# 10MHz – 10GHz Bias-T from China

Rev 1.0
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Hello,

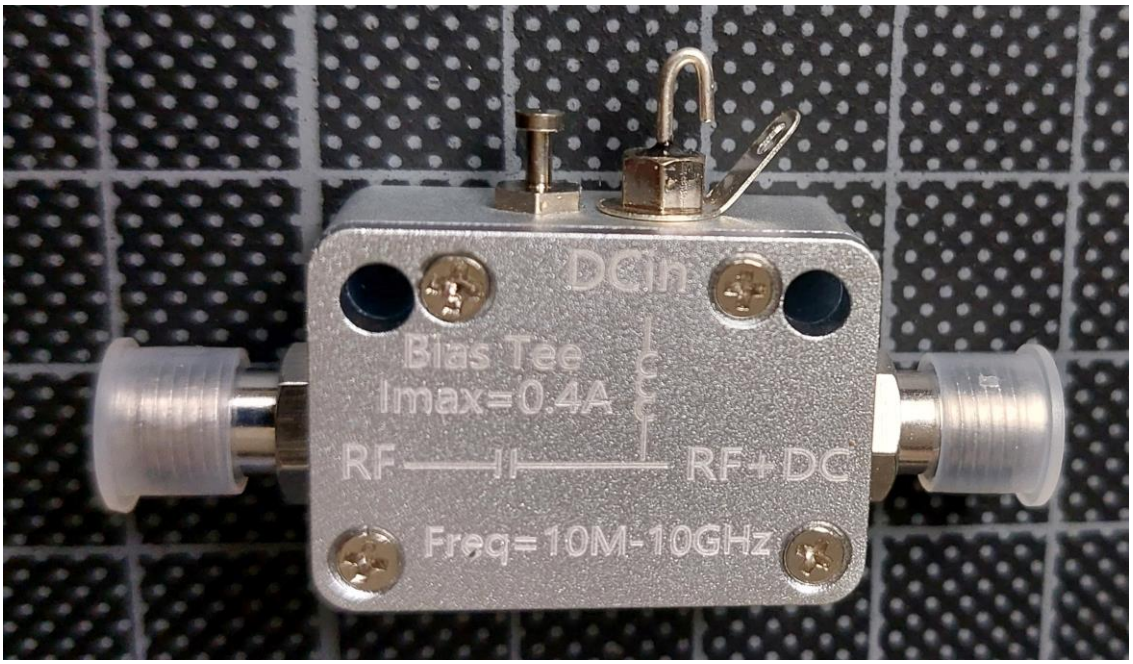
Today I received a Bias-T from China which I was curious to test. The specified frequency range is 10MHz to 10GHz. The price was very attractive: I paid 14.03 Euros from Ali-Express including VAT and shipping to Germany. The part arrived within 8 days as guaranteed by the seller. Here is the advertised specification:

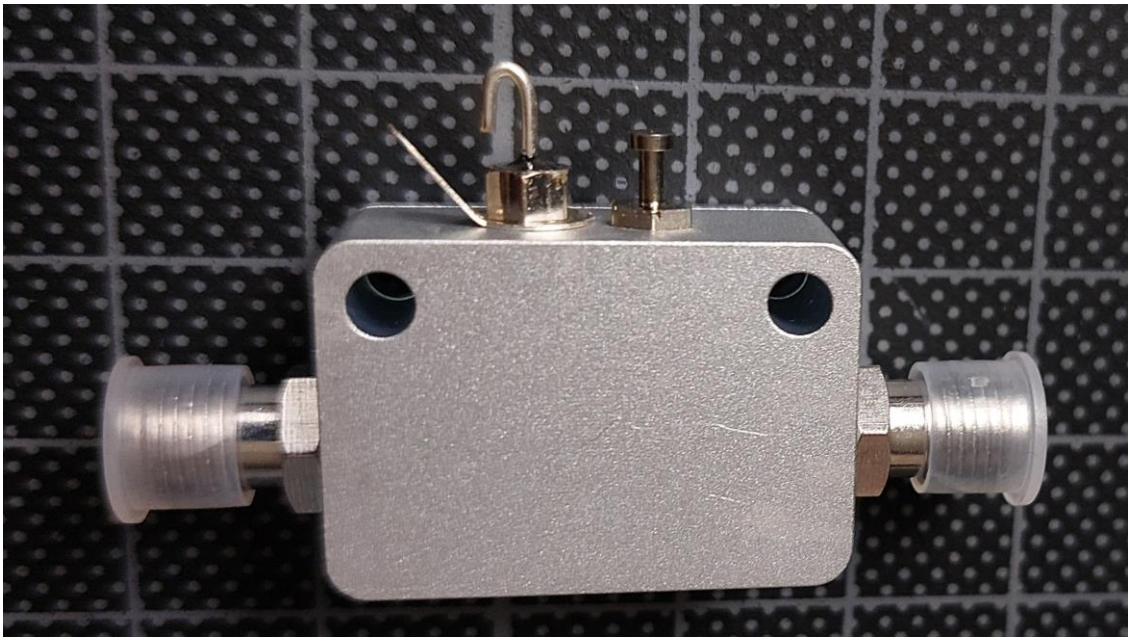
| | |
|---|---|
| Frequency range: | 10MHz-10GHz |
| Insertion loss: | 0.5dB@6GHz, 0.9dB@10GHz |
| Supply voltage: | max. 50V DC |
| Supply current: | max 0.4A |
| Connectors: | SMA female input and output |
| Size (w/o connectors): | 26mm x 18mm x 12mm |

Here is the frequency response S11 and S21 as advertised by the seller:

