



# 5G RF Planning and Design Part 3: 5G Link Budget

**5G\_230d | On-Demand | 5G Access | Expanded**

**Course Duration:** 4 hours

This is the third course in a four-course set of self-paced courses encompassing 5G RF Planning and Design. In this course, you will learn about the components of a 5G link budget. You will also learn the impacts of mid-band frequencies and different types of 5G use cases on the link budget. Each course in this four-course set can stand on its own or can be combined with other courses as necessary to meet your learning objectives.

## Intended Audience

RF planning and design and performance optimization engineers

## Objectives

After completing this course, the learner will be able to:

- Identify components of 5G link budget for different services in low, mid, high bands
- Describe the uplink and downlink channels and signals in 5G
- Calculate 5G link budgets for eMBB and URLLC

## Course Prerequisites

[5G NR Air Interface](#)

## Outline

1. 5G Link Budget Principles
  - 1.1 Link Budget Principles
  - 1.2 Approach for Developing a Link Budget
  - 1.3 Link Budget and Cell Size
2. Propagation Models
  - 2.1 Propagation for 5G Spectrum
  - 2.2 Propagation Model and Scenarios
3. Channels and Signals for RF Design
  - 3.1 Downlink Channels and Signals
  - 3.2 Uplink Channels and Signals
4. Link Budget Considerations
  - 4.1 Uplink Link Budget for eMBB
  - 4.2 Downlink Link Budget for eMBB
  - 4.3 URLLC and mMTC Link Budgets
  - 4.4 Mid-band Link Budget

Exercise: Link Budget Calculations for DL and UL