

3GPP TSG-RAN WG4 Meeting #64
Qingdao, P.R.China, 13–17 August 2012

R4-124061

Source: Dish Network, Qualcomm Inc.

Title: Band 23 Duplexer Simulation Results

Agenda: 4.2.1

Document for: Discussion

Band 23 Duplexer Simulation Results



Band 23 Duplexer Simulations

- Following slides present TX/RX simulations of Band 23 duplexers from Avago, Pilkor, and Triquint.
- The duplexer simulations present:
 - insertion loss, isolation, and harmonic rejection
 - rejection of TX emissions into B2/B25
- Worst case analysis of TX emissions rejection into B2/B25 over temperature is presented



Insertion Loss Summary

	TX (25C) nominal	TX (-30 to 85C) worst case	RX(25C) nominal
Avago	<2dB	3dB	<2dB
Pilkor	5dB	N/A	<3dB
Triquint	4dB	5dB	N/A

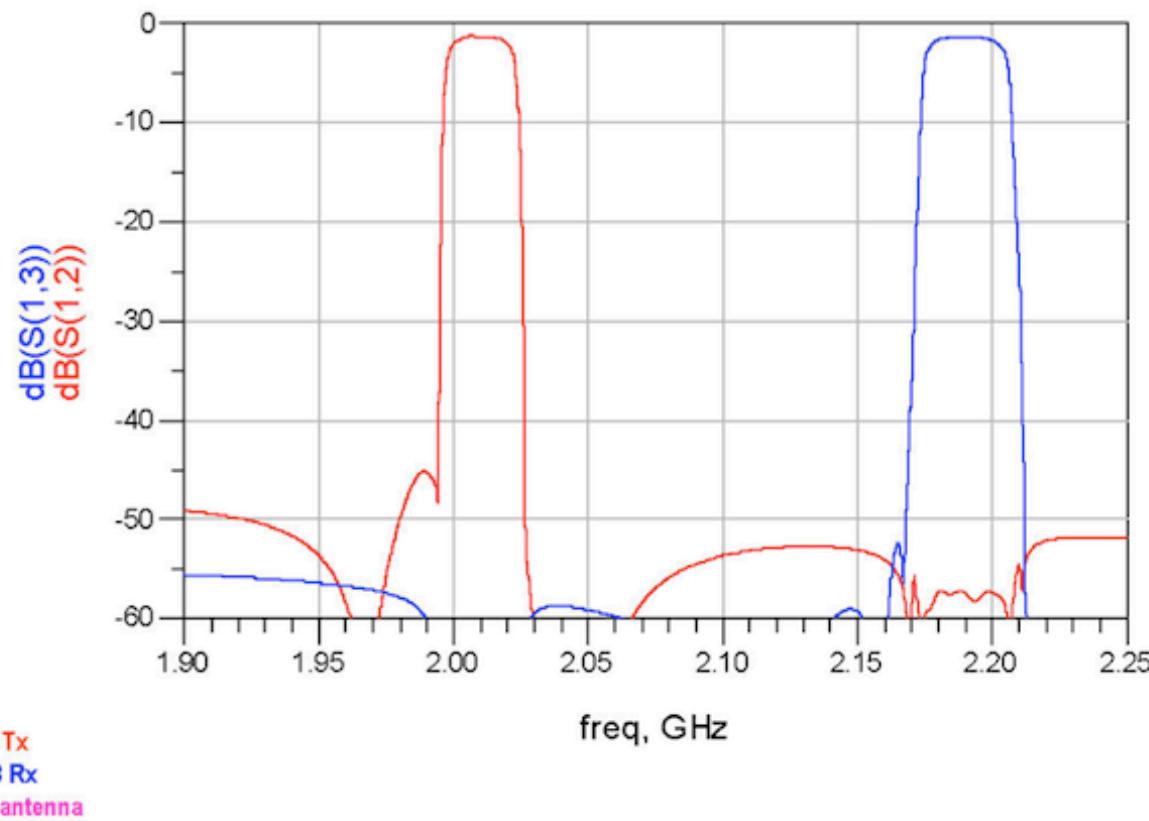
B2/B25 TX Rejection

	1995 (25C) nominal	1990 (25C) nominal	1995(85C) worst case	1990(85C) worst case
Avago	32dB	45dB	6dB	45dB
Pilkor	15dB	42dB	8.5dB	N/A
Triquint	30dB	40dB	15dB	36dB

