

How do I Measure the VSWR of this Video Detector?

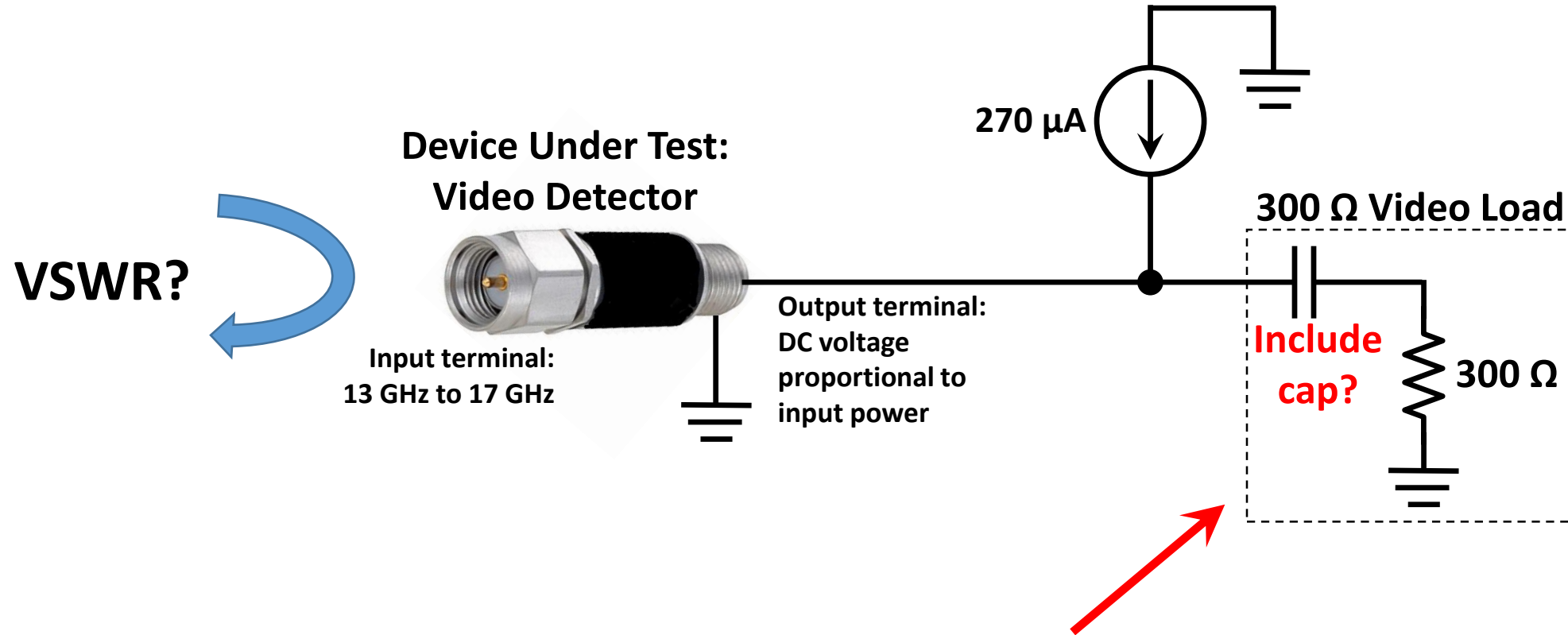
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From the Spec sheet:

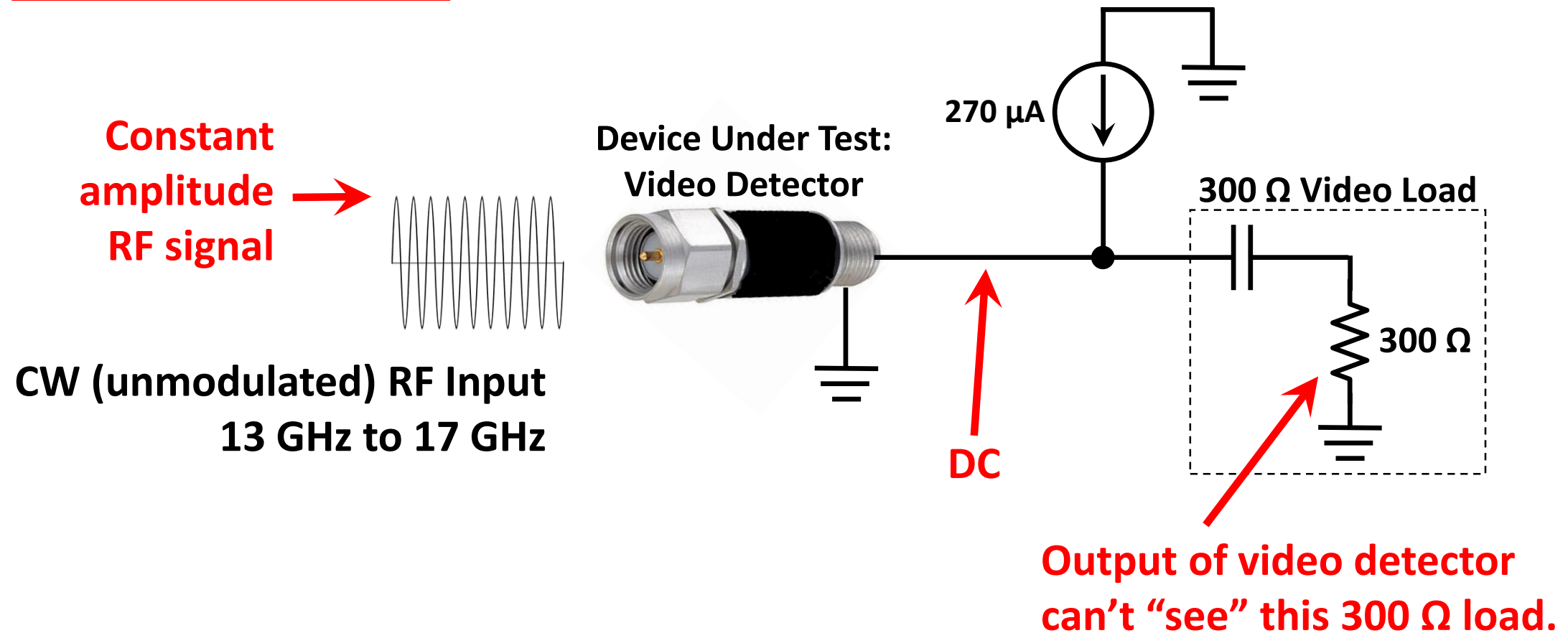
- Frequency range: 13.0 GHz to 17.0 GHz.
- ➔ • VSWR: The RF Input VSWR shall be less than 4.0:1 over the operating frequency range with a detector bias of 270 μ A and a video load resistance of 300 Ω .
- Video polarity is negative.

I believe I need to measure the VSWR while sweeping from 13 GHz to 17 GHz, with a $300\ \Omega$ video load connected to the output and $270\ \mu\text{A}$ DC of current being sourced into the output terminal:

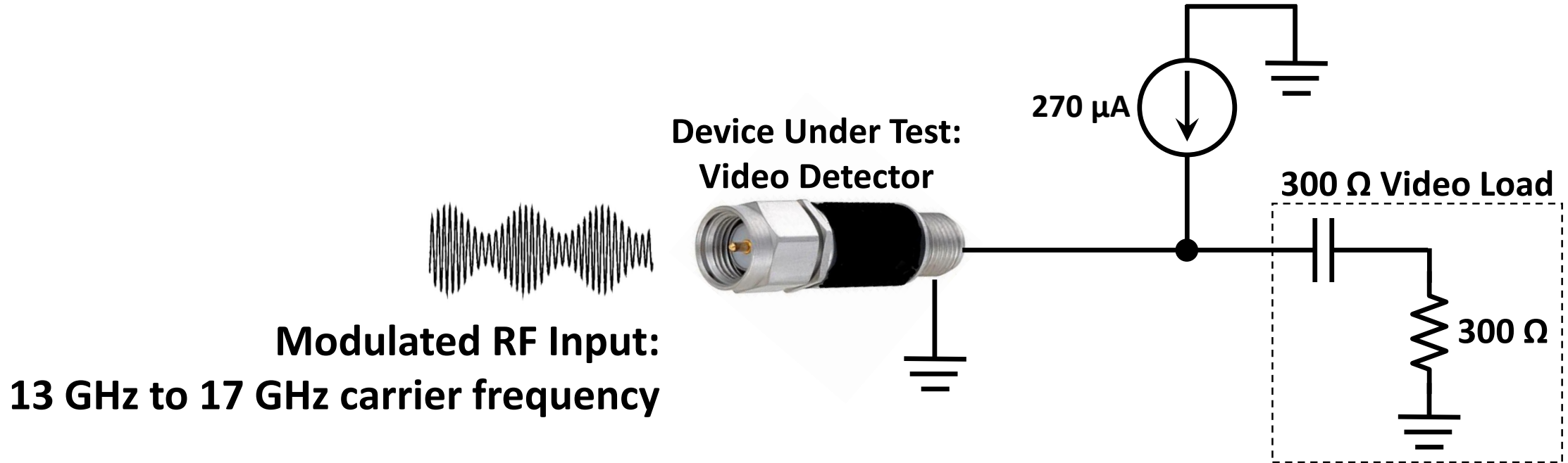


First assumption: I don't think the video load can just be a $300\ \Omega$ resistor. I think the video load needs a blocking capacitor to prevent the $270\ \mu\text{A}$ of current from going into the resistor. Would that be correct?

