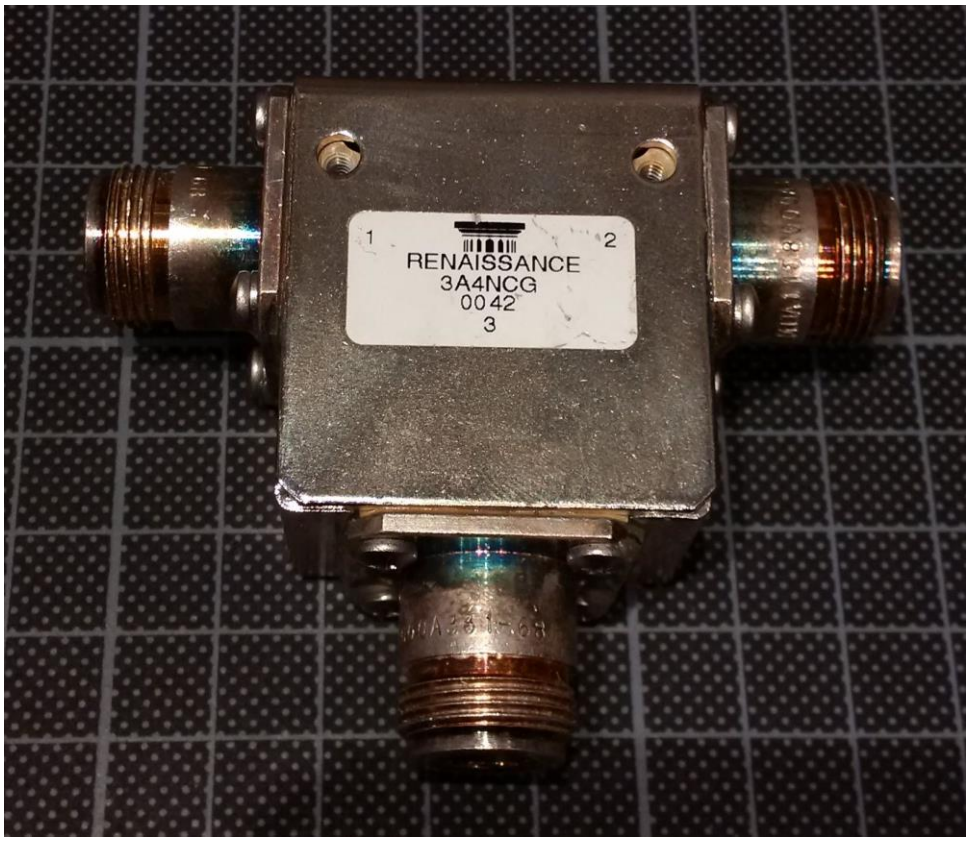
Using the Renaissance Circulator 3A4NCG for the 13cm band

Matthias, DD1US, Updated January 26th 2020, Rev 2.0

Hello,

I recently acquired a circulator from Renaissance with the part number 3A4NCG. Here is a picture of my unit:



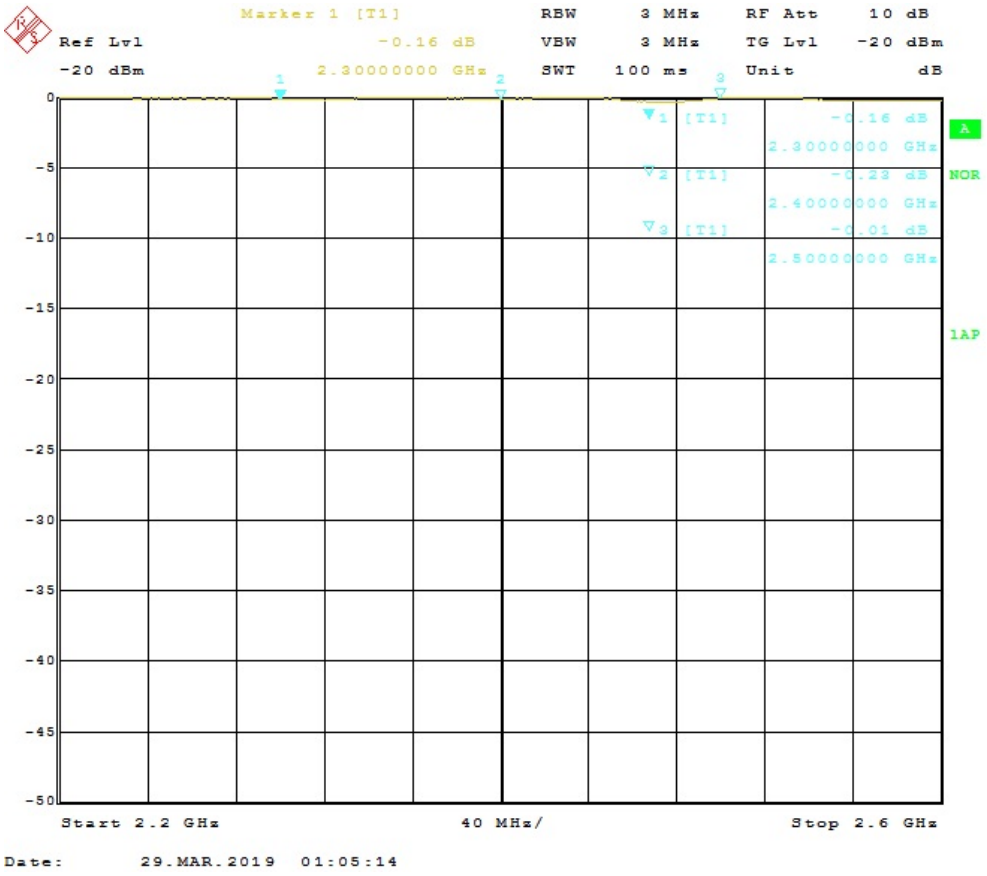
It features N-connectors at all 3 ports.

