

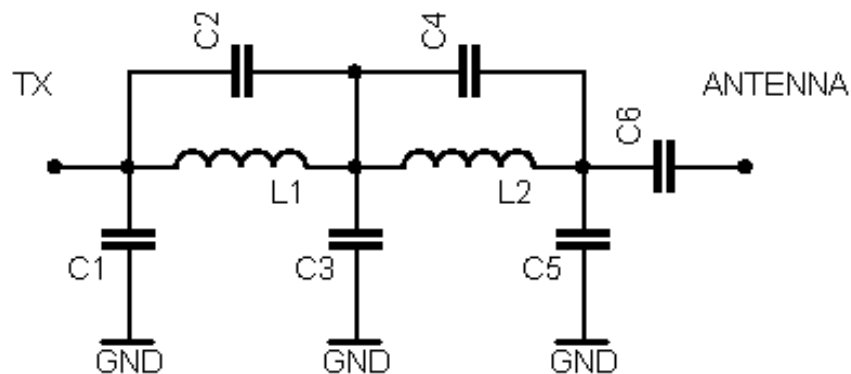
The Output LP/BP Filters for Transceivers GENESIS G****, AVALA-01, AVALA-02.... and CER-01- Make them Simple as Possible with Outstanding Performances

Dipl. Ing . Tasić Siniša –Tasa YU1LM/QRP

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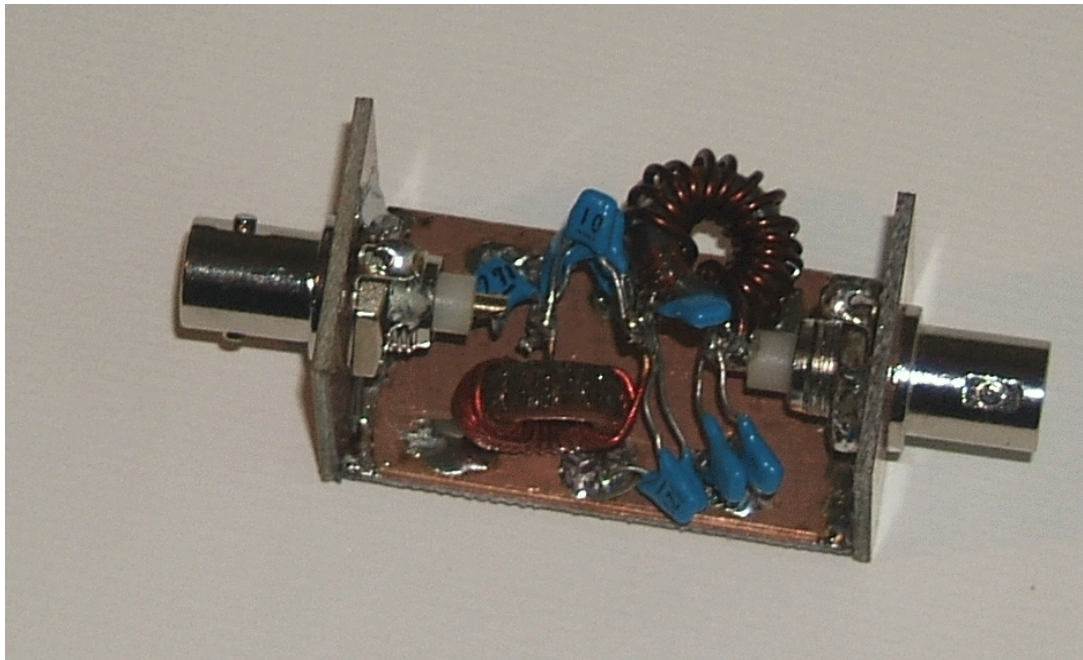
The GENESIS G****, AVALA-01, AVALA-02....ADTRX1....ADTRX9 and CER-01 transceiver transmitter power amplifier output spectrum have a lot of harmonics. To achieve clear output spectrum according to FCC regulation -50dBc we need to add LP (low-pass) or BP (band-pass) filter at output. I successfully realized LP-BP filter as simple peaked LP (low pass) used in transmitting and receiving branches simultaneously (or in TX path only) with only 2 coils. LP and BP realization is simplified to the end. It is possible next realization for utilizing in SDR transceiver for all HF bands GENESIS G59, AVALA-02..... For very easy use with AVALA-01 mono-band transceiver LP/BP-s should be realized as separate block (see picture BP/LP realized for 7 MHz and amplitude transfer characteristic down). It is possible the classic realization also see table and schematic down in article. I left for the Genesis series G40, G3020,... at the PCB place for montage all these type filters and some new not publish here too. I took all real losses for L and C during design.

