

Application Note

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AUTOMATED BER PLOTS USING FB100A BER TEST SYSTEM AND INTEGRATED NOISE AND IMPAIRMENT MODULE



Highly accurate and automatic measurements of BER vs C/N vs Interference leads to dramatic reduction in test times.

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TECHNICAL HIGHLIGHTS

- Test engineers can now automatically plot BER vs. Eb/No vs. Interference
- Test setup is completely automated by resident software
- User can specify accuracy and confidence factors to optimize speed of test
- Software pre-calculates test time based on user defined parameters

RELATED APPLICATION NOTES

- CABLE MODEM PHY PERFORMANCE EVALUATION
- BER ANALYSIS USING FRAMED DATA
- MEASURING BER OF DEVICES WITH UNIQUE SERIAL AND PARALLEL INTERFACES
- BER TEST TIME OPTIMIZATION

DEMODULATOR PERFORMANCE CHARACTERIZATION

Performance of digital RF demodulators is often characterized by measuring BER over a range of carrier to noise ratios. In addition, these measurements are often run while applying various adjacent channel impairments at different levels.

Performing this measurement requires a BERT capable of generating the necessary test patterns, an RF modulator with the appropriate modulation and error correction schemes, and a noise and impairment source.

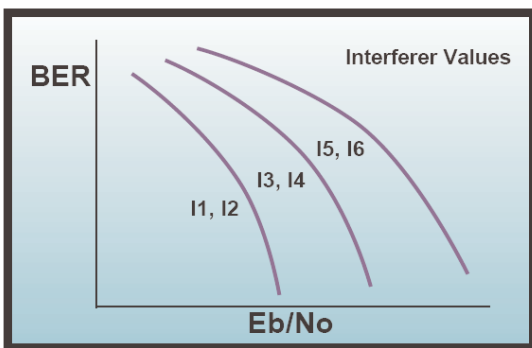


Figure 1. Typical FB100A output, BER vs. Eb/No vs. Interference testing

The user configures the BERT to supply test data to the modulator if a user-generated pattern is desired. The modulated signal is upconverted to the desired test frequency, and is routed through the impairment test set. Next, the user sets the desired carrier output power with attenuation in the impairment test set. Then the desired adjacent channel impairments are routed into the test set and the amplitudes are set at the desired levels relative to the carrier. Finally, the range of Eb/No values are set and BER vs. Eb/No for the desired adjacent signal levels are performed by the FB100A. This can be repeated for different impairment signal levels.

AN INTEGRATED HARDWARE AND SOFTWARE SOLUTION

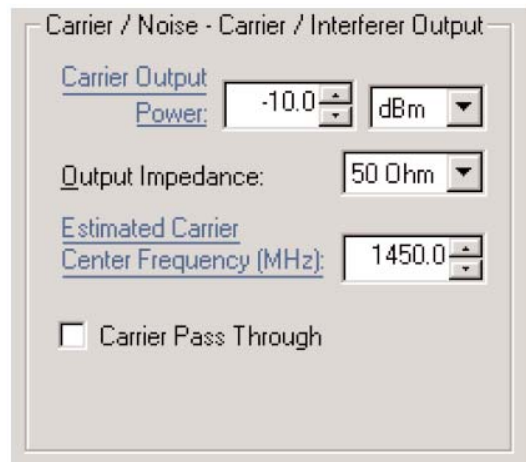
Fast Bit's FB100A BER test system, one of the system's optional modulators, and the frequency tunable noise and impairment generator module can be used together as a turn-key system to automate this measurement.

The FB100A has an internal BER "calculator" to assist the user in trading off accuracy, confidence factor and test time for each desired measurement point. The user can pre-calculate worst case test times prior to launching the measurement. By using this pre-planning software tool, test times can often be reduced significantly. When the measurement is completed, the BER data is logged and graphed. Upon completion of the measurement, the data can be stored to a file, or plotted on a local or network printer.

SETTING UP THE MEASUREMENT

STEP 1

Set the carrier output power level and the center frequency for the modulated carrier. Select operation with 50 or 75 ohm output impedance.