I found the following data on the internet:

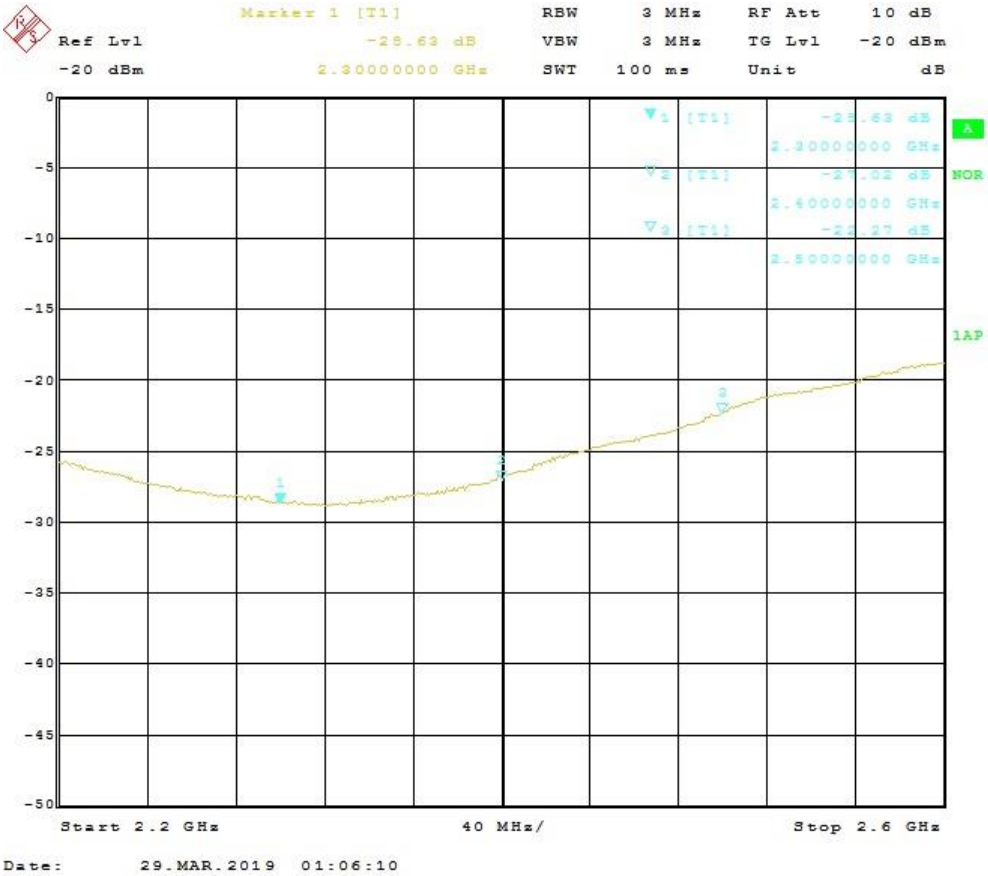
Frequency range:	2305-2360 MHz
Isolation (min.):	22 dB
Insertion Loss (max.):	0.4 dB
VSWR:	1.2
Power CW (max.):	50 W
Power pulsed (peak):	5kW
Operating temperature range:	-10…+50 degree C

As I want to use this isolator at 2400 MHz I measured its characteristics using a spectrum analyzer with tracking generator. Here are the results:

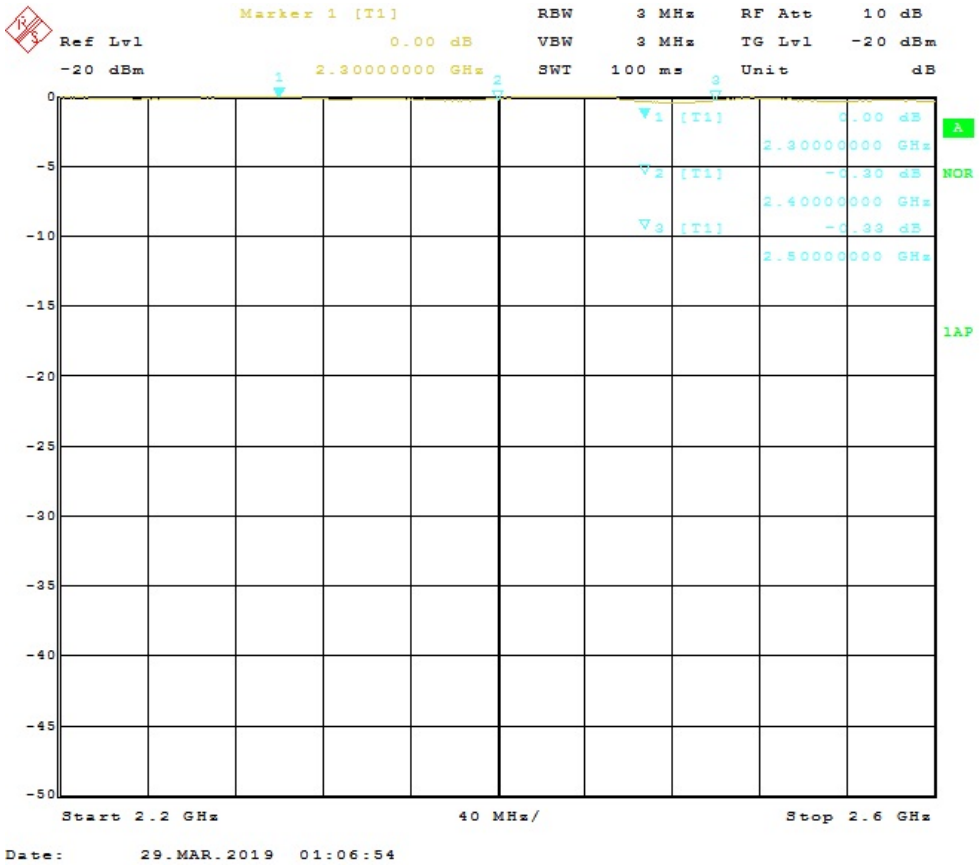
S1 -> S2 (insertion loss 0.16dB @2.3 GHz, 0.23dB @2.4 GHz, 0.01dB @2.6 GHz)



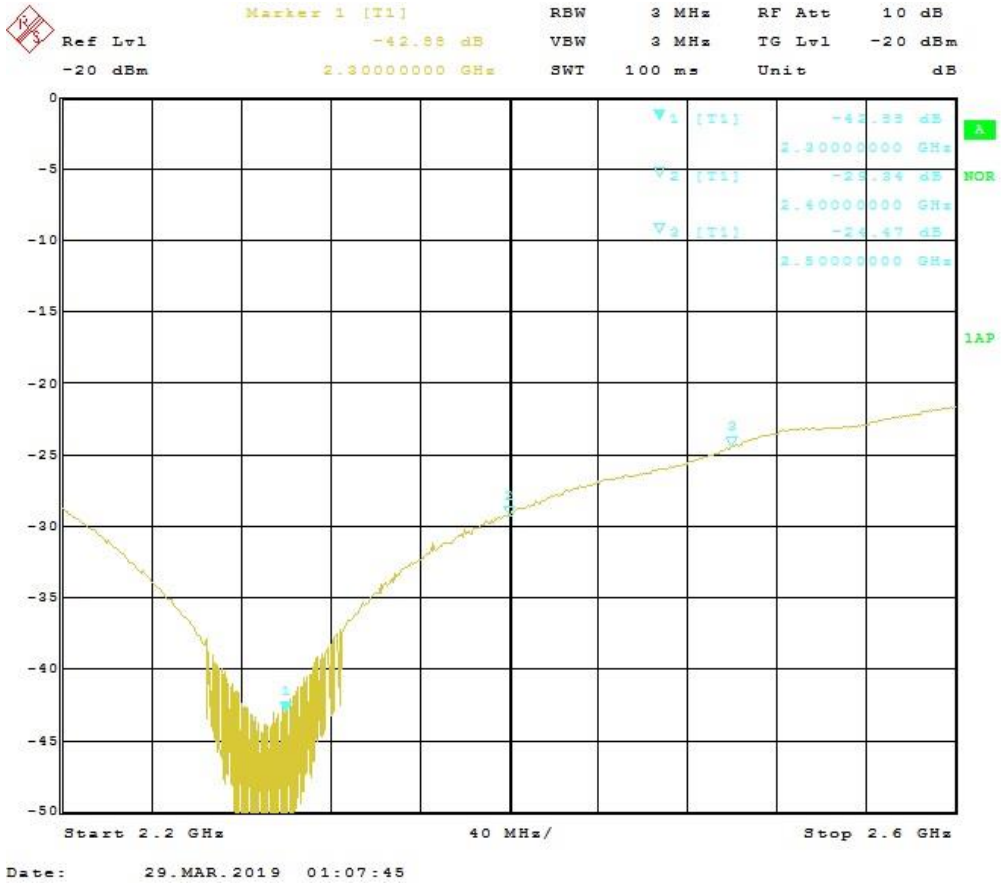
S2 -> S1 (isolation 28.6dB @2.3 GHz, 27.0dB @2.4 GHz, 22.3dB @2.6 GHz)



