# 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

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