

Application Note

Output Level, Attenuators, and Return Loss

1. The DTA-110's output level is -25dBm, 5dB higher than that of the DTA-107. Why?

Customers asked for a higher output level. They want to compensate for the loss of longer cables and distribution networks (splitters).

2. Is the higher output level detrimental to my equipment?

In general, no. The level is still quite low so that it is not destructive.

3. What is the downside of a having higher output level?

In some cases, the input stage in the receiving equipment can be overdriven. This mainly happens when the receiver is directly connected to the DTA-110, and when a short cable is used.

4. What happens when the input stage in the receiver is overdriven?

It compresses the signal. The constellation points are squeezed. This starts with the corner points. Compression makes it difficult to detect the signal reliably, resulting in a higher Bit Error Rate. In extreme situations, the receiver might not even lock.

5. How can I prevent this to happen?

Insert an attenuator between the DTA-110 and the receiver. DekTec ships the DTA-110 with a 10dB attenuator.

6. Should I insert the attenuator on the DTA-110 side, or on the receiver side?

That does not matter. Attenuators are symmetric. Inserting the attenuator on the receiver side has the added benefit that it improves the return loss of the receiver input.

7. How does an attenuator improve return loss?

The attenuator attenuates both the incident and the reflected signal. Thus, a 10dB attenuator improves return loss by 20dB. Theoretically spoken, of course. The attenuator has its own return loss, which is 20dB for the shipped part.

8. What is the downside of using an attenuator?

When a weak signal is further attenuated, you might run into noise problems. For very low input levels the receiver's input stage starts adding noise. Never use attenuators when you run a distribution network with various passive splitters and long cables.

9. What about active splitters?

Active splitters can be overdriven, too. Never use an active splitter right after the DTA-110, unless you are sure it can handle the large signals here.