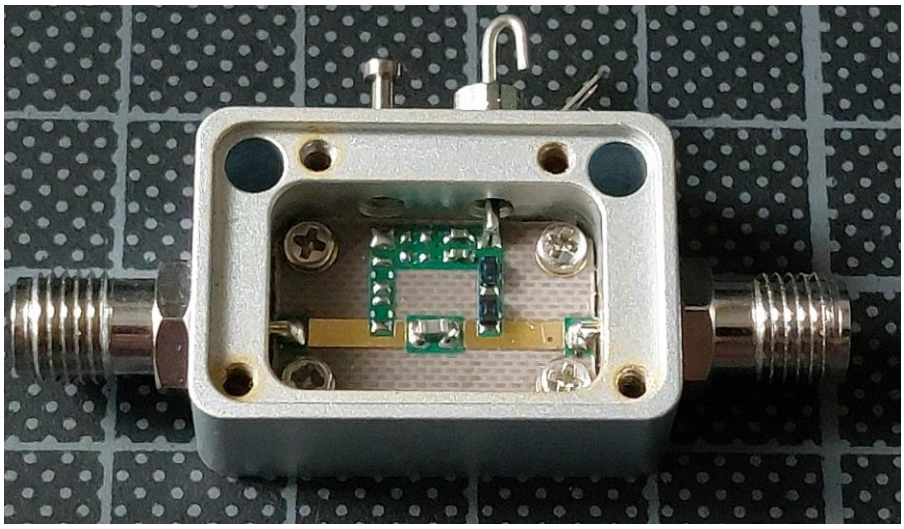

The scaling of the plots with 10dB/div is quite course but the marker values of an insertion loss of less than 1dB up to 10GHz looks very nice.

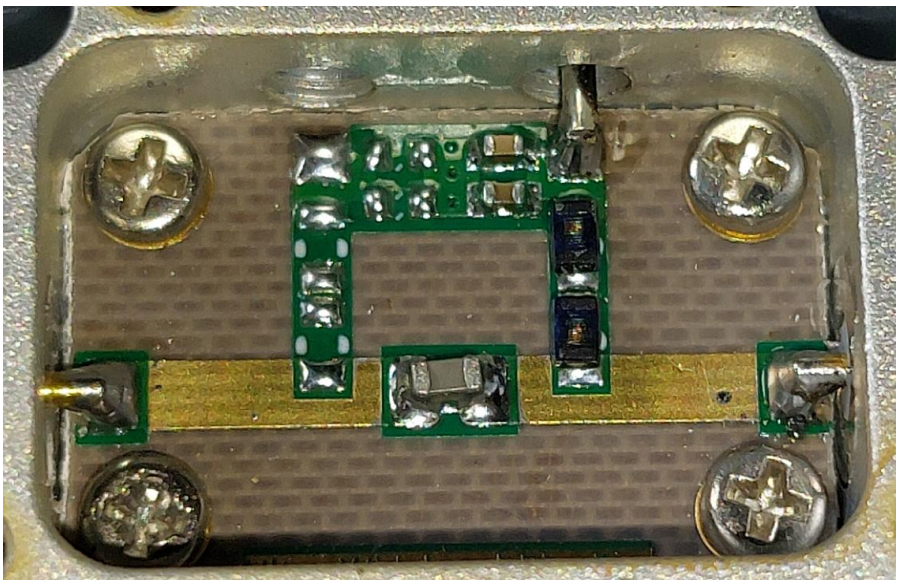
Here are some pictures of the device I received. The Bias-T is in a nice metal encasing and it is much smaller than the known other Bias-Ts from China which are specified for a maximum frequency of 6GHz.



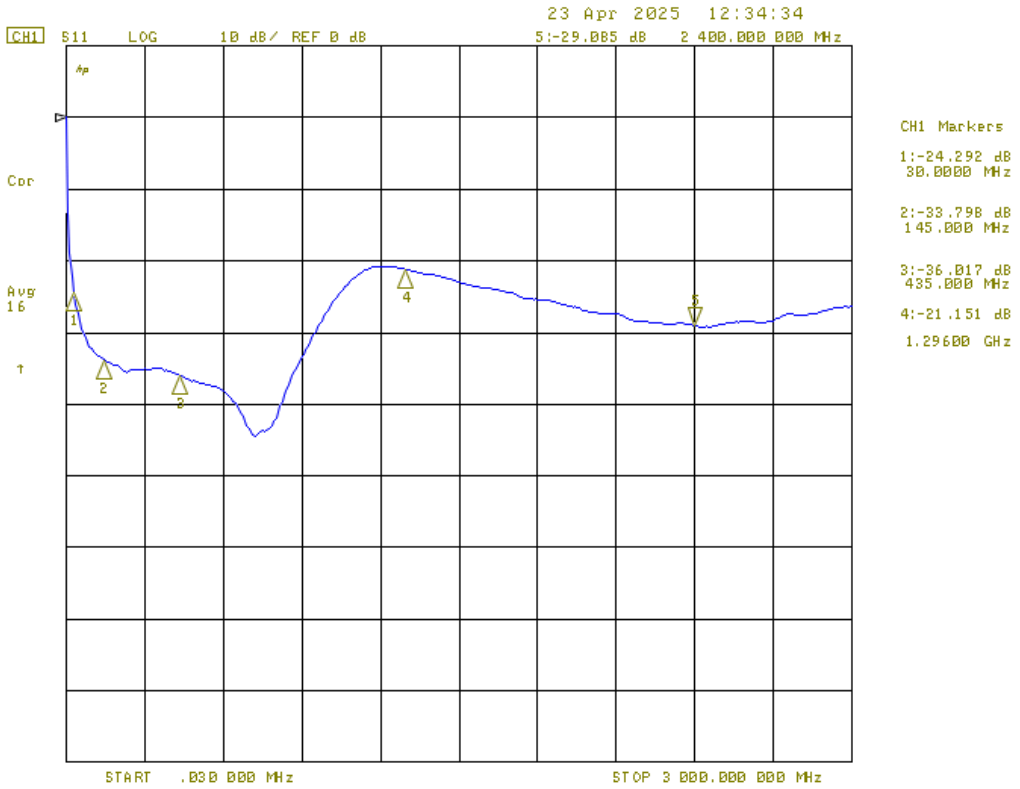
Here are some pictures of the open device. The layout is improved versus than the other Bias-Ts from China.