Second assumption: If I need a blocking capacitor for the video load, then I assume the microwave signal to the input of the detector (13 GHz to 17 GHz) *can't* be a simple, CW (non-modulated) signal. Because if it were, the output of the detector would be DC, and thus the output of the detector would not “see” the 300 Ω load. Would that be correct?



If the previous two assumptions are correct, it means I would need to measure the VSWR with a *modulated* signal, with the carrier swept from 13 GHz to 17 GHz.

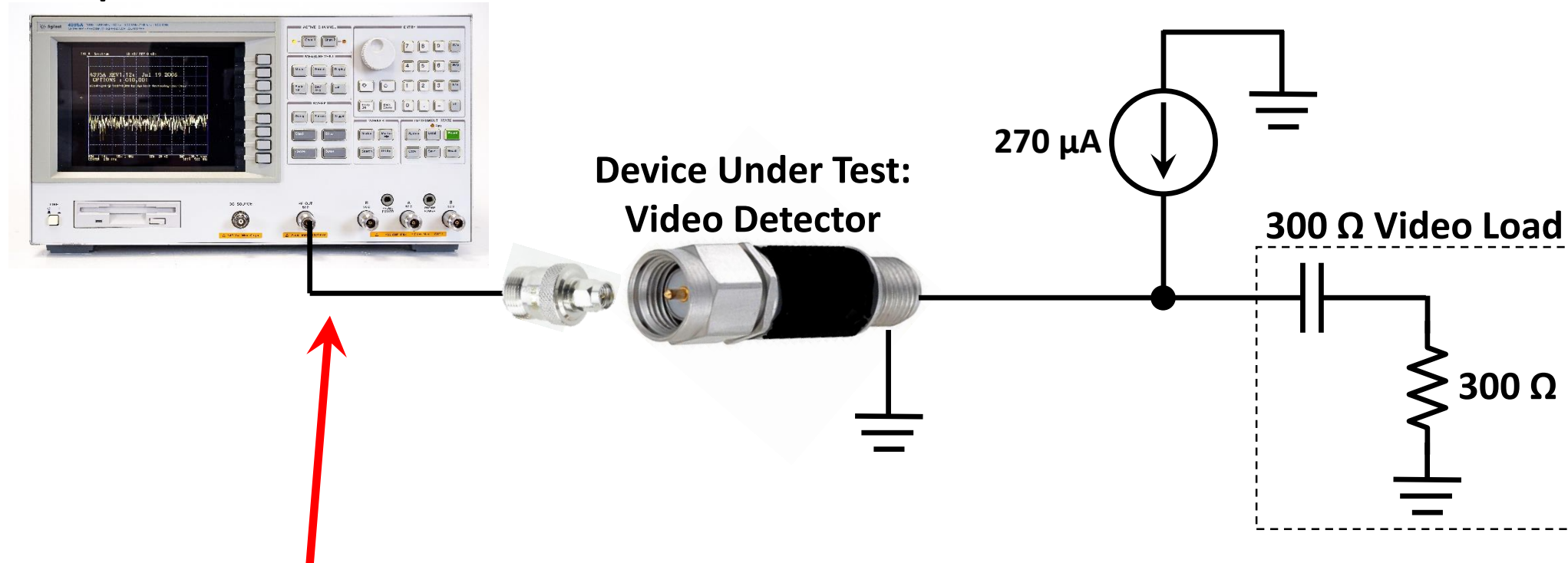


Two questions, then:

1. What type of modulation should be used? AM? FM? Other?
2. How should the VSWR be measured? Can a VNA measure VSWR using a modulated signal? Or should I use a stand-alone sweep generator, modulation source, and directional coupler? See next two slides.

Approach #1: Use a Vector Network Analyzer (VNA) to measure VSWR.

VNA
Sweep from 13 GHz to 17 GHz



Can you modulate the carrier signal from the VNA? Does a VNA have a modulation input? Can the VNA measure VSWR with a modulated carrier? Or does a VNA measure VSWR for only a CW (non-modulated) signal?

Approach #2: Use separate components to measure VSWR.

Does this look O.K.?