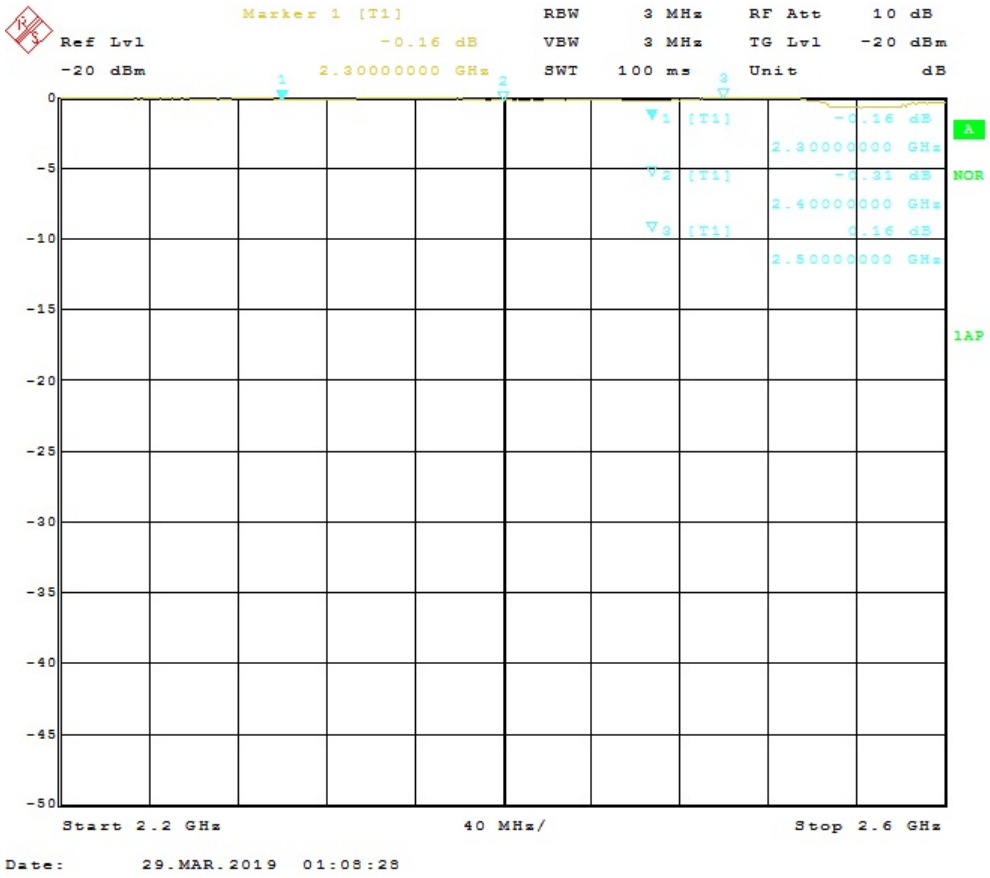
S2 -> S3 (insertion loss 0.00dB @2.3 GHz, 0.30dB @2.4 GHz, 0.33dB @2.6 GHz)