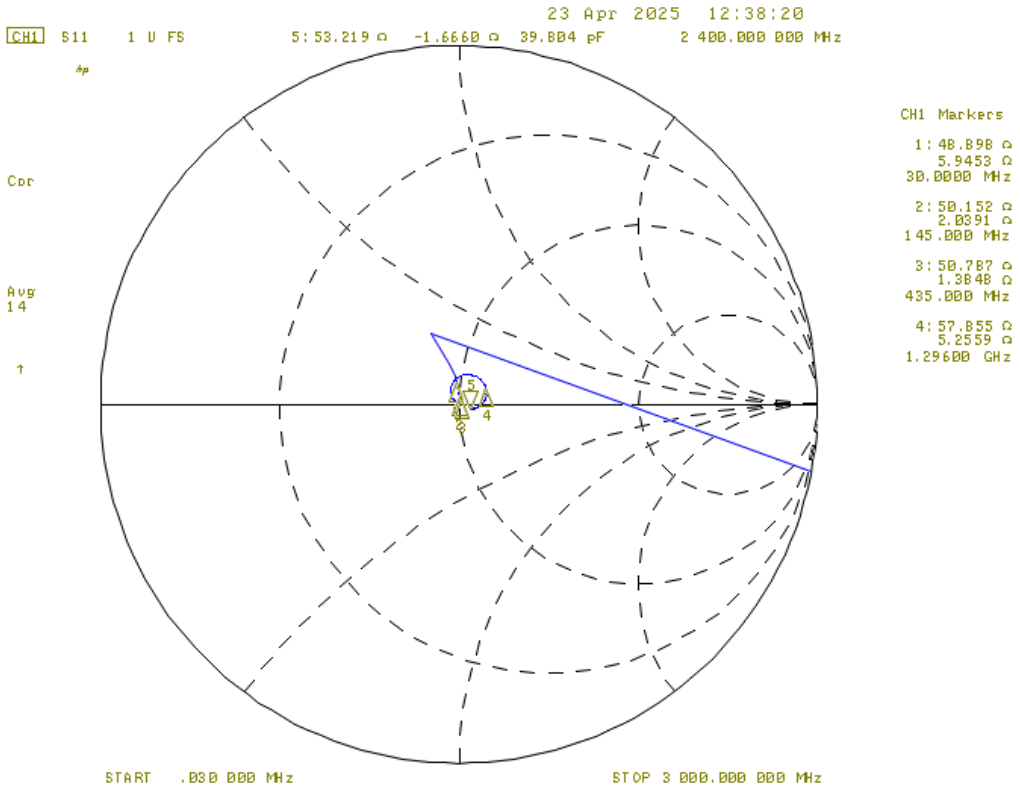




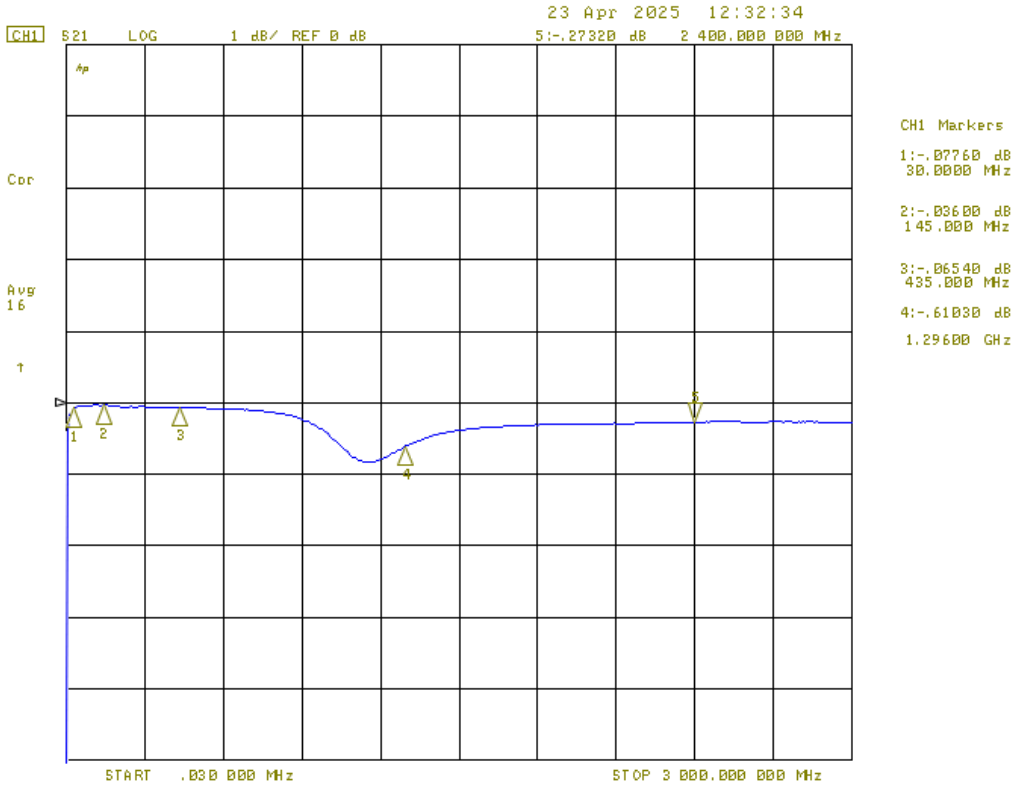
This Bias-T is using 2 inductors in series to decouple the RF path from the DC path. In addition, three ceramic capacitors are used for blocking the DC respectively providing low impedance for the RF signal at the DC input.