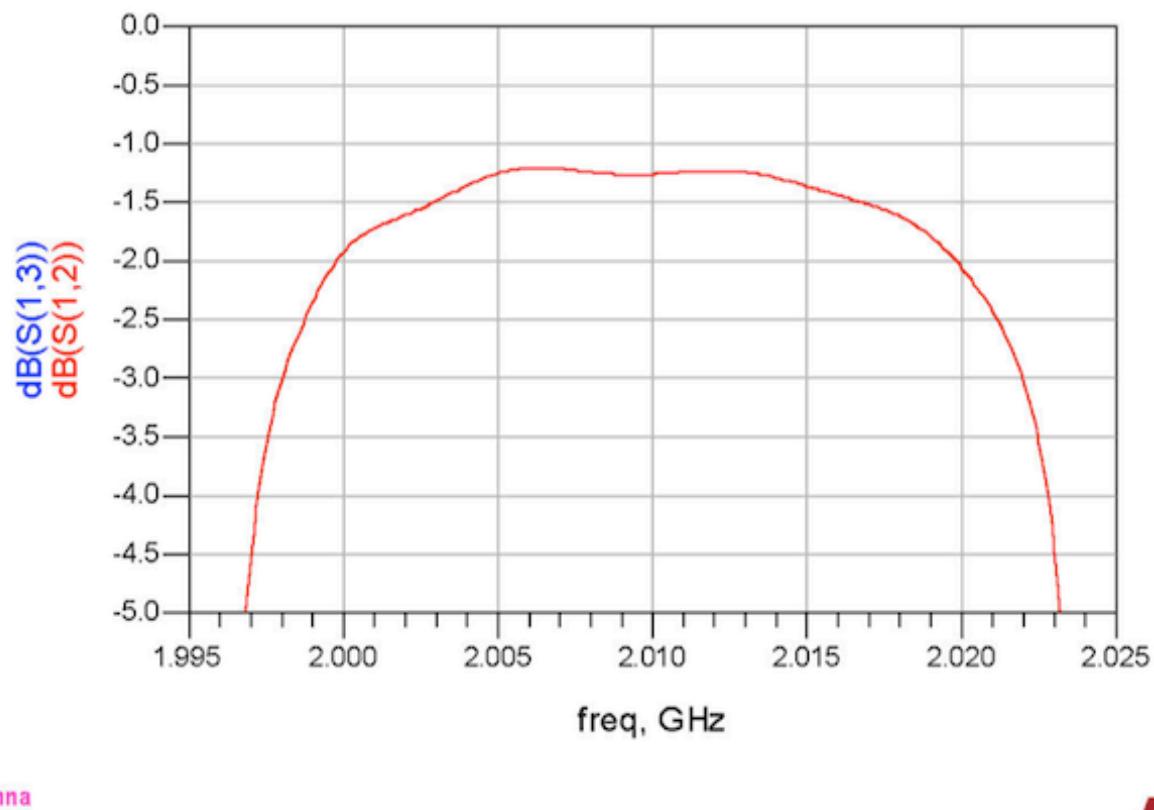
Data illustrates degradation in rejection due to shift in frequency response as temperature changes from 25C to 85C.



