



# Gooch & Housego

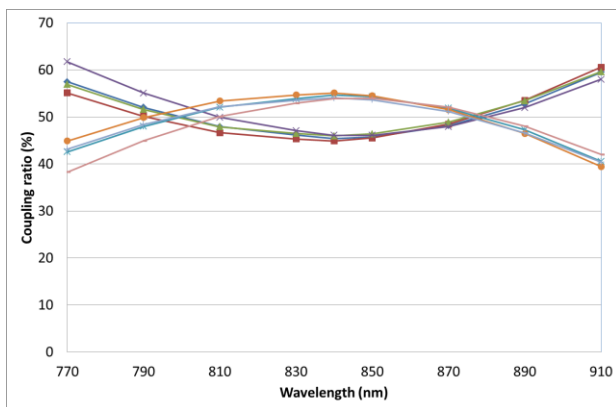
## OCT Coupler Application Note 1:

### OCT Ultra-wideband coupler performance

This application note is intended as a guide to the performance of ultra-wideband OCT couplers designed for fiber interferometers for use in OCT light engines. Coupling ratio and excess loss data is provided for a selection of devices operating in the important OCT wavelength bands of 850nm, 1060nm, and 1300nm. At the end of the application note we also present a guide as to how these devices are measured. All G&H components are measured prior to shipment and this data is kept in our historical database.

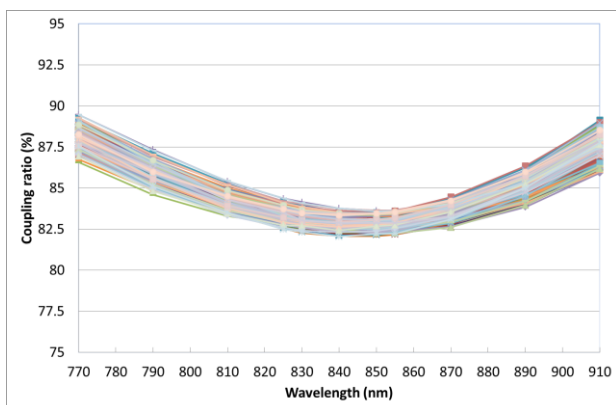
### 850nm Window Coupler Performance

The following data comprises of measurement of 50/50 couplers at 840±70nm

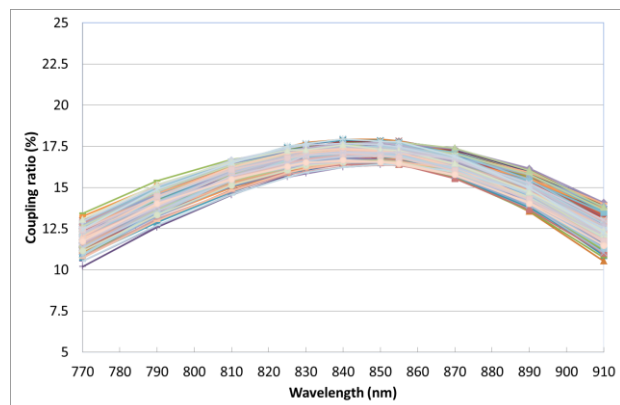


Graph 1: coupling ratio through port P2 & Port P3

The following data comprises of measurement of 85/15 couplers at 840±70nm



Graph 2: coupling ratio through port P2



Graph 3: coupling ratio through port P3

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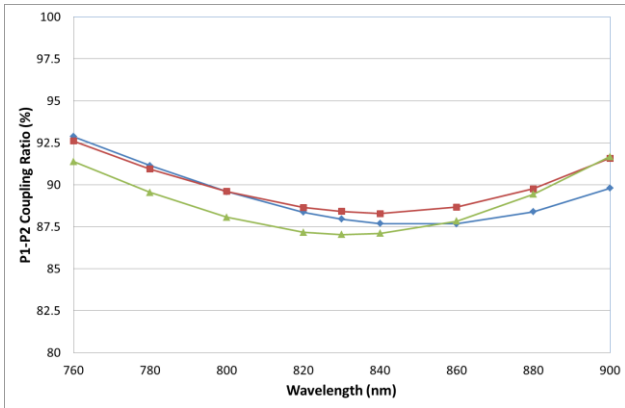
As part of our policy of continuous product improvement we reserve the right to change specifications at any time  
PEC 0181 Issue 1