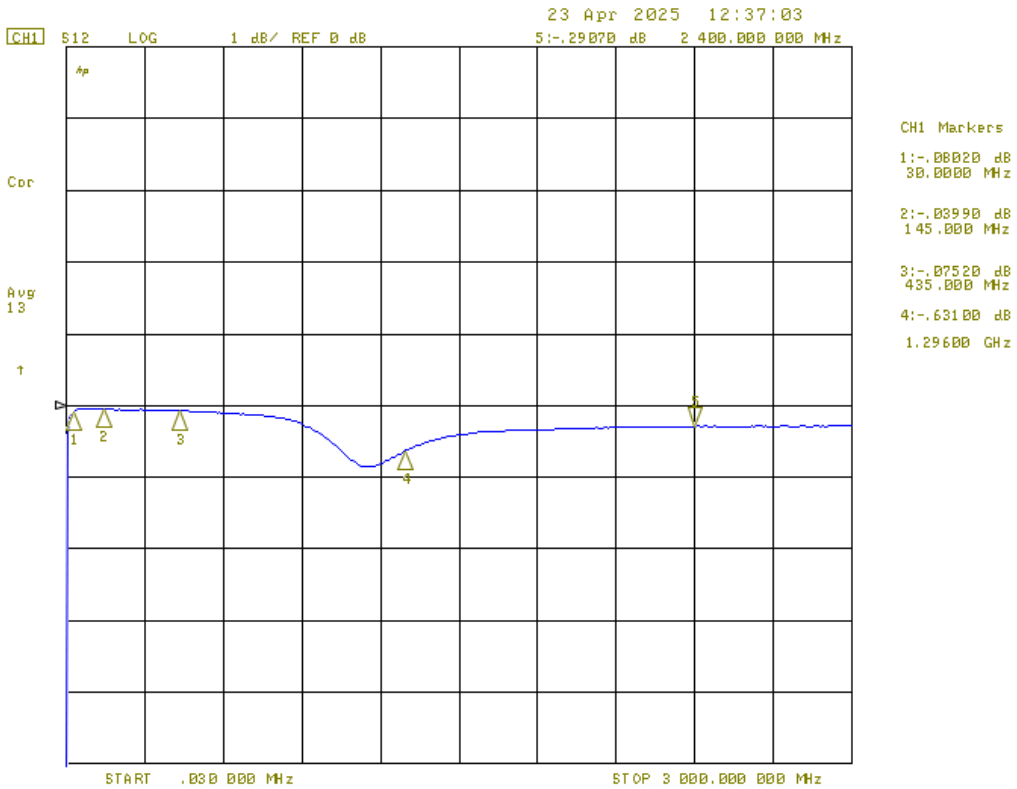
My VNA is not capable to measure the frequency range up to 10GHz. In the next plots you will find the S-parameters first in the frequency range up to 3GHz and then up to 100MHz to have a closer look on the high-pass characteristic of the Bias-T.