1. HF/6m BP-LP filters YU1LM version with peaked LP

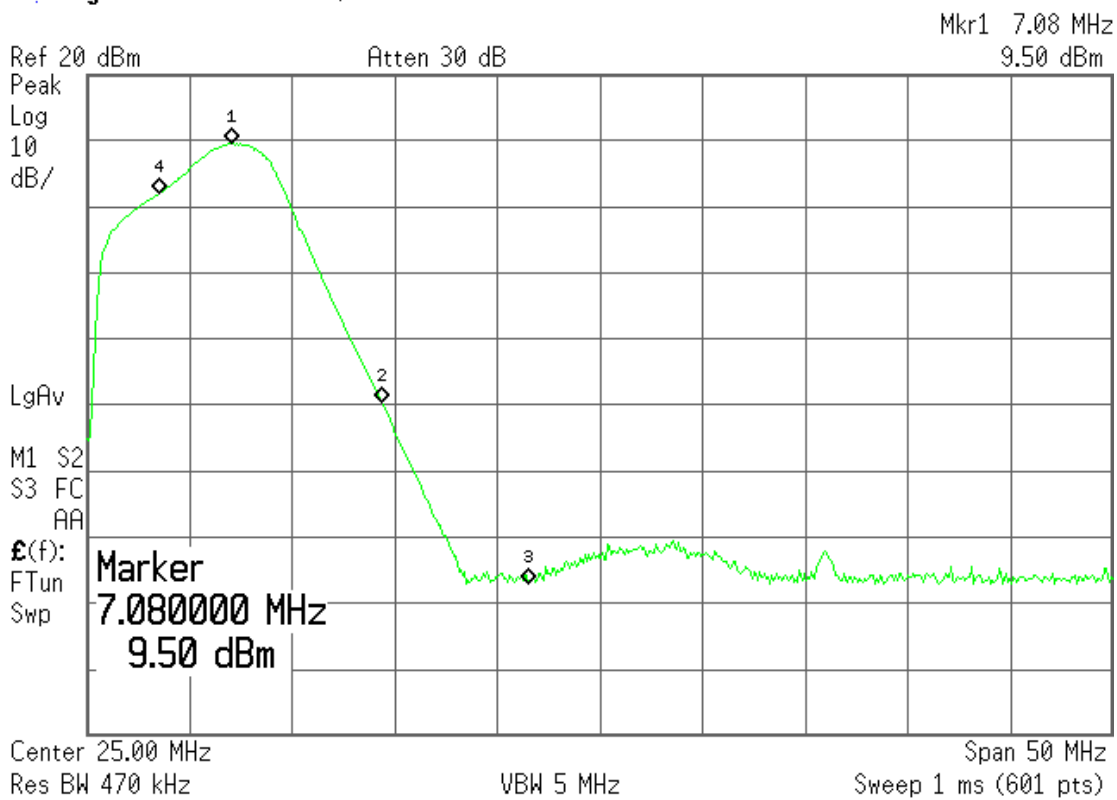


LP/BP FOR AVALA-01... TRANSIVERS - YU1LM

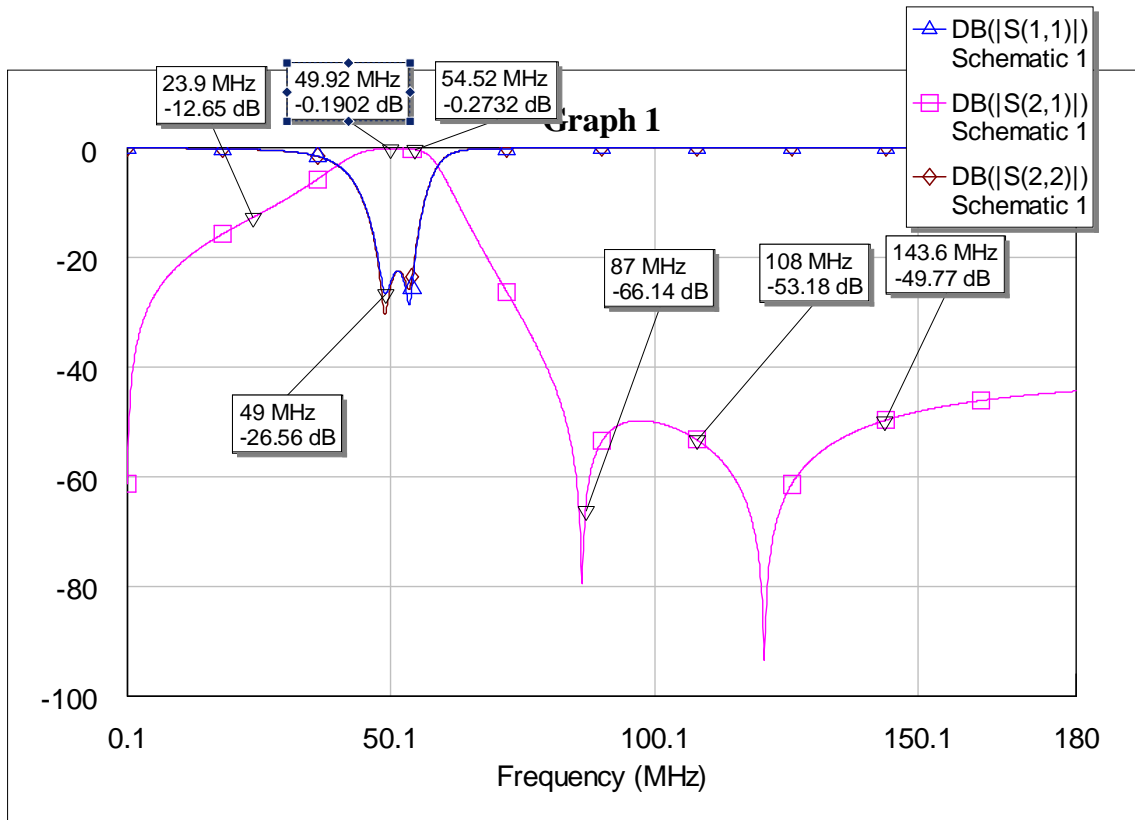
BAND[MHz]	L1[uH]	L2[uH]	C1[pF]	C2[pF]	C3[pF]	C4[pF]	C5[pF]	C6[pF]
1.8	3.35	5.86	2700	240	3300	360	91	1000
3.5	1.8	3.35	1000+330	120	1800	150	100	470
7	0.91	1.64	680	56	910	68	39	270
10	0.57	1	470	47	470+150	47	27	180
14	0.48	0.84	330	27	470	39	18	120
18-21	0.286	0.544	390	22	270	12+12	22	100
24-28	0.29	0.53	150	12	180	15	3.3	68
50	0.1	0.16	100	18	180	22	12	39