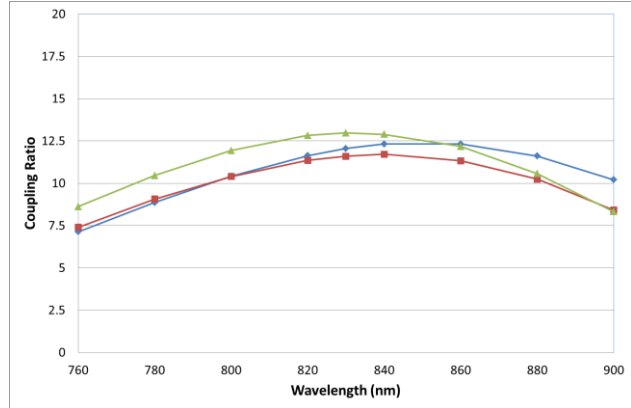
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The following data comprises of measurement of 90/10 couplers at 840±70nm

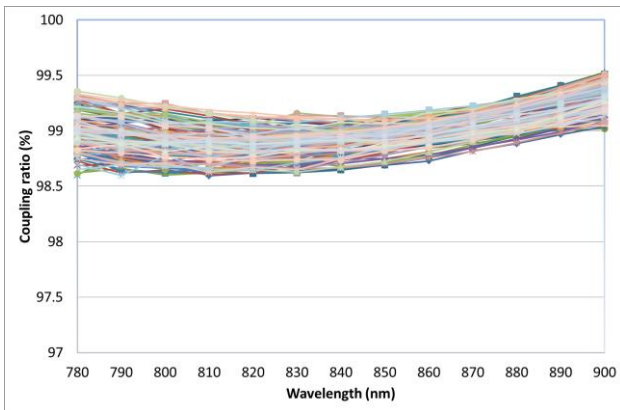


Graph 4: coupling ratio through port P2

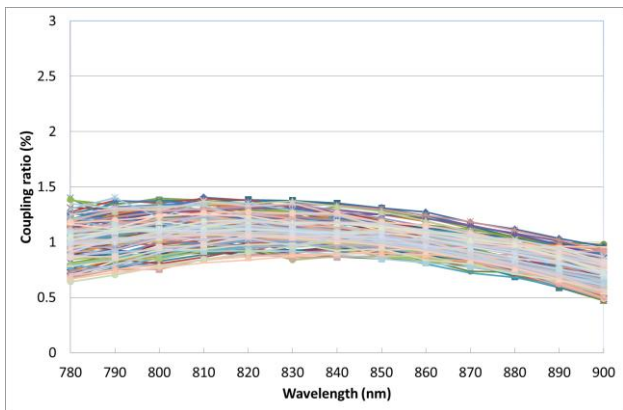


Graph 5: coupling ratio through port P3

The following data comprises of measurement of 99/1 couplers at 840±60nm



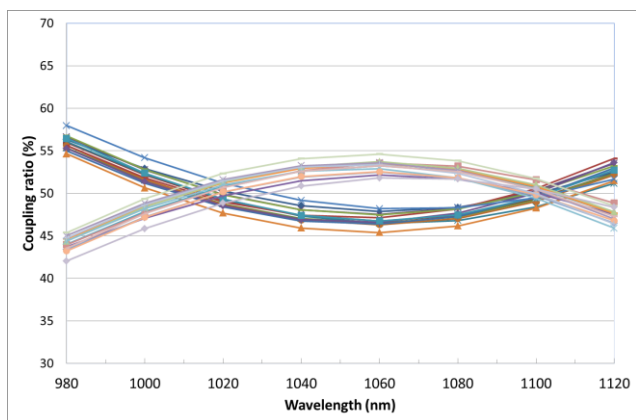
Graph 6: coupling ratio through port P2



Graph 7: coupling ratio through port P3

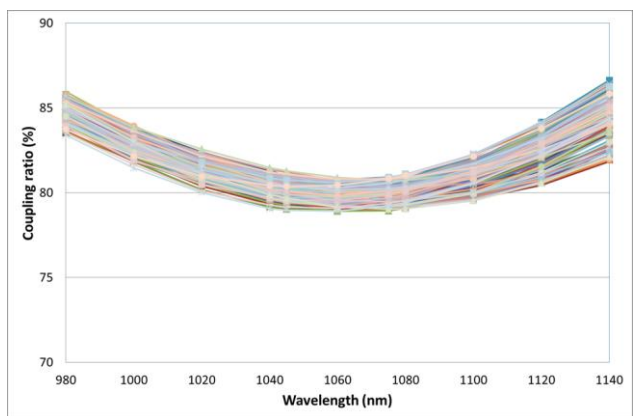