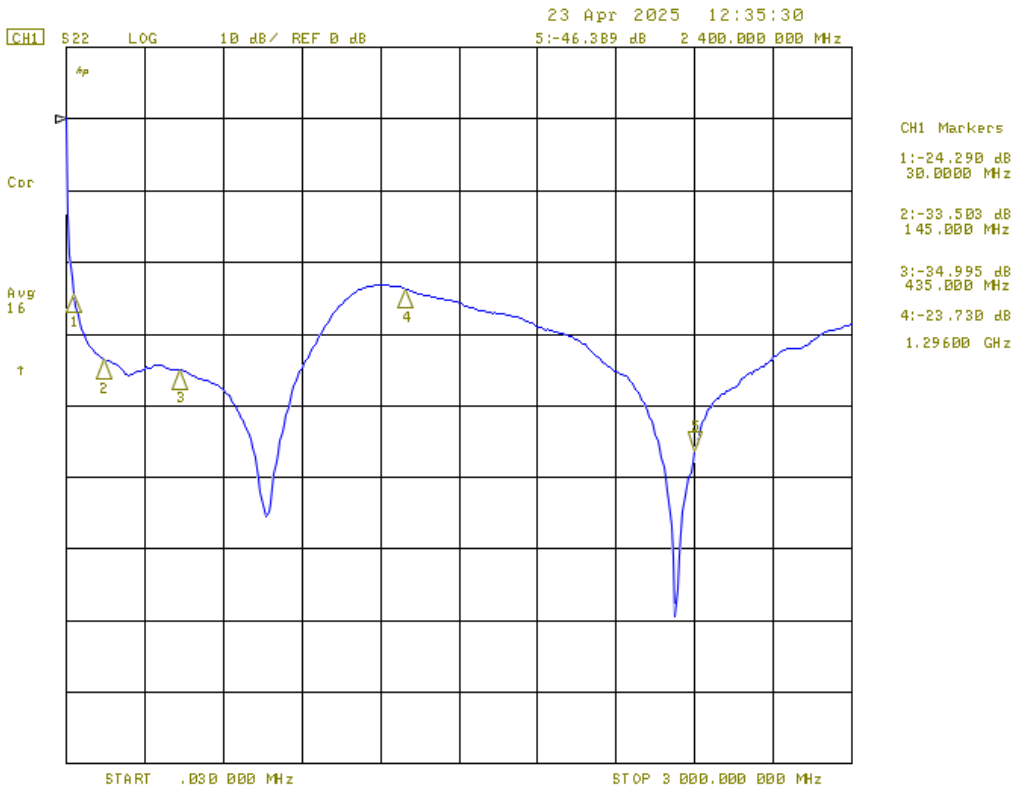



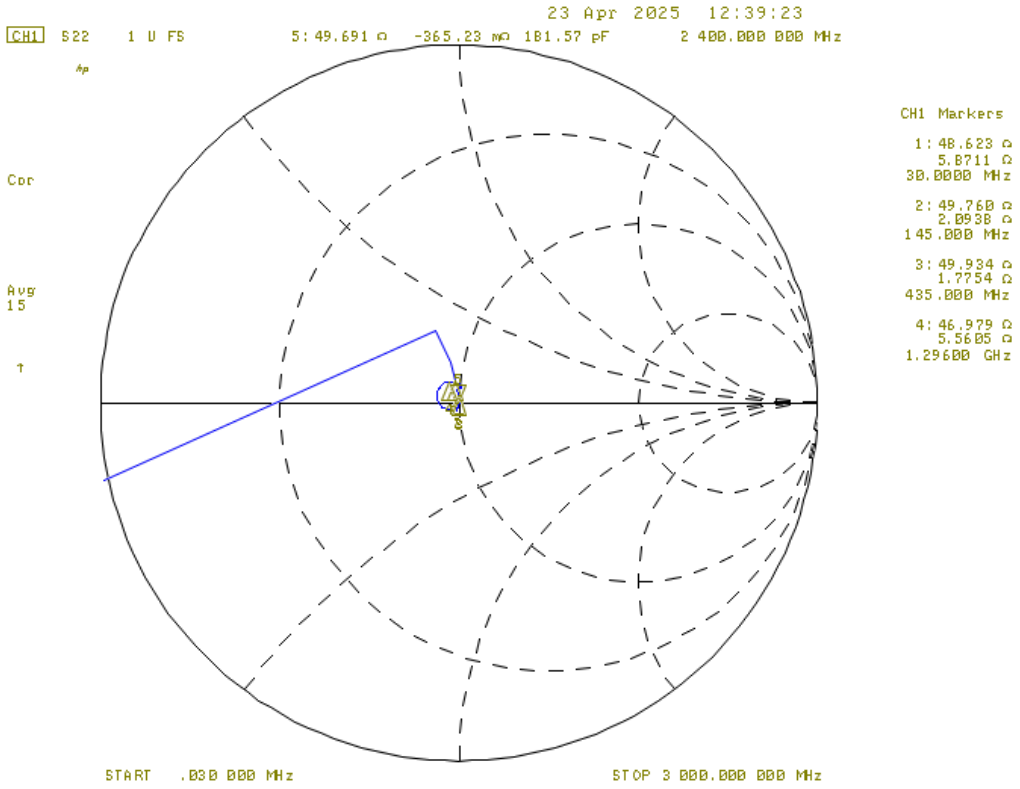

Input return loss is better than 20dB in the frequency range 30MHz to 3GHz. There is a “hump” in the frequency range 1000MH to 1800MHz otherwise it would be better than 25dB.



