Processing gain test setup

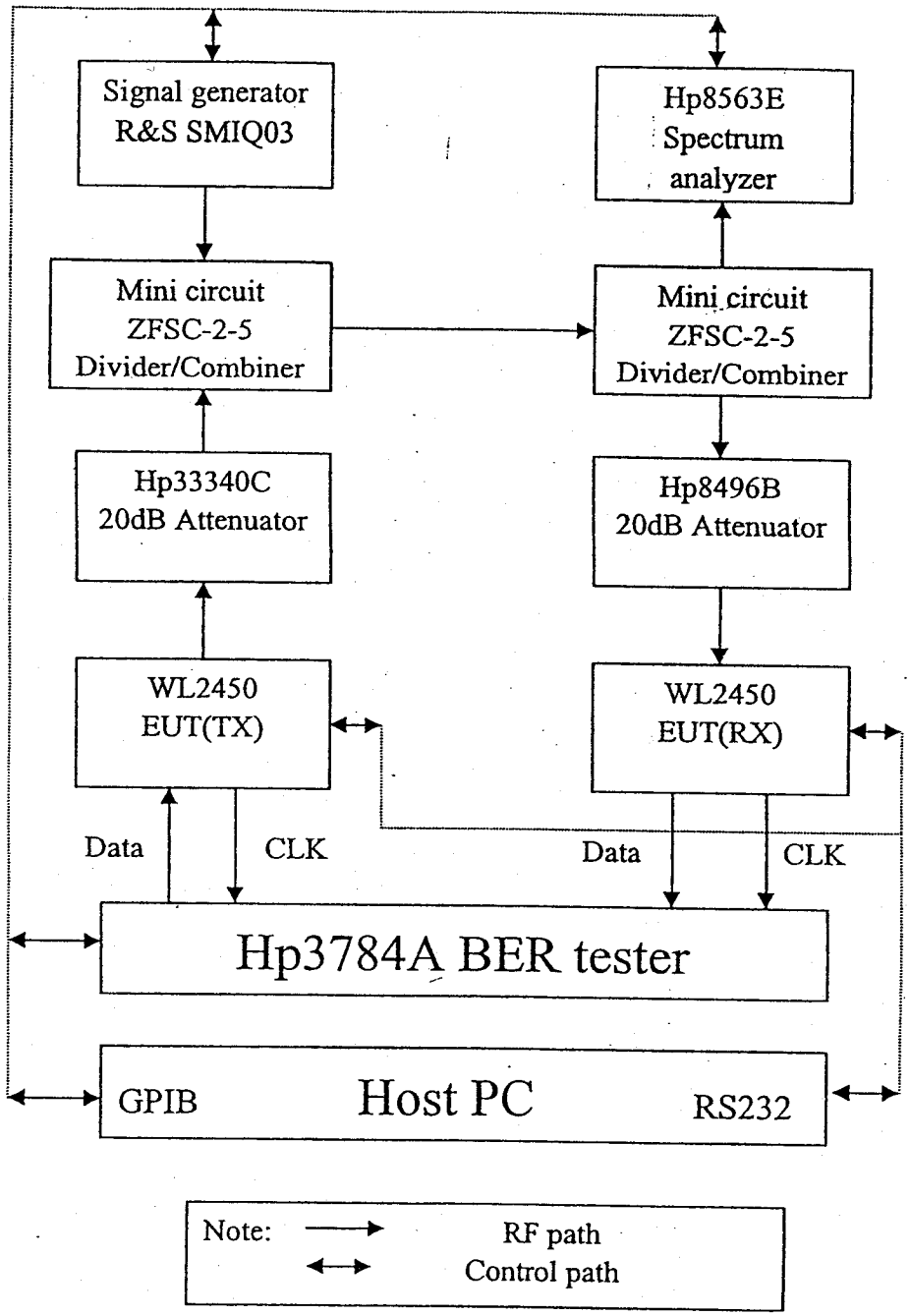

Fig 1

(2) Procedures

(a) Test installation setup as Fig 1. After receiving a Tx command from Host PC, the EUT(Tx) sends a clock signal to synchronize with BER Tester (Hp3784A). The test firmware loaded into the EUT(Tx) will transmit a random data packet, generated from Hp3784 BER Tester.

(b) After receiving a Rx command from Host PC, the test firmware loaded into the EUT (Rx) will enter EUT into Rx mode. The EUT (Rx) then, demodulates received data, sends them to BER Tester. The BER Tester checks the data and calculates BER.

(c) The Host PC controls both EUT(Tx) and EUT(Rx) via RS232 port.

(d) The Host PC controls RF Signal Generator, Spectrum Analyzer and BER Tester via GPIB interface to get an appropriate J/S ratio.

(e) Repeat (d); by increase/decrease jamming power in the test program, to get a chosen BER, then records the J/S ratio.

(f) Repeat (e) by increasing CW jamming frequency in 50KHz step across entire pass band of each test channel.

(3) Test Condition

(a) The test configuration and procedure are according to the FCC document 54797, page 2-3.

(b) The pass band of each channel is 22MHz.

(c) The BER Tester is set up to calculate BER per 10 second. When the BER value is close to 1×10E-5, record the value and get the J/S.

(e) The power value of Signal and Jammer, listed in the test results, are read and recorded, automatically by the program, directly from the "channel power measurement function" of HP8563E Spectrum Analyzer with Signal, or Jammer turned off.

(4) Derivation of the Processing Gain

(a) The Processing Gain (Gp) is calculated according to the following equations:

$Gp = (S/N)o + Mj + Lsys$ .....(4-1)....Refs to FCC document 54797 Page3.

Where Mj = J/S ratio (dB)

Lsys = System losses (assumed to be 2 dB)

(S/N)o = the required signal to noise ratio at the receiver output for a given received signal quality.

(b) Since the EUT uses coherent DBPSK/DQPSK demodulation, a (S/N)o=9.8dB is required to sustain a BER of 1×10E-5. This is shown at the curve of Fig.7.2, Viterbi, A.J. Principles of Coherent Communications, Page 192 (New York,

McGraw-Hill, 1996), Recommended by FCC document 54797.

Therefor, from equation (4-1)

$Gp = 9.8 + J/S + 2\ (dB) = 11.8 + J/S\ (dB)$.....(4-2)

(5) Test Results

The data points of test results are listed in following pages. In addition, three plots are also listed to show the processing gain versus frequency. Discard the worst 20% of J/S ratio data points. The remaining lowest J/S ratio is used to determine the Processing Gain, according to derived equation(4/2), of each test channel.

For channel 1, PG =10.03
channel 6, PG =10.06
channel 11, PG =10.11

In these three channels, the measured Processing Gain values of EUT are greater than 10dB, which satisfies §15.247(e).