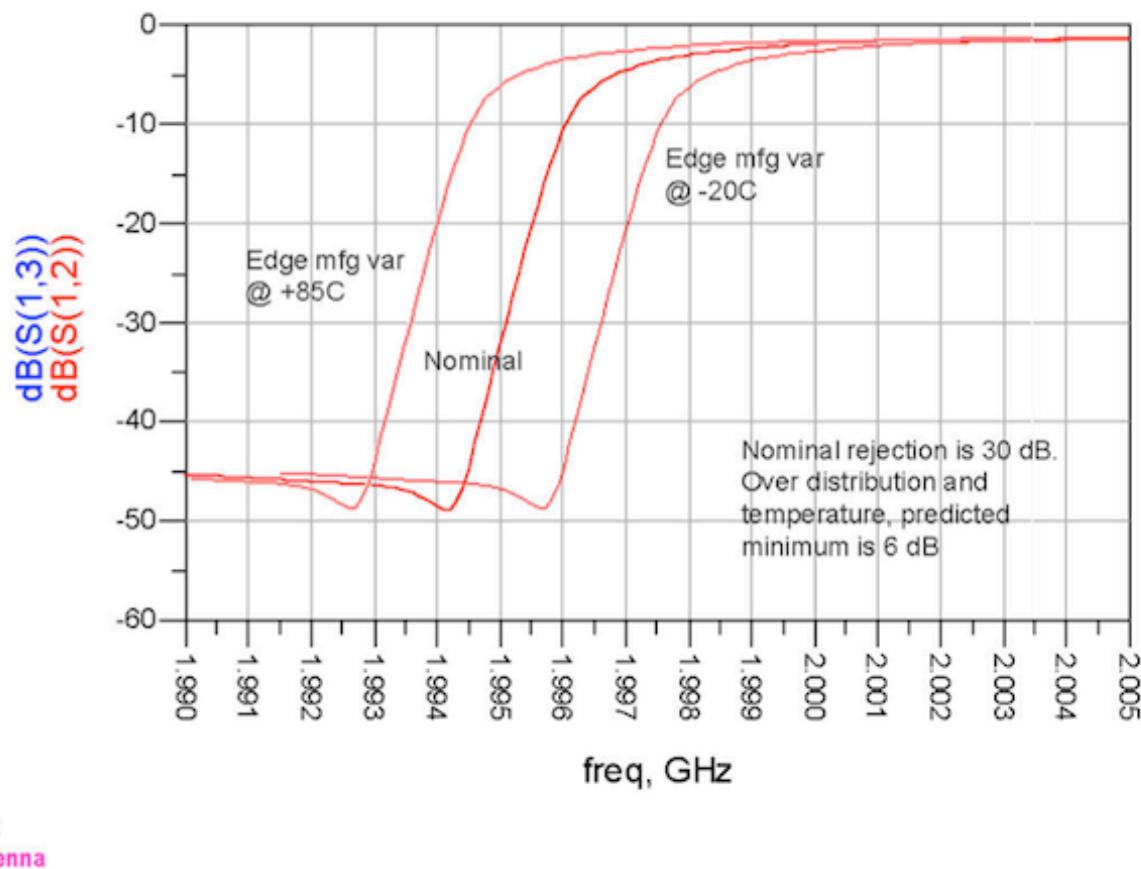
B23 Duplexer: Pass Band



B23 Duplexer: Tx Insertion Loss



B23 Duplexer: Tx Leading Edge – Close Up



B23 TX path, B25/2 rejection



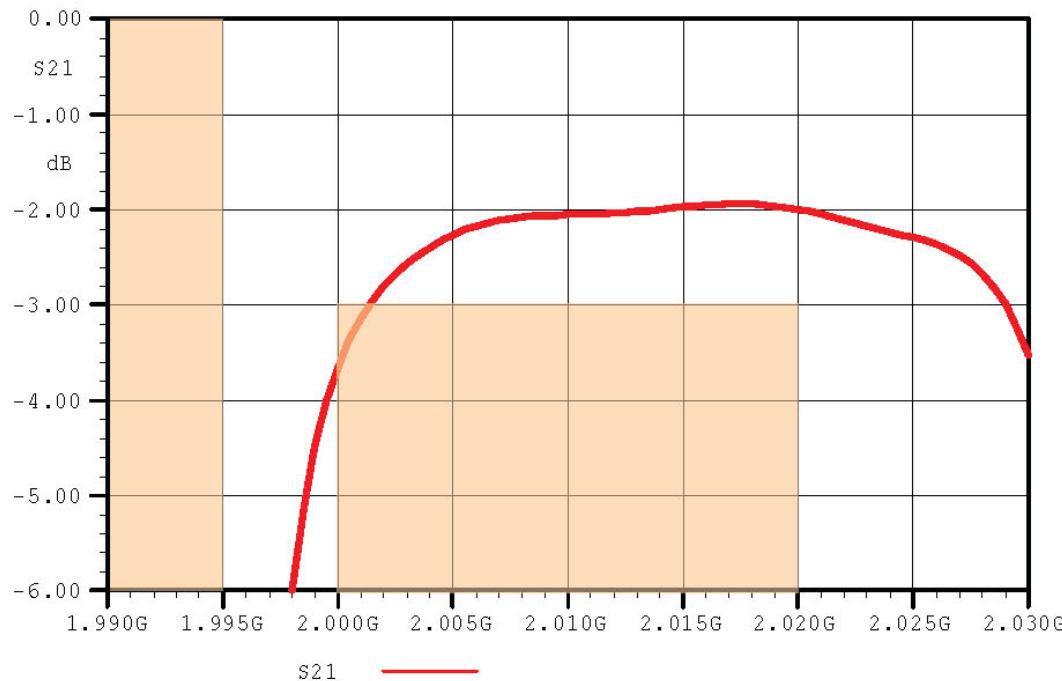
- optimized to meet rejection of 30dB at 1995MHz at 25C
- demonstrated manufacturing tolerance of skirt frequency is 300 kHz (1σ). This translates into a rejection of 30dB with a variation of 3dB (1σ) at 1995MHz.
- Temperature effects shown in later part of presentation.

concept work based on: B23 Duplexer Spec Rev1 2012-07-06 (2) logo
source file: B23_2a_16jul2012.n

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B23 TX path, passband



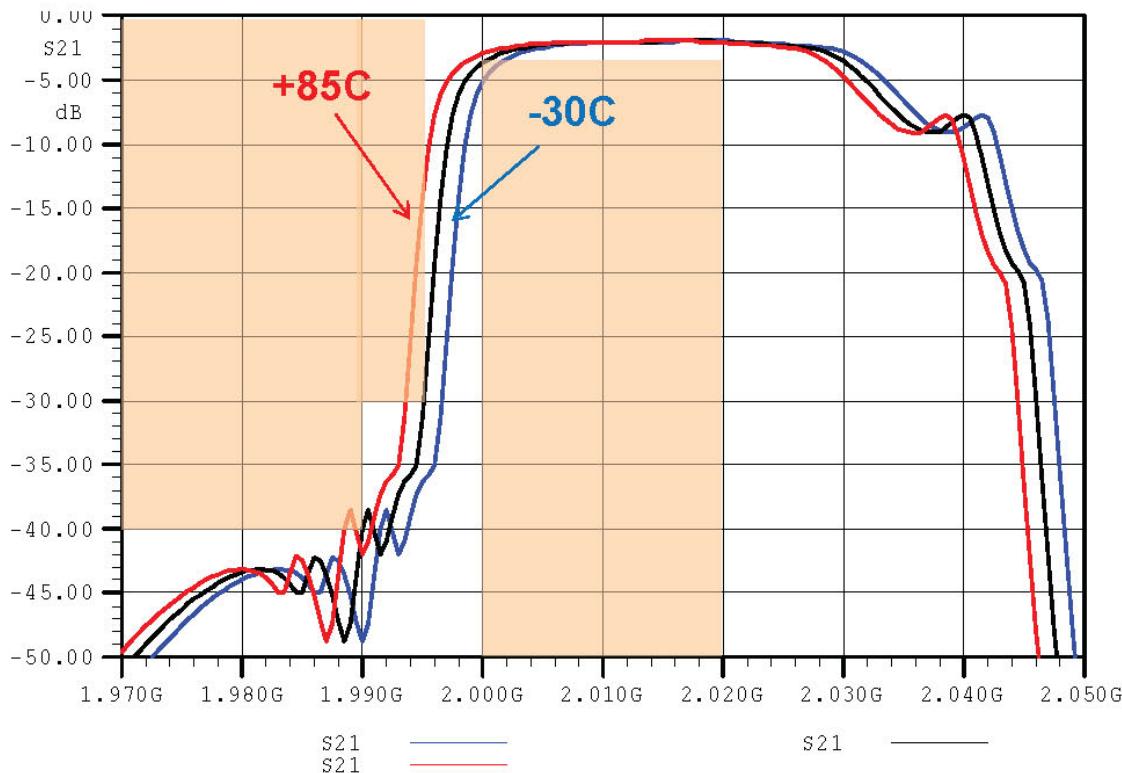
- Currently available BAW process will achieve 4dB IL at 2000MHz at 25C, unable to meet requested 3dB max IL.
- most of passband around 2dB IL.
- In order to meet 3dB max IL at 2000MHz the rejection at 1995MHz would degrade to 10dB at 25C.
- demonstrated manufacturing tolerance of skirt frequency 300 kHz (1σ) will cause IL at 2000MHz to show a variation of 0.2dB (1σ).
- Temperature effects shown in later part of presentation.



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B23 TX path, B25/2 rejection and IL at -30C, 25C, 85C



- Current BAW process has a temperature coefficient (TCF) of -16 ppm/C
- at +85C the rejection at 1995MHz will degrade to 15dB
- at -30C the IL at 2000MHz will degrade to 5dB

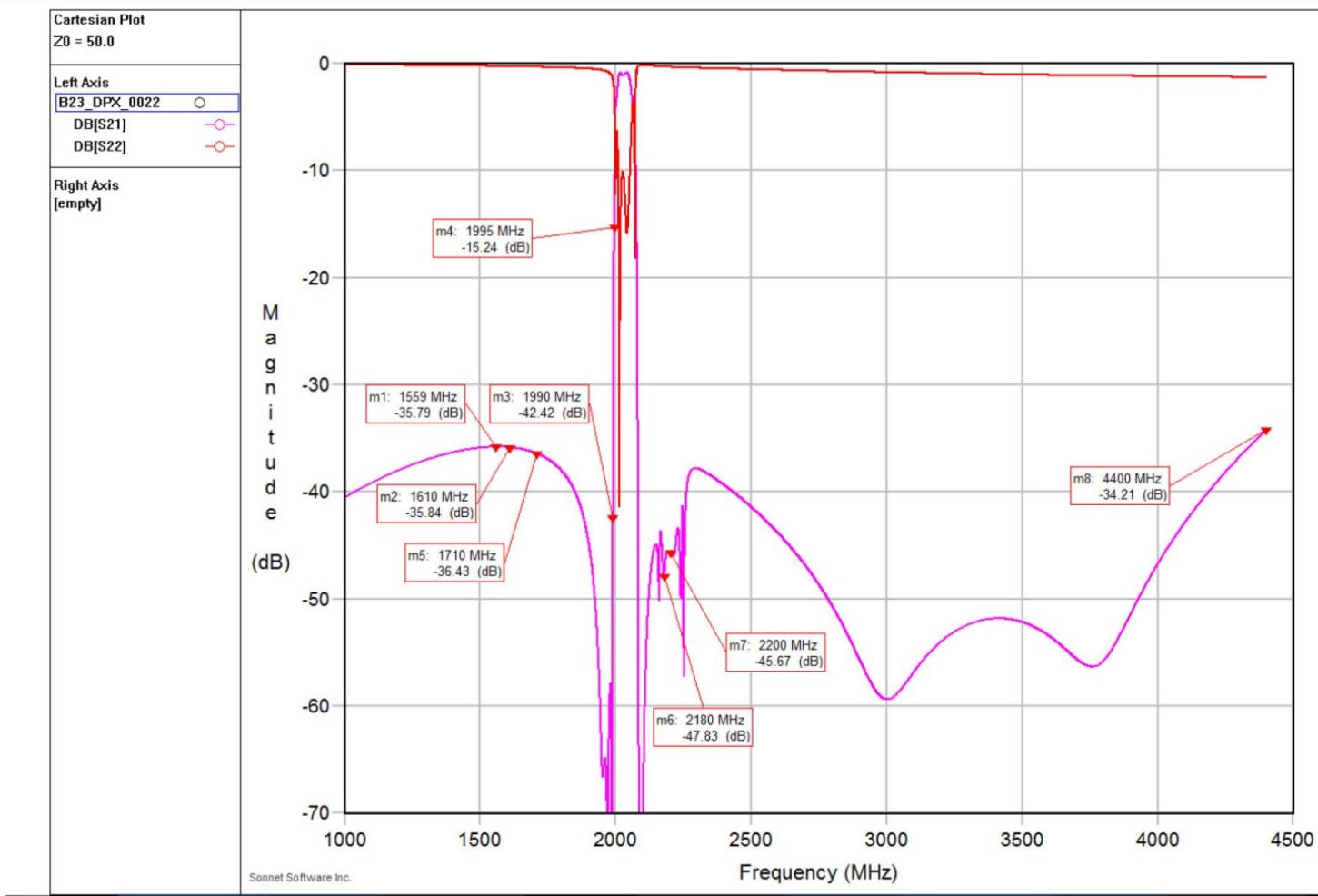


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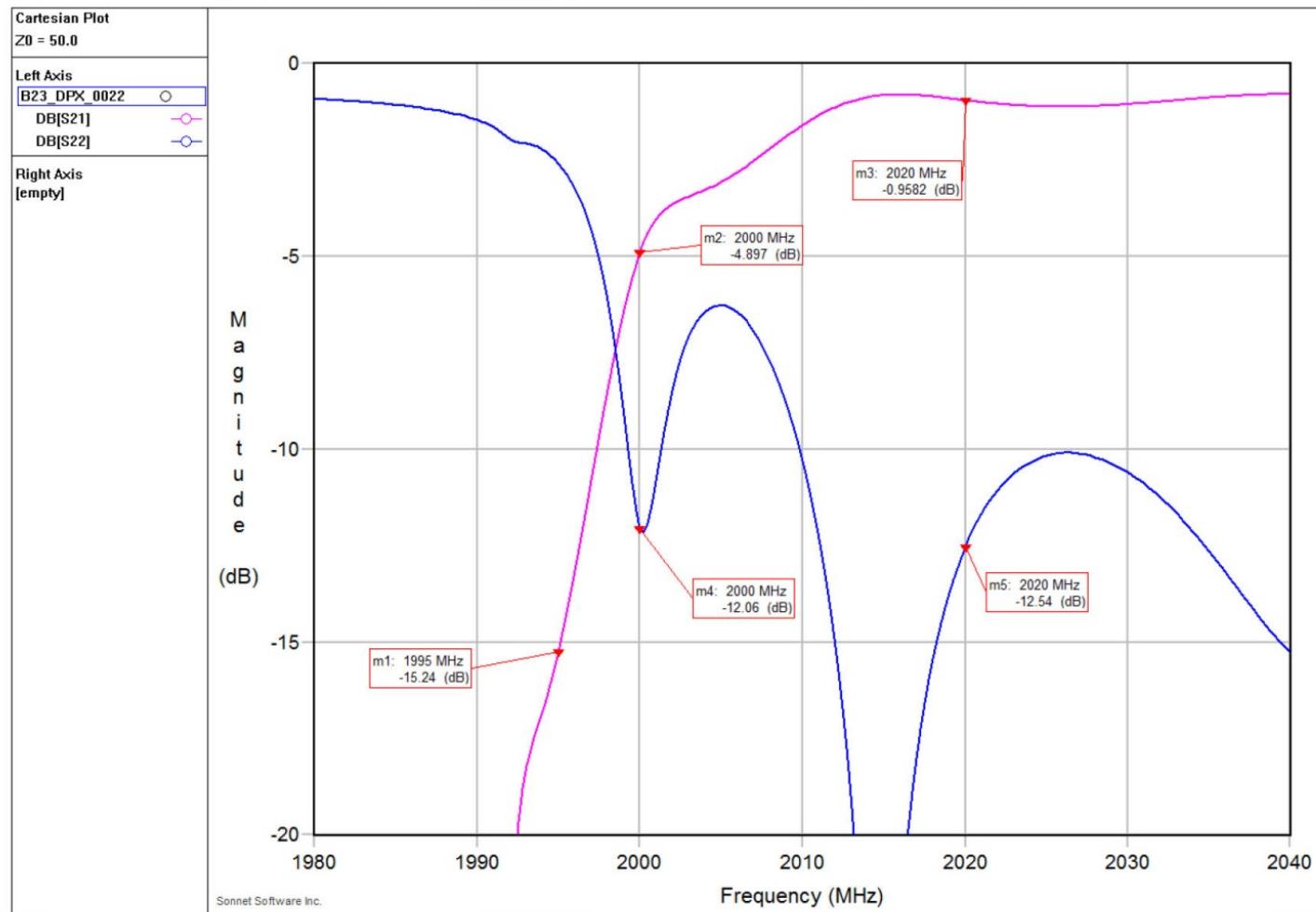
Tx Attenuation

BAW



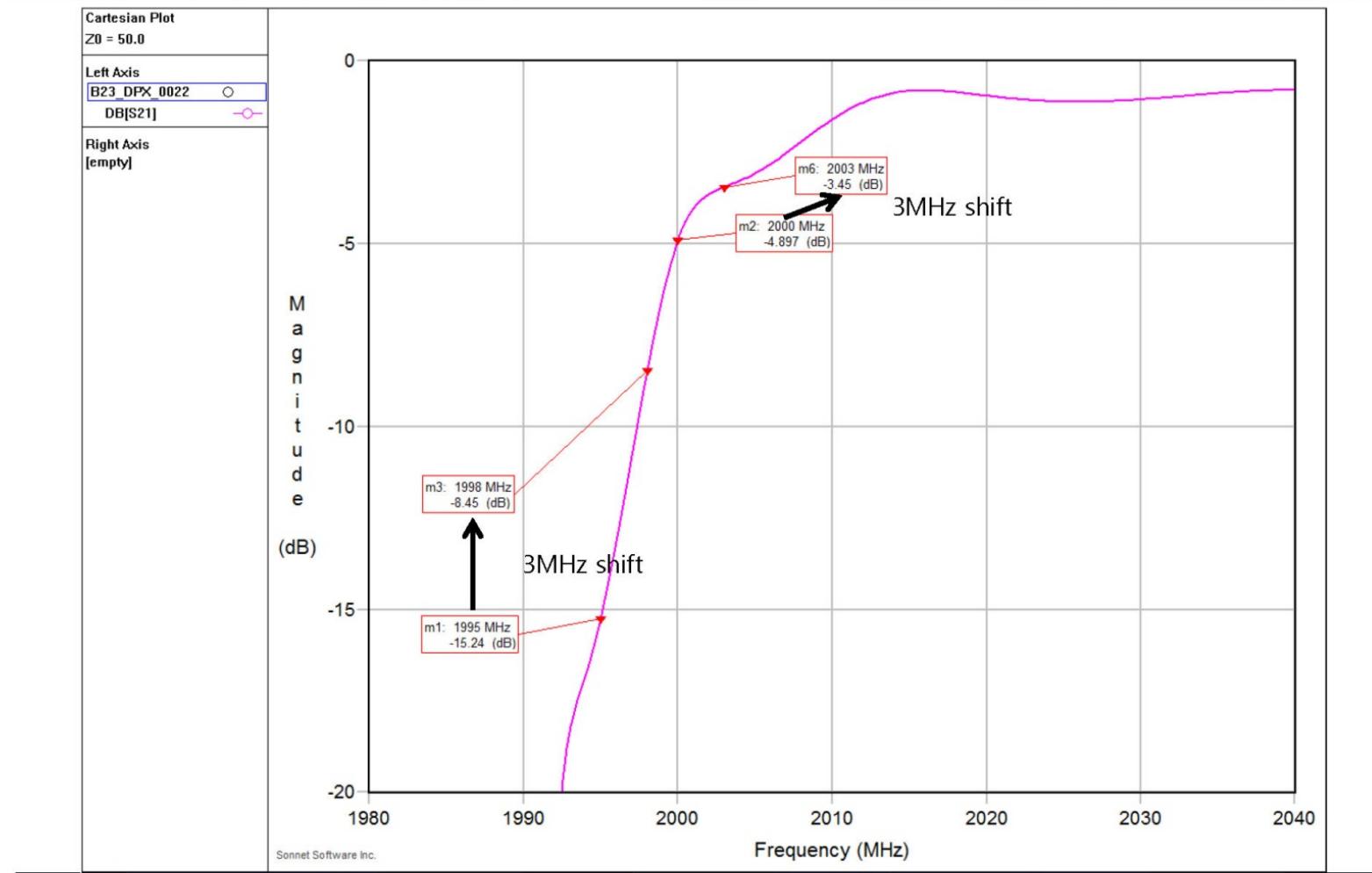
Tx IL & RL

BAW



3MHz shifting with TCF

BAW



Conclusions & Next Steps

- The data presented here can be used in future meetings to propose improvements and corrections to the B23 specification.