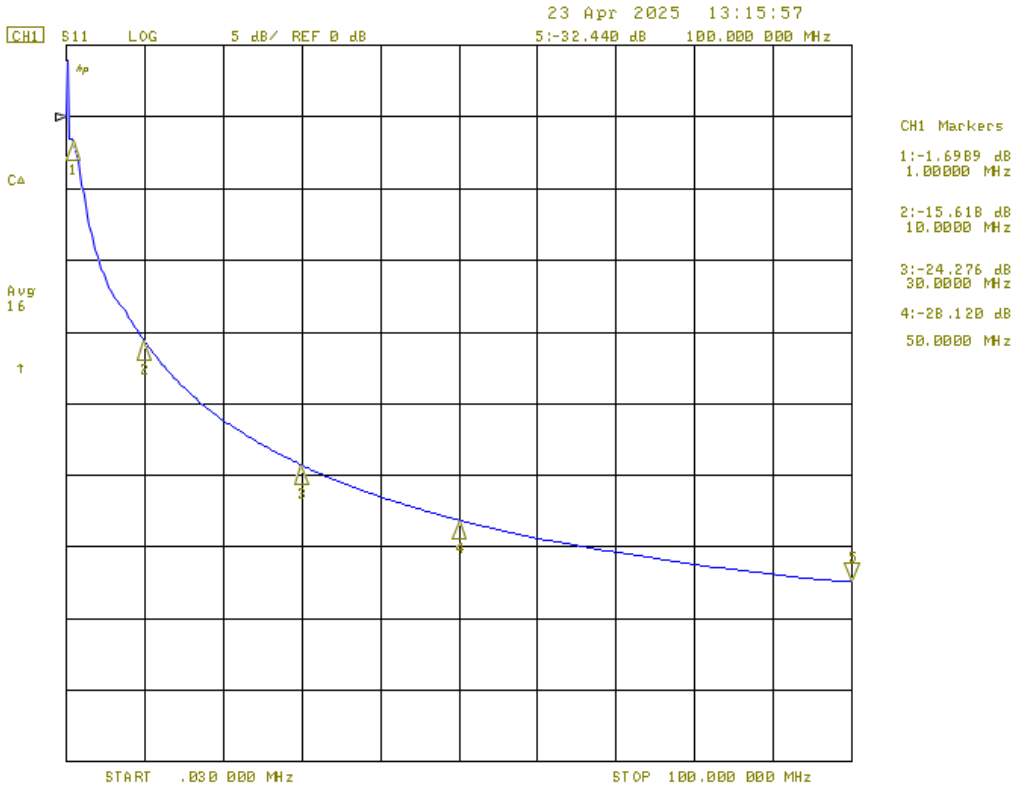



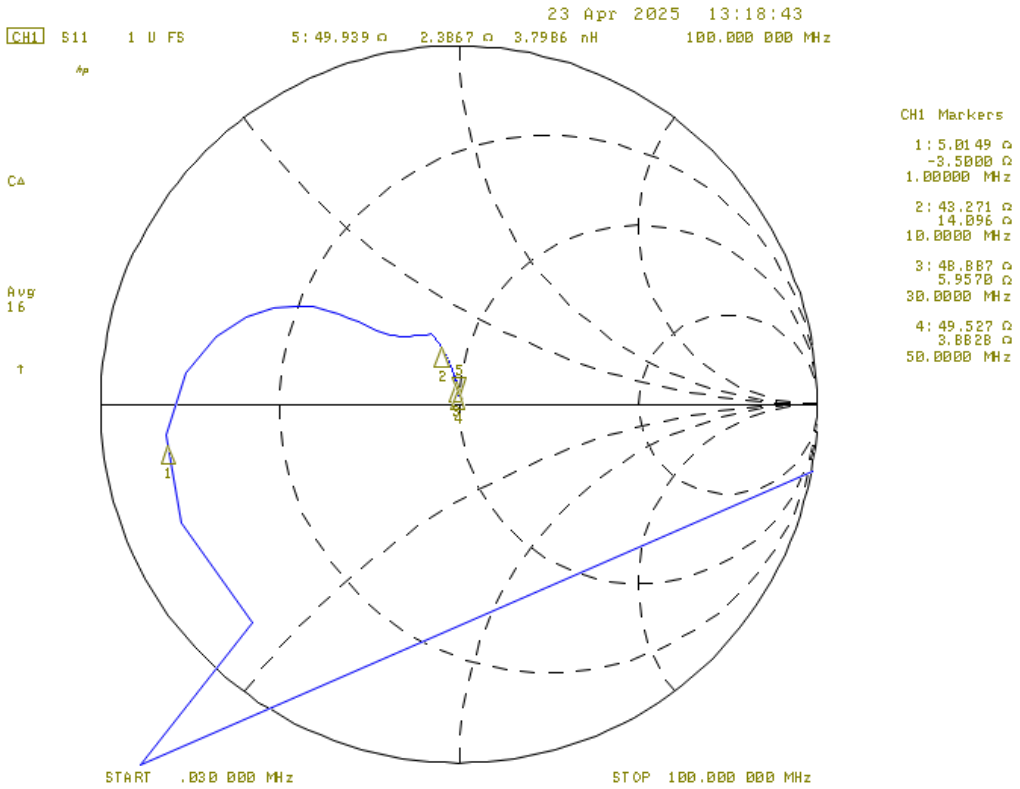

Insertion loss is better than 0.6dB in the frequency range 30MHz to 3GHz. The “hump” in the frequency range 1000MH to 1800MHz is degrading the insertion loss otherwise it would be better than 0.3dB.