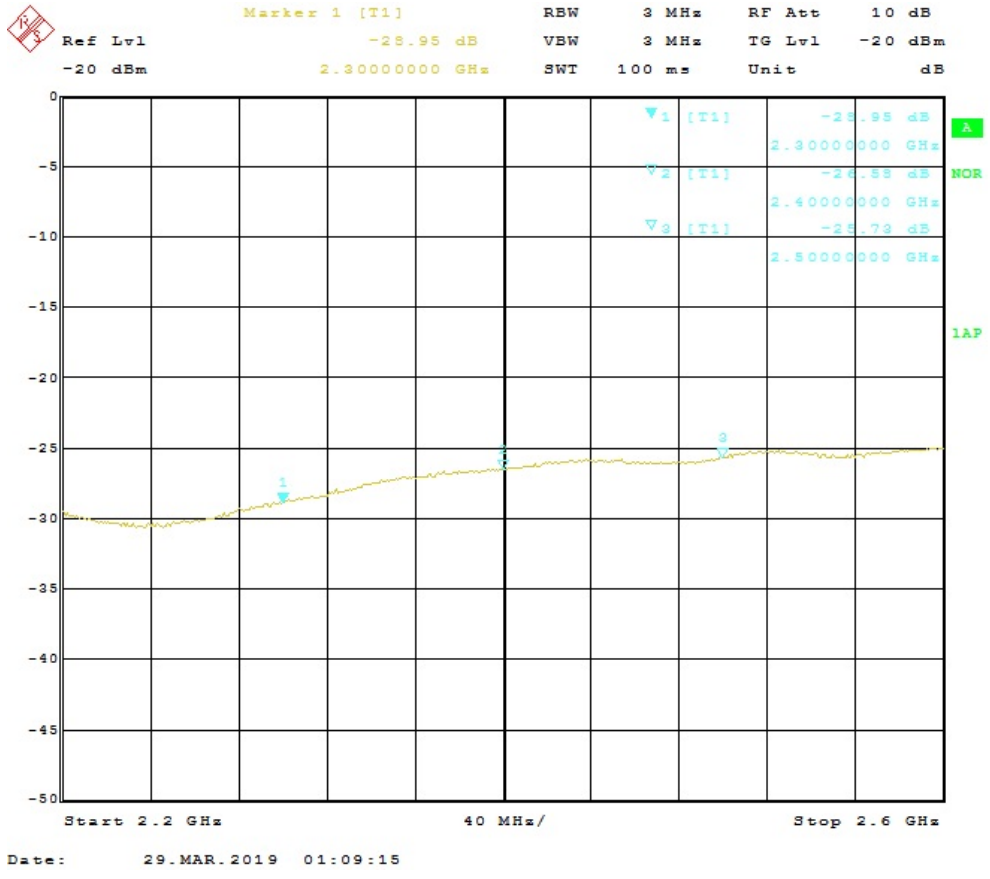
S3 -> S2 (isolation 42.3dB @2.3 GHz, 29.3dB @2.4 GHz, 24.5dB @2.6 GHz)



S3 -> S1 (insertion loss 0.16dB @2.3 GHz, 0.31dB @2.4 GHz, 0.16dB @2.6 GHz)



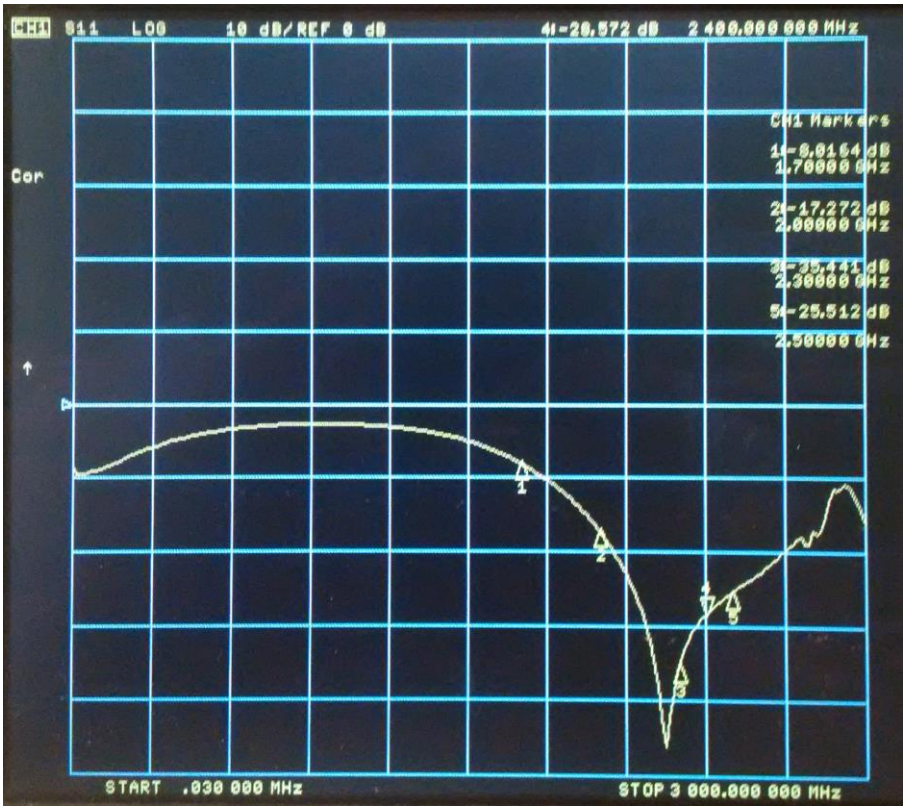
S1 -> S3 (isolation 29.0dB @2.3 GHz, 26.6dB @2.4 GHz, 25.7dB @2.6 GHz)

