exponent, so the description in C 7.12.11a.4 says "If **`x`** is infinite or NaN, they compute **`LLONG_MIN`** and a domain error occurs." In similar cases, of a function with floating parameters and integer return type, where no return value is suitable, the "invalid" floating-point exception is raised. Examples in current C include **`ilogb`**, **`lrint`**, and **`lround`**. However, TS 18661-2 neglects to specify raising "invalid" for **`llquantexp`**, which was an oversight.

For the C examples above, the specification of "invalid" is in annex F, because the functions are not just for IEC 60559 implementations. The **`llquantexp`** functions are only for decimal floating types, which C requires to be IEC 60559 conformant. Therefore, the specification for "invalid" can be in the primary description in 7.12.

CFP has made a similar change for the **`quantize`** functions. This was done as an editorial change, because it matches specification for the IEC 60559 quantize operation, whose specification TS 18661 adopts by reference.

Suggested Technical Corrigendum

In TS 18661-2 12.4.1, in C 7.12.11a.4#2, change the second sentence from:

> If **`x`** is infinite or NaN, they compute **`LLONG_MIN`** and a domain error occurs.

to:

> If **`x`** is infinite or NaN, they compute **`LLONG_MIN`**, the "invalid" floating-point exception is raised, and a domain error occurs.