

EECS 622 Project -
A Super-Het Receiver Design

Rev. A

Fall 2008

1. Summary

For this project, your team will **synthesize a wideband microwave receiver** design and analyze the design performance. This design includes the identification and specification of every microwave component, including LNA, preselection filter(s), mixer(s), local oscillator(s), IF amplifier(s), controllable attenuators(s), and IF filter(s).

You team will submit—by **5:00 pm on Friday, December 12**—a report that **a)** describes this design, and **b)** provides an analysis and verification of design specifications.

Your team will not build or in any way construct this receiver—this is a **paper design only!**

2. Technical Requirements

2.1 Receiver Requirements

The technical **requirements** for this microwave design are stated below.

2.1.1 RF Bandwidth

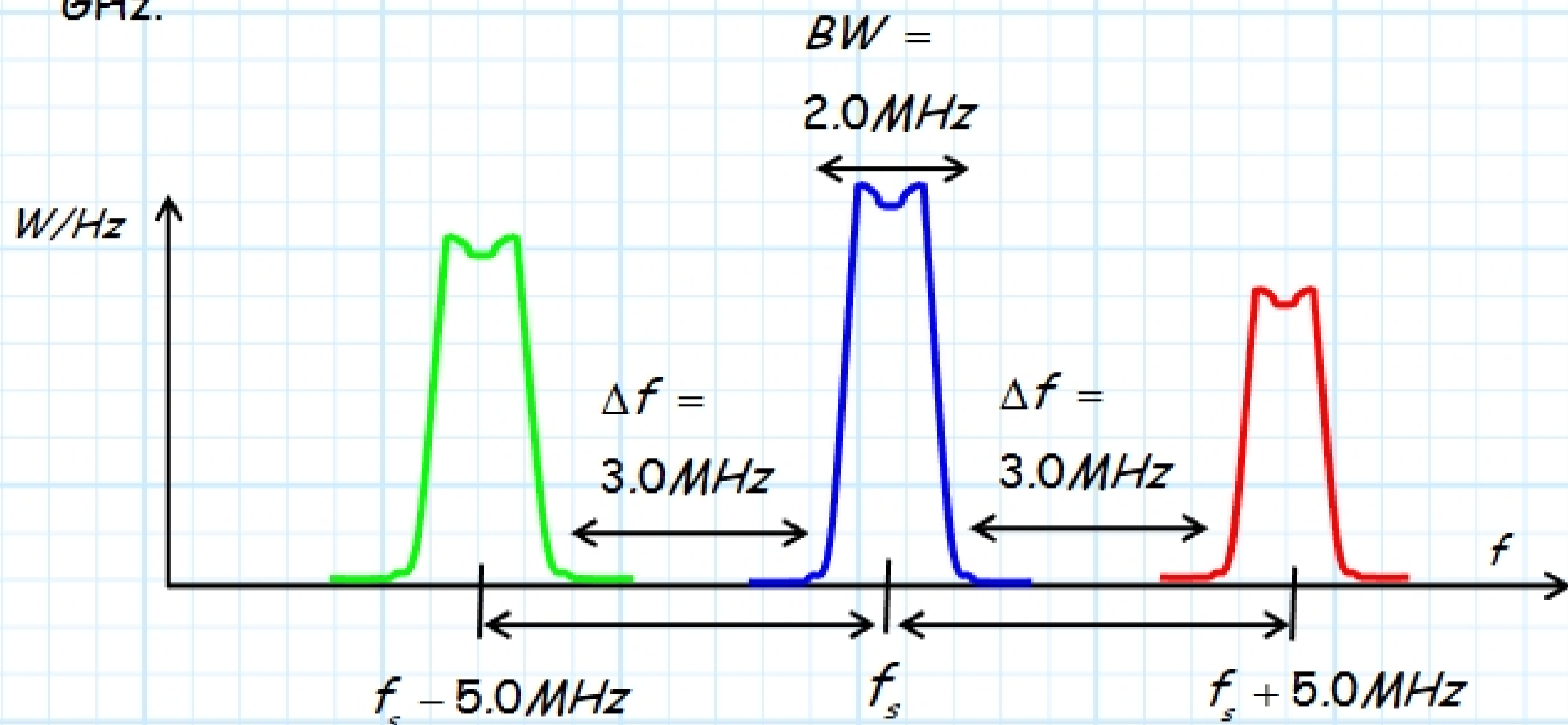
The **total** 3 dB-bandwidth for this microwave receiver shall extend from 3.0 GHz to 5.0 GHz.

2.1.2 IF Bandwidth

The **instantaneous** bandwidth of this microwave receiver shall be 2.0 MHz.

2.1.3 Channel Spacing

The adjacent signals in the RF spectrum can be as close as 5.0 MHz. In other words, the **gap** between adjacent signals can be as small as 3.0 GHz.



2.1.4 Selectivity

The IF filter shall attenuate **adjacent channels** by **at least 40 dB**.

2.1.5 Image Rejection

The RF **image band** shall be attenuated by **at least 50 dB**

2.1.6 Spurious Signal Rejection

All RF **signals** that produce spurious products at the **IF center frequency** shall be attenuated by **at least 25 dB**.

2.1.7 Sensitivity

The Minimum Discernable Signal shall be **less than -104 dBm**.

2.1.8 Total Dynamic Range

The **total dynamic range** of the receiver shall be **as large as possible**.