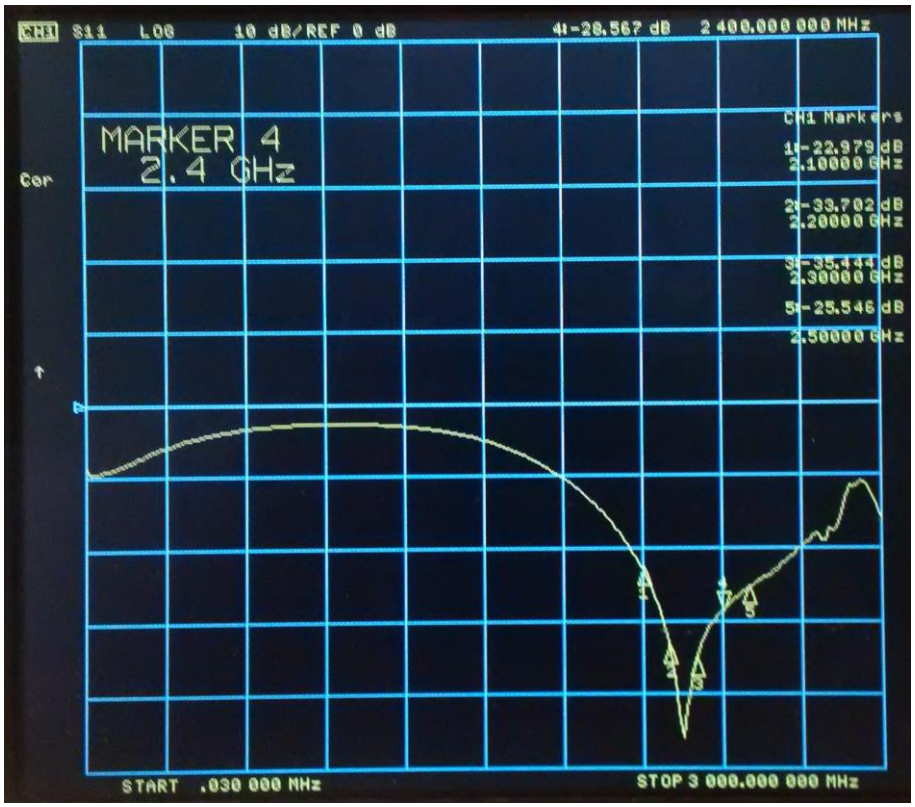


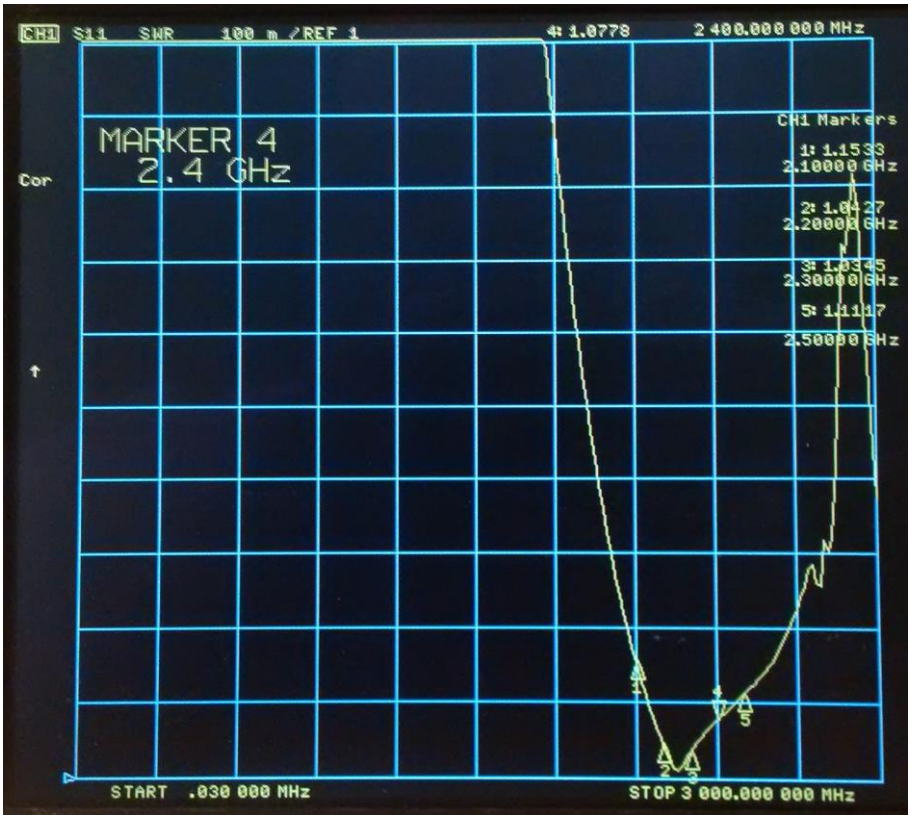
Update January 26th 2020:

I got a second unit and measured it with my VNA.