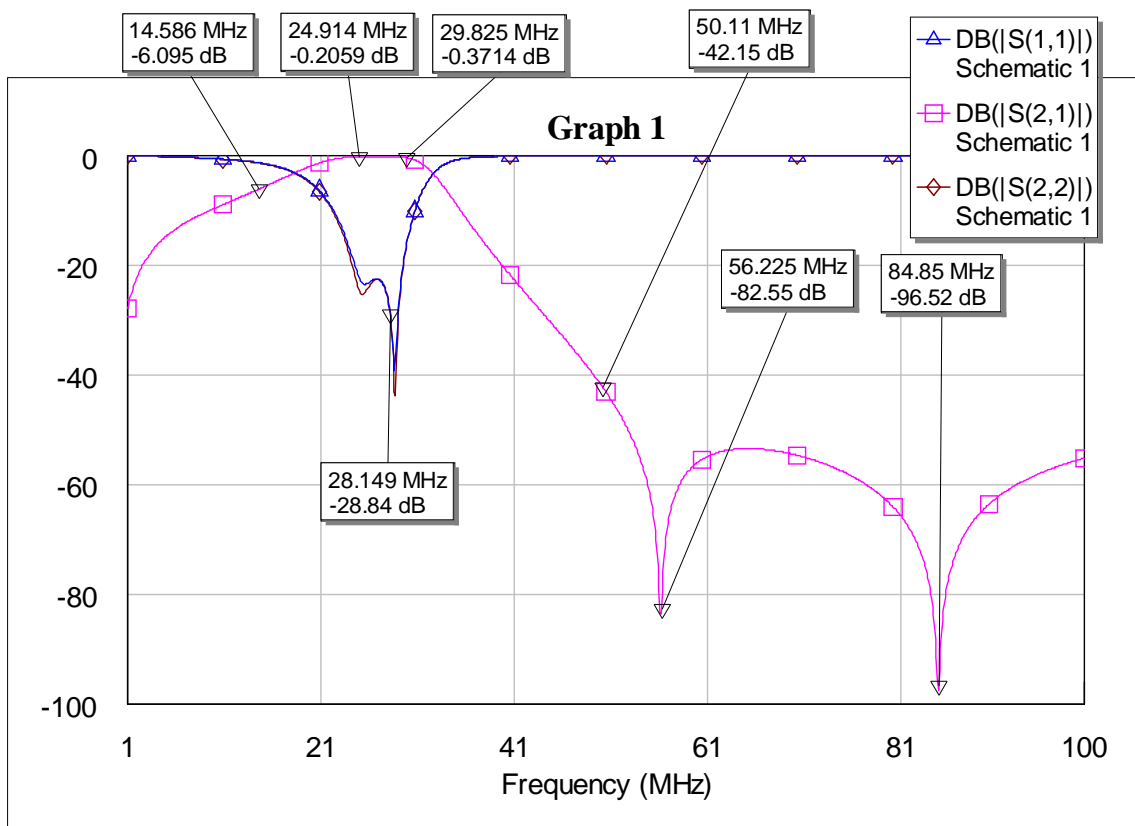
Agilent 18:09:39 Jul 26, 2007



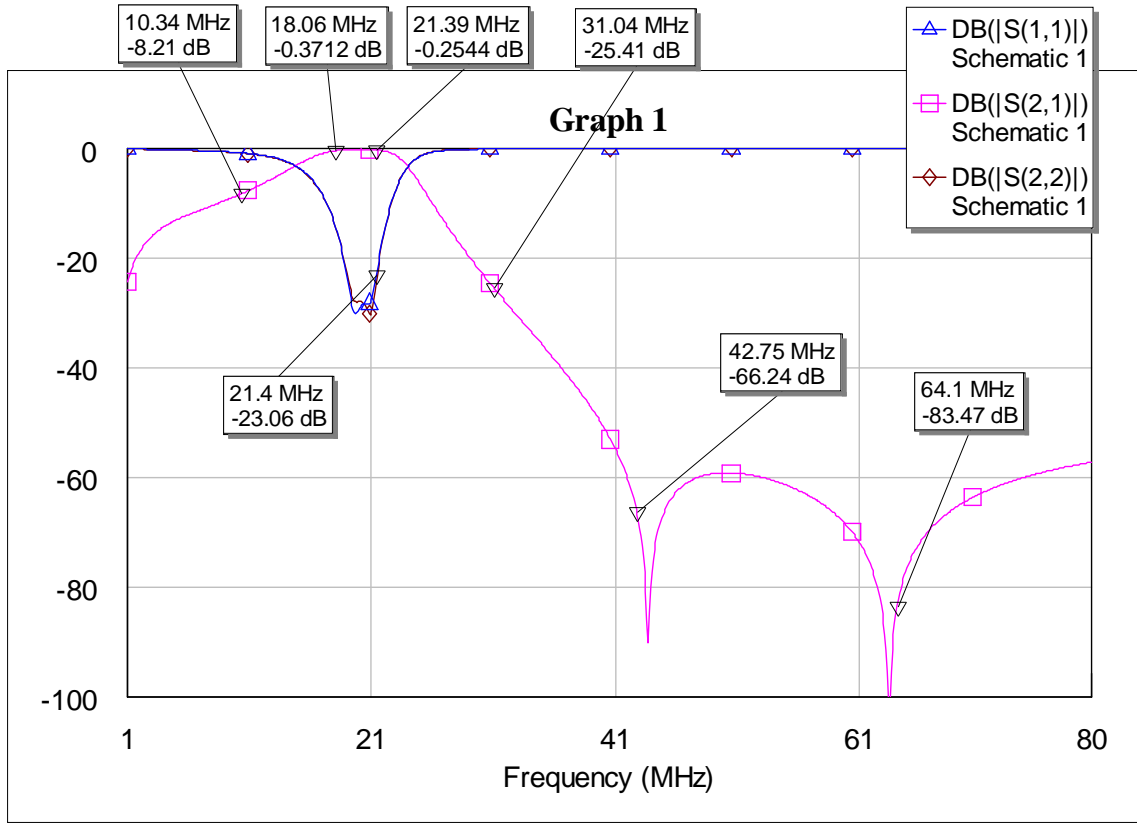
Pictures above are example of the BP/LP filter for 7 MHz which is similar to the proposed in article. The transfer characteristic I obtained at spectrum analyzer screen with function max hold and with swept signal generator output power +10dBm.