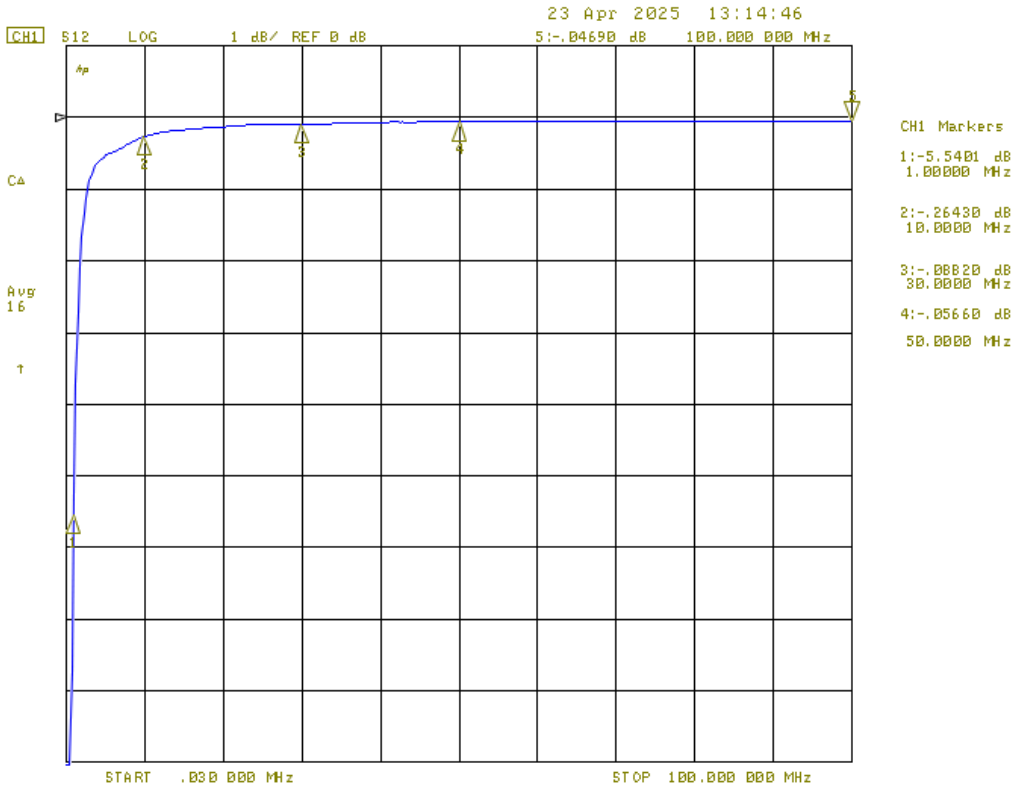



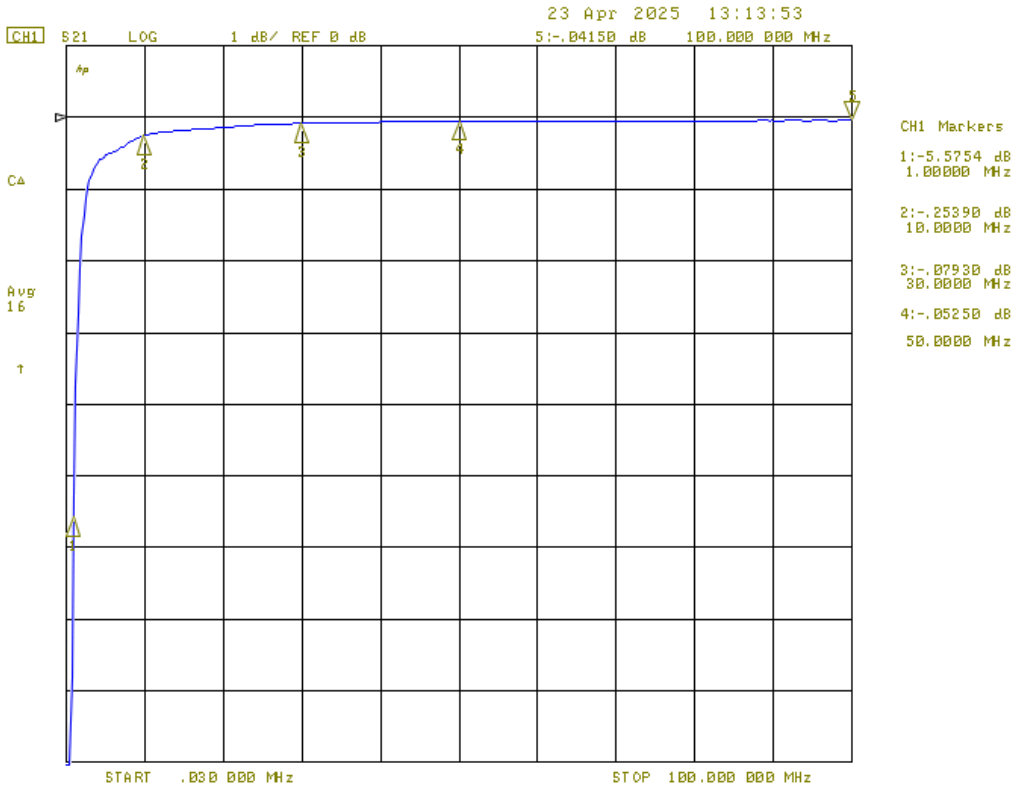

Output return loss is better than 20dB in the frequency range 30MHz to 3GHz but there is a “hump” in the frequency range 1000MH to 1800MHz otherwise it would be better than 25dB.