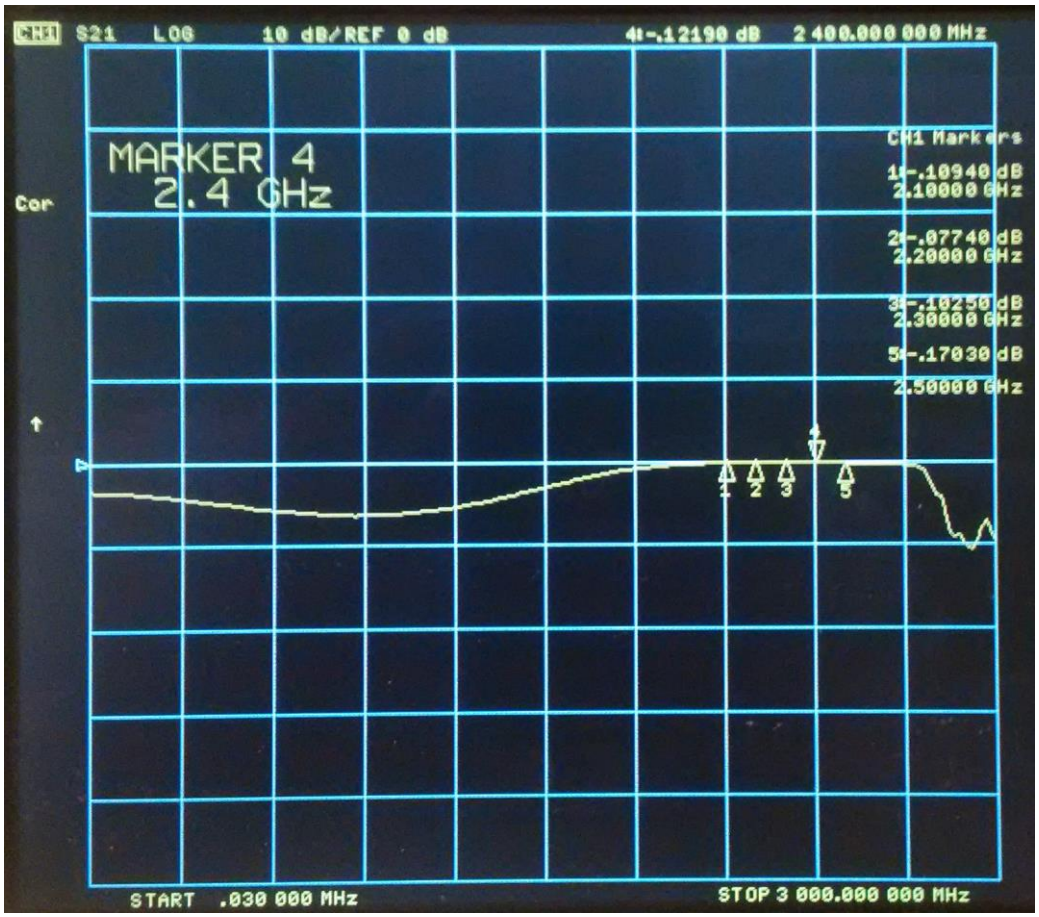
S11 input matching (return loss -8dB@1700MHz, -17dB@2000MHz, -35dB@2300MHz, -25dB@2400MHz)