## 1060nm Window Coupler Performance

The following data comprises of measurement of 50/50 couplers at 1050±70nm

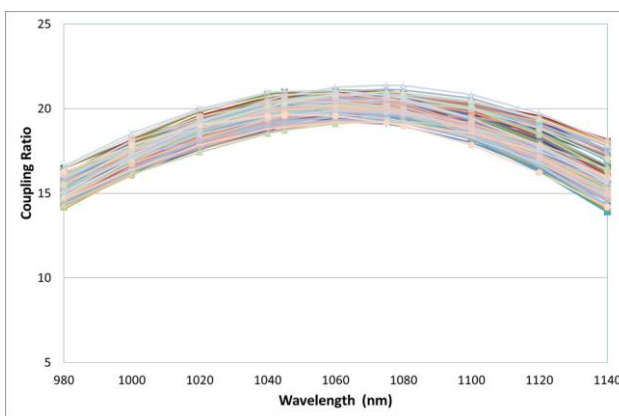


Graph 8: coupling ratio through port P2 & Port P3

The following data comprises of measurement of 80/20 couplers at 1060±80nm

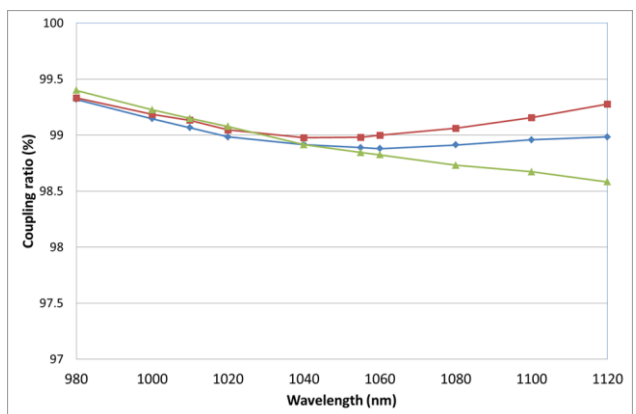


Graph 9: coupling ratio through port P2

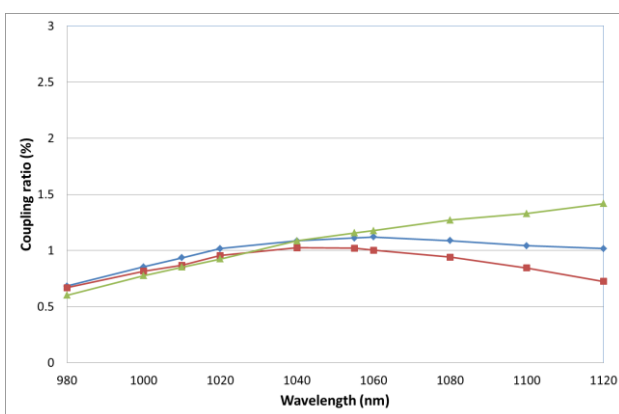


Graph 10: coupling ratio through port P3

The following data comprises of measurement of 99/1 couplers at 1050±70nm



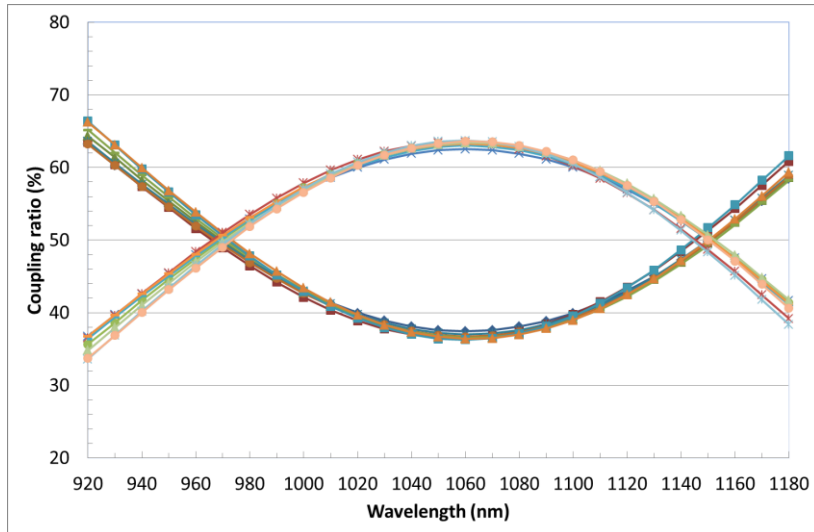
Graph 11: coupling ratio through port P2