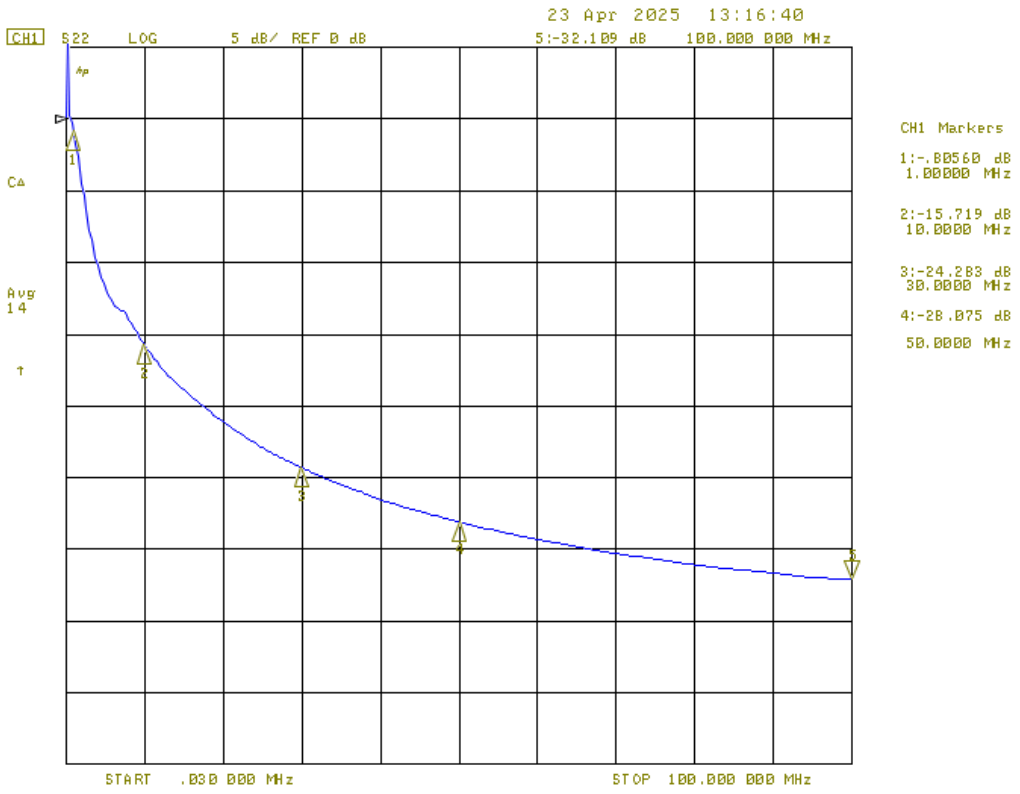



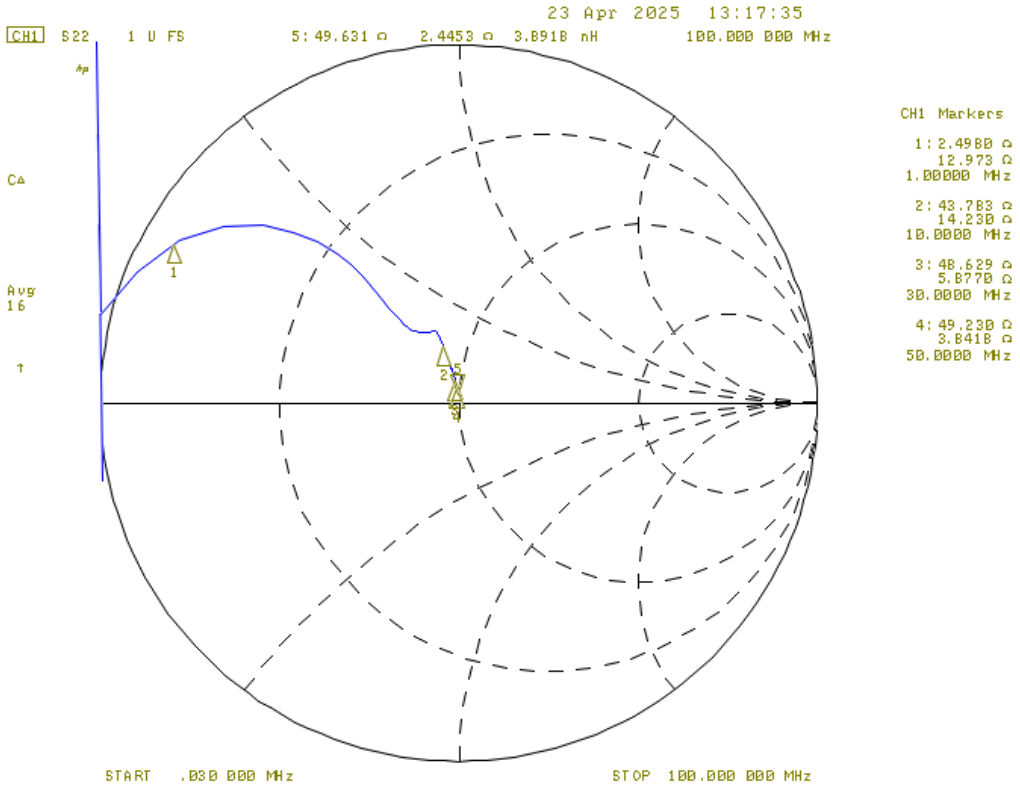

Input return loss is better than 15dB at 30MHz and improving with increasing frequency reaching 32dB at 100MHz.



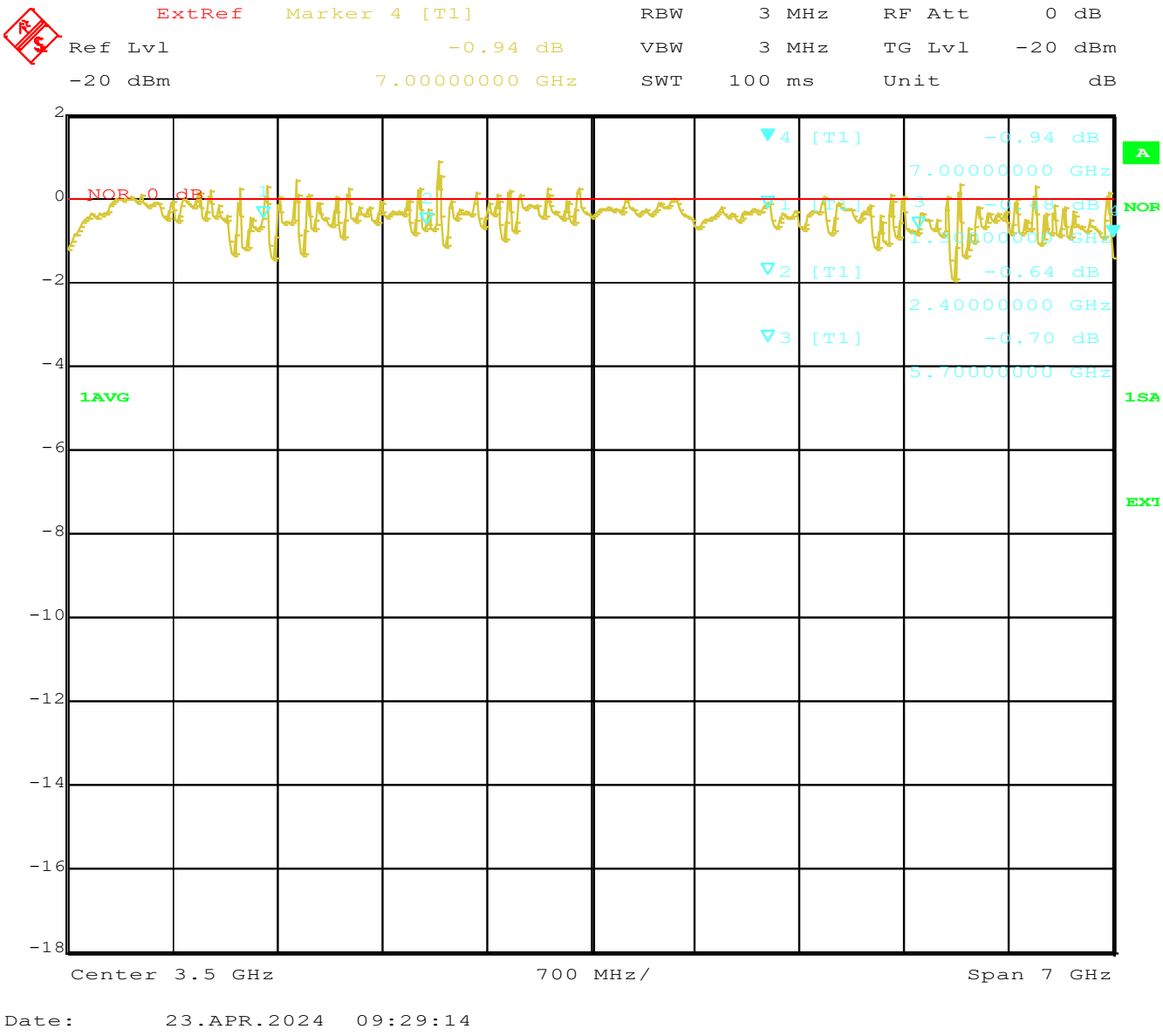

Correspondingly insertion return loss is lower than 0.3dB at 30MHz and improving with increasing frequency reaching 0.05dB at 100MHz.




Output return loss is better than 15dB at 30MHz and improving with increasing frequency reaching 32dB at 100MHz.

Finally, I measured insertion loss using my spectrum analyzer with tracking generator up to 7GHz. The accuracy is much worse versus the VNA but the result is good enough to see, that there are no unwanted resonances up to 7GHz and the insertion loss stays below 1dB.




In summary this is a very good Bias-T for the frequency range from 10MHz to at least 3GHz. If the hump in the frequency range 1000 to 1800MHz could be mitigated it would result in excellent performance.

As my measurement results are very similar to the measurement graphs provided by the seller, I have no reason to doubt that the performance is as specified up to 10GHz but I would be very happy if someone with the adequate test equipment could send me measurement results over the full frequency range.

I always appreciate feedback. Please also let me know if you may know the supplier of such Bias-Ts.
Please send it to the Email address below.

Best regards

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