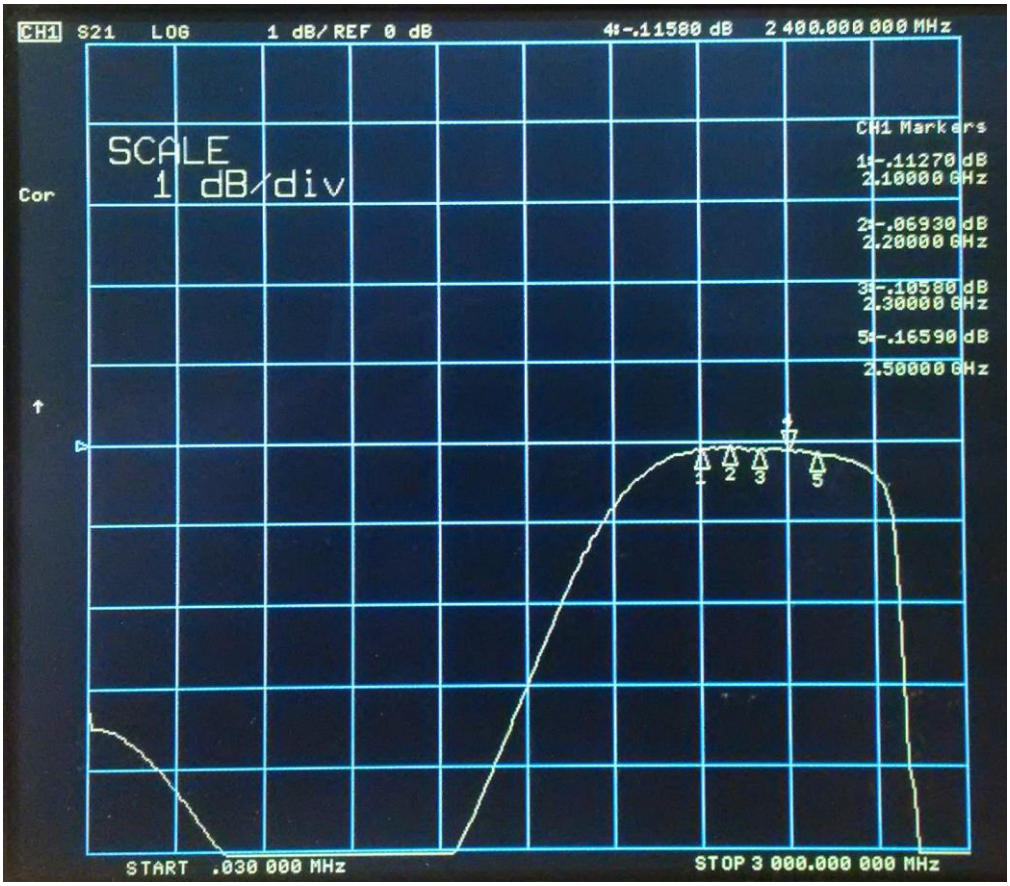






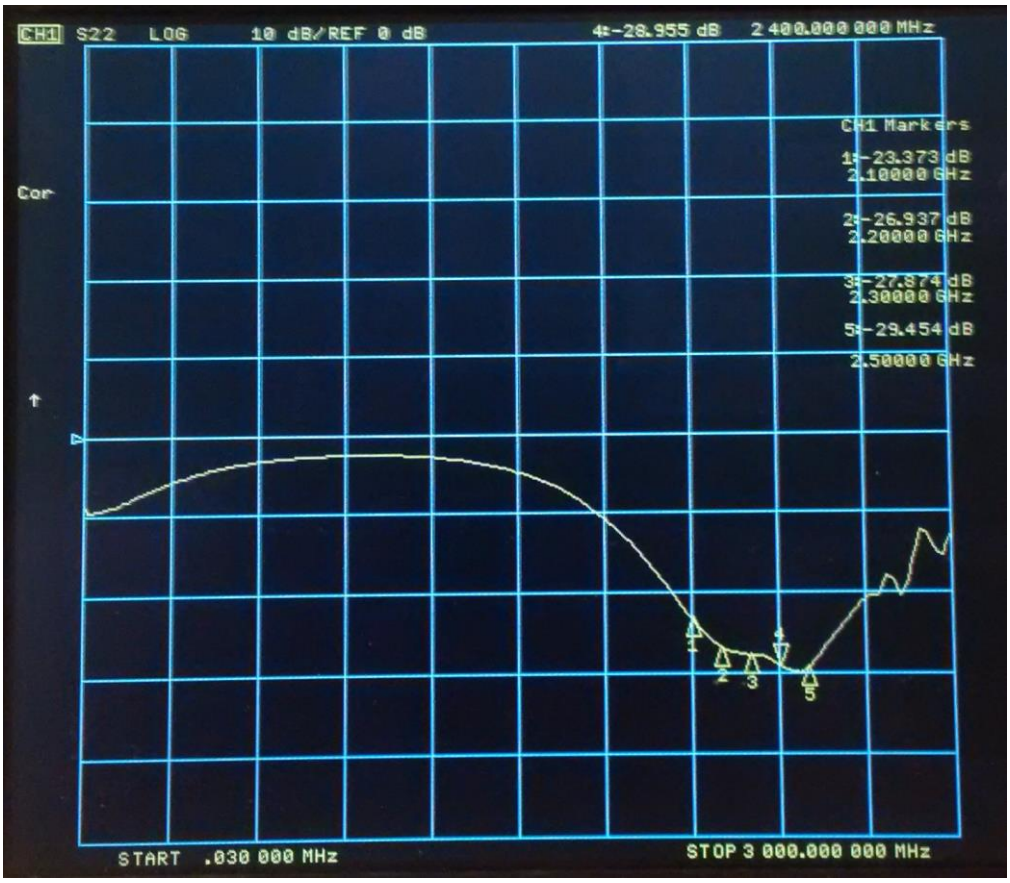
S21 forward transmission (insertion loss 0.11dB@2100MHz, 0.08dB@2200MHz, 0.10@2300MHz, 0.12dB@2400MHz, 0.17@2500MHz)





S12 reverse transmission (isolation at 23.6dB@2100MHz, 28.4dB@2200MHz, 32.9dB@2300MHz, 30.3dB@2400MHz, 24.7dB@2500MHz)

S22 output matching (return loss at 23.4dB@2100MHz, 26.9dB@2200MHz, 27.9dB@2300MHz, 29.0dB@2400MHz, 29.5dB@2500MHz)



As can be seen even at 2.4 GHz the specification parameters with respect to Insertion Loss and Isolation are exceeded.

I always appreciate feedback. Many thanks in advance.

Best regards

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