Graph 12: coupling ratio through port P3

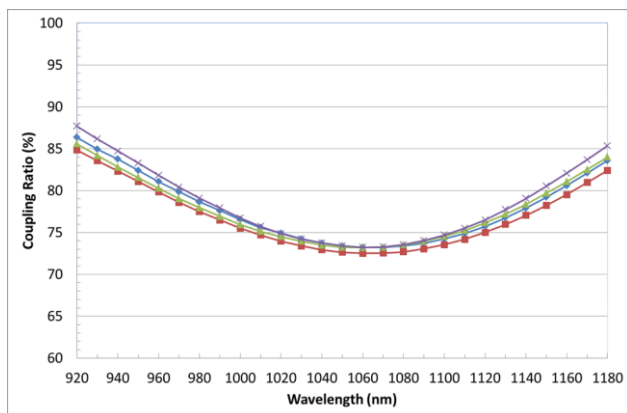
## 1060nm Window Ultra-Wideband (260nm) Coupler Performance

The following data comprises of measurement of 50/50 couplers at 1050±130nm

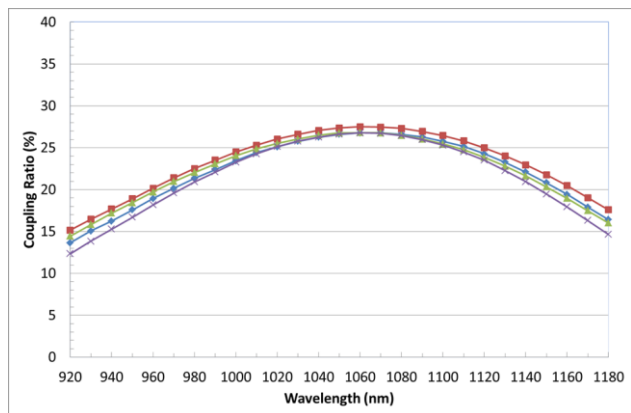


Graph 13: coupling ratio through port P2 & Port P3

The following data comprises of measurement of 80/20 couplers at 1050±130nm



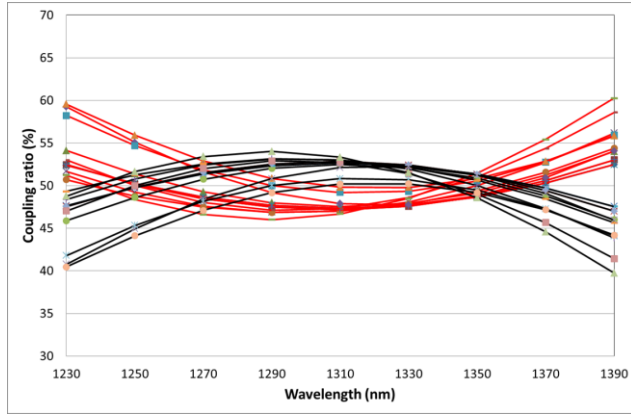
Graph 14: coupling ratio through port P2



