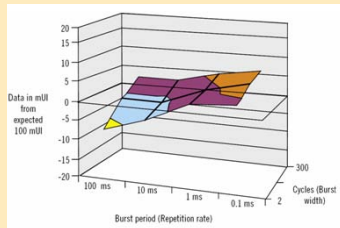
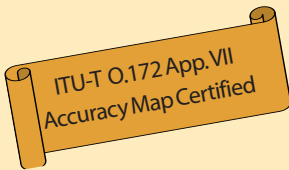
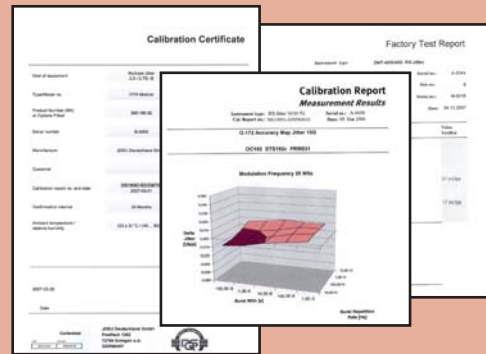


How to make a quick assessment of the accuracy, repeatability and reliability of a jitter test instrument

1. The instrument must be calibrated with a reference transmitter recommended by ITU-T O.172 App. VII that is verified with the methods described in App. VIII

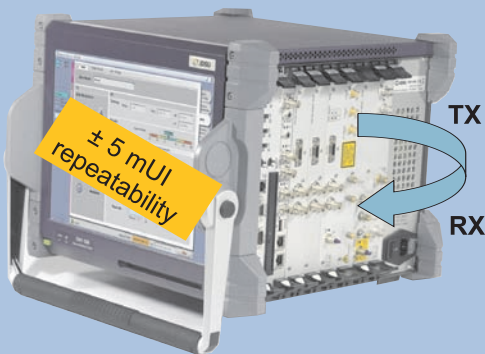


2. High receiver accuracy (JDSU guarantees 15 mUIpp at 10/10.7G, 25 mUIpp up to 2.7G, and 50 mUI for 40/43G) as calibrated and verified with an industry-standard ITU-T O.172 App. VII source, proved by Accuracy Maps.



3. Loop back measurement

- TX+RX intrinsic jitter values add up. Shown jitter values must not be corrected by software but must be equivalent to the values measured on the demodulated jitter output. A high repeatability of ± 5 mUIpp for ten times one minute measurement under same conditions must be provided.



4. Auto-mode functions (MTJ, JTF) must react in the expected way

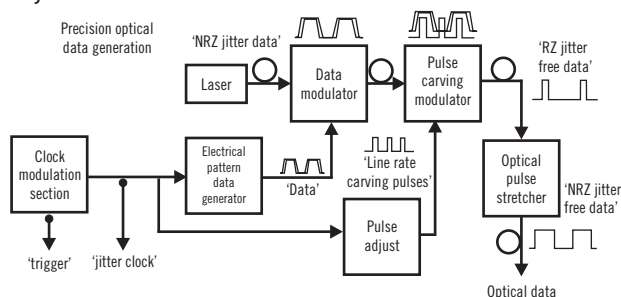
- MTJ: in loop back all results above recommendation mask, high jitter generation levels necessary to fulfill mask
- JTF: in loop back all results below recommendation mask except for high frequencies (no jitter suppression in loop back), a calibration cycle is necessary



Concise Explanation of ITU-T O.172 Appendices VII and VIII and how JDSU ONT-506/512 addresses them

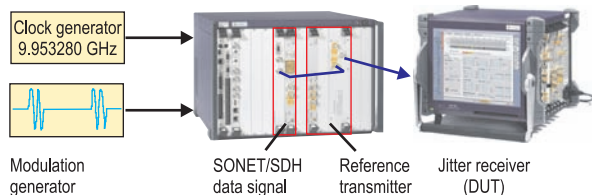
Main differences between App.VII

- App. VII addresses the RX accuracy verification of a test instrument by defining a reference transmitter which produces a SONET/SDH framed data signal with PRBS payload as specified by the standard negligible intrinsic jitter.



Reference transmitter implementation

- By adding defined jitter modulation to the reference signal the amount of intrinsic jitter of the receiver is figured out exactly (Accuracy Map).
- Modulation with transient bursts of different frequencies, burst widths and repetition rates.



JDSU calibration set-up

Reference transmitter verification

- The reference transmitter signal is verified for ITU test patterns (PRBS 15, 23, 31) by broadband jitter oscilloscope analysis.
- Compliance to O.172 App. VIII is verified as well.

Conclusion

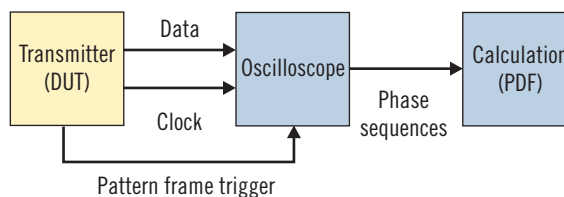
JDSU's unique reference transmitter is the only tool for jitter verification **fulfilling both ITU appendices**. Receiver accuracy verification according to O.172 App. VII (Accuracy Map) is more important for intrinsic jitter measurement of a device under test. Verification with App. VIII only is not sufficient since it is for TX verification only and does not use a realistic SONET/SDH test pattern.

For more information, please see our white paper "Jitter Measurements in Telecom Transmission Systems– Improving Accuracy and Repeatability" under www.jdsu.com/test_and_measurement/technical_resources/.

...and VIII

- Addresses the characterization of a TX signal under certain restricted conditions.
- Defined Test pattern is a diagnostic tool only. Therefore App. VIII cannot evaluate jitter originated by PRBS data signals.

Data: Test pattern 1 or 2



Principal App. VIII implementation

Summary

App. VIII does not use a realistic SONET/SDH test pattern, it modifies the header field and is not defined for all types of jitter like burst and continuous jitter.

➔ **App. VIII "Qualification of a standard TX" does not provide a comprehensive method to accurately verify RX accuracy.**

JDSU is the only test equipment supplier that has a reference transmitter and delivers Accuracy Maps

- Every jitter unit which leaves production is being calibrated with the reference transmitter to guarantee industry-leading receiver accuracy.
- An Accuracy Map characterization is supplied with every jitter instrument (calibration report).