Carrier / Noise - Carrier / Interferer Output

Carrier Output Power: -10.0 dBm

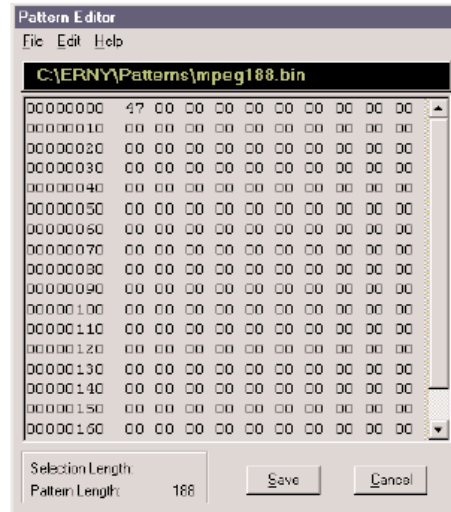
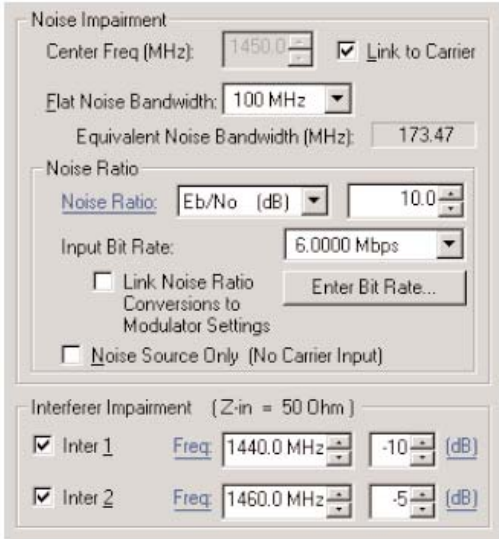
Output Impedance: 50 Ohm

Estimated Carrier Center Frequency (MHz): 1450.0

Carrier Pass Through

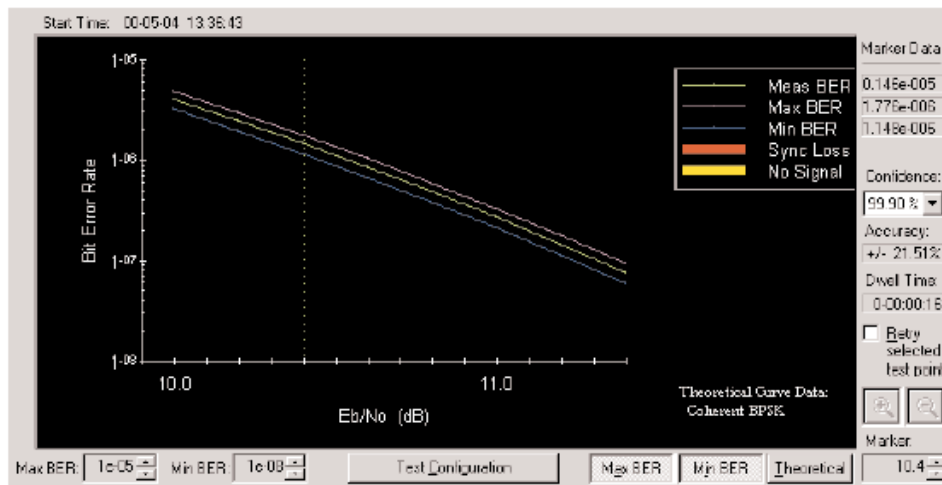
STEP 2

Select the desired flat noise bandwidth. Link or set the center frequency of the frequency agile noise source to the carrier center frequency. Select the desired units for C/N and enter the applicable bit or symbol rate. For a single point measurement, set the desired C/N ratio. To generate a curve, use the "Automated Eb/No" controls in the FB100A, per step 4. If additional interfering signals are desired, connect these signals to the test set and set the desired C/I ratios.



STEP 3

Either configure the modulator to use its internal test pattern or program the FB100A generator and analyzer patterns using the hex pattern editor.



RUNNING THE TEST

STEP 4

Select the Auto Noise Icon under the C/N - C/I entry on the Outlook bar. Edit the settings as described in Application Note "BER Test Time Optimizatation". Click on "Start Measurement and Graph" to begin testing and graphing.

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