Graph 15: coupling ratio through port P3

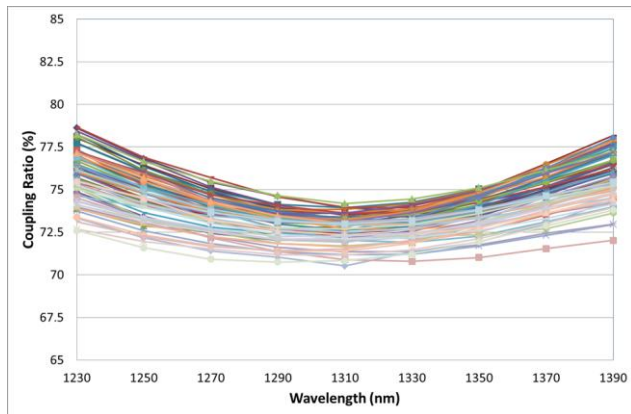
## 1310nm Window Coupler Performance

The following data comprises of measurement of 50/50 couplers at 1310±80nm

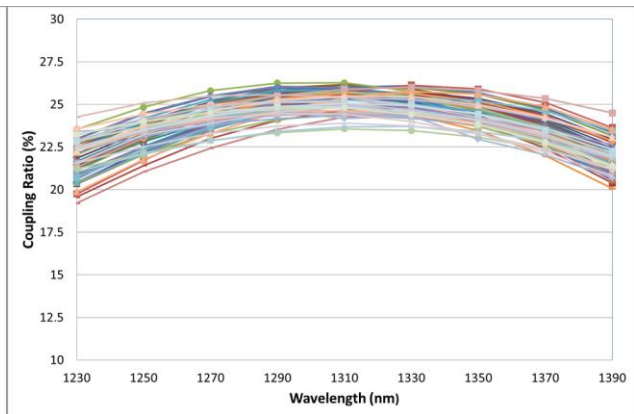


Graph 16: coupling ratio through port P2 & Port P3

The following data comprises of measurement of 75/25 couplers at 1310±80nm



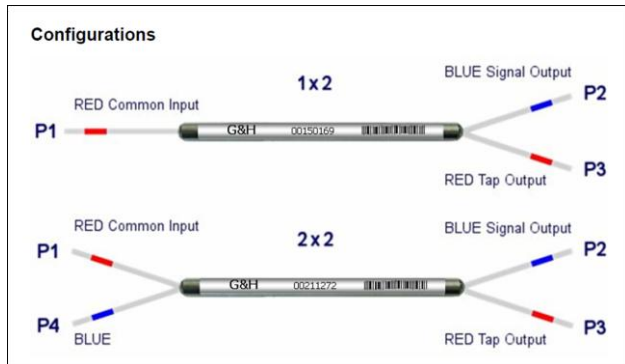
Graph 17: coupling ratio through port P2



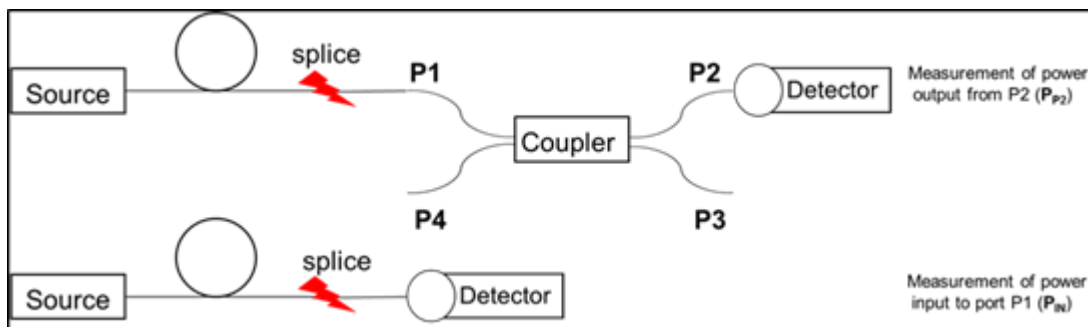
Graph 18: coupling ratio through port P3

## Fused Coupler Measurements

- Fused couplers are typically 3 or 4 port devices
- Ports are named P1, P2, P3, and P4 as shown below
- It is G&H convention to color the ports as indicated



- Fused couplers should be measured using a “cut back” technique to ensure splice loss does not affect the measurement.
- The “cut back” measurement is illustrated below
- A source is spliced onto Port P1 and power output is measured at the other ports P2 and P3 (P<sub>P2</sub> and P<sub>P3</sub>)
- Finally the fiber is broken between the splice and port P1 and the power is measured from the source (thus including any splice loss) – this is defined as P<sub>IN</sub>



- All fused coupler performance data is derived from measuring the power output from the output ports and then measuring the power to the input port

### Coupling Ratio (CR) from Ports P2 and P3

$$CR_{P2}(\%) = \left[ \frac{P_{P2}}{(P_{P2} + P_{P3})} \right] \times 100$$

$$CR_{P3}(\%) = \left[ \frac{P_{P3}}{(P_{P2} + P_{P3})} \right] \times 100$$

### Device Excess Loss (light lost in transmission)

$$EL (dB) = -10 \times \log \left[ \frac{P_{P2} + P_{P3}}{P_{IN}} \right]$$