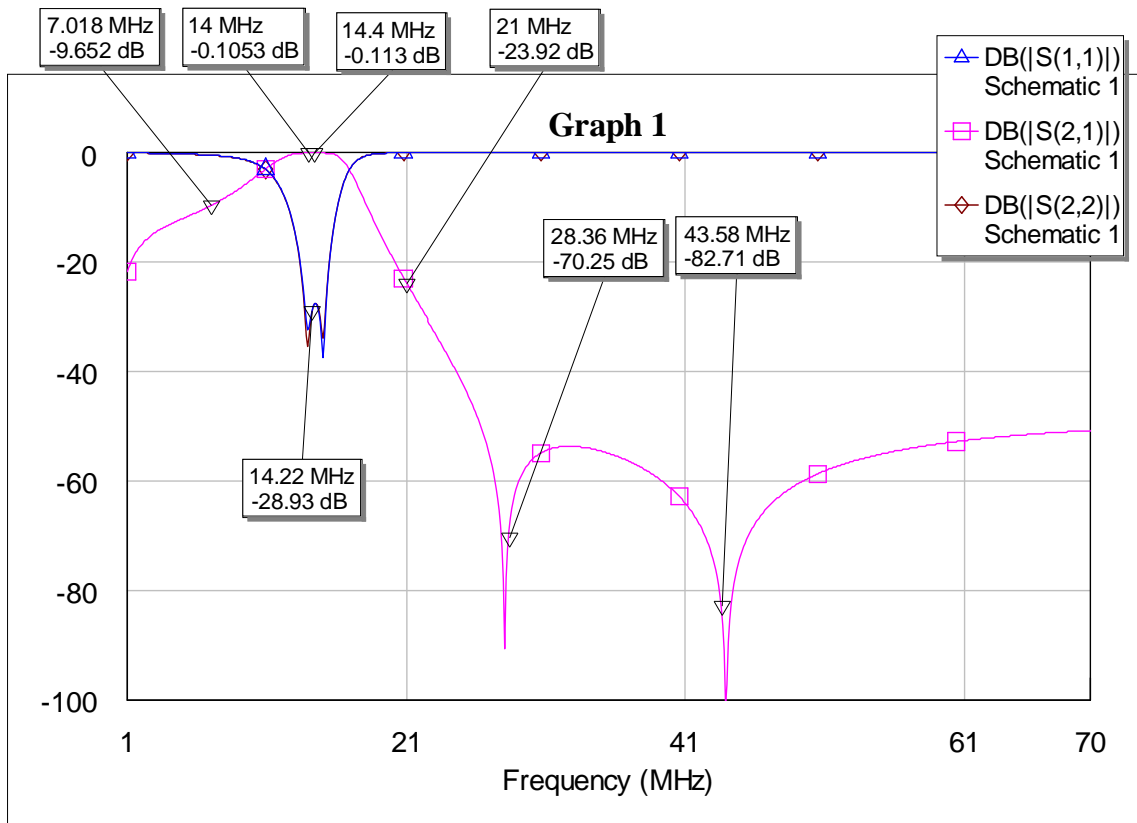
BP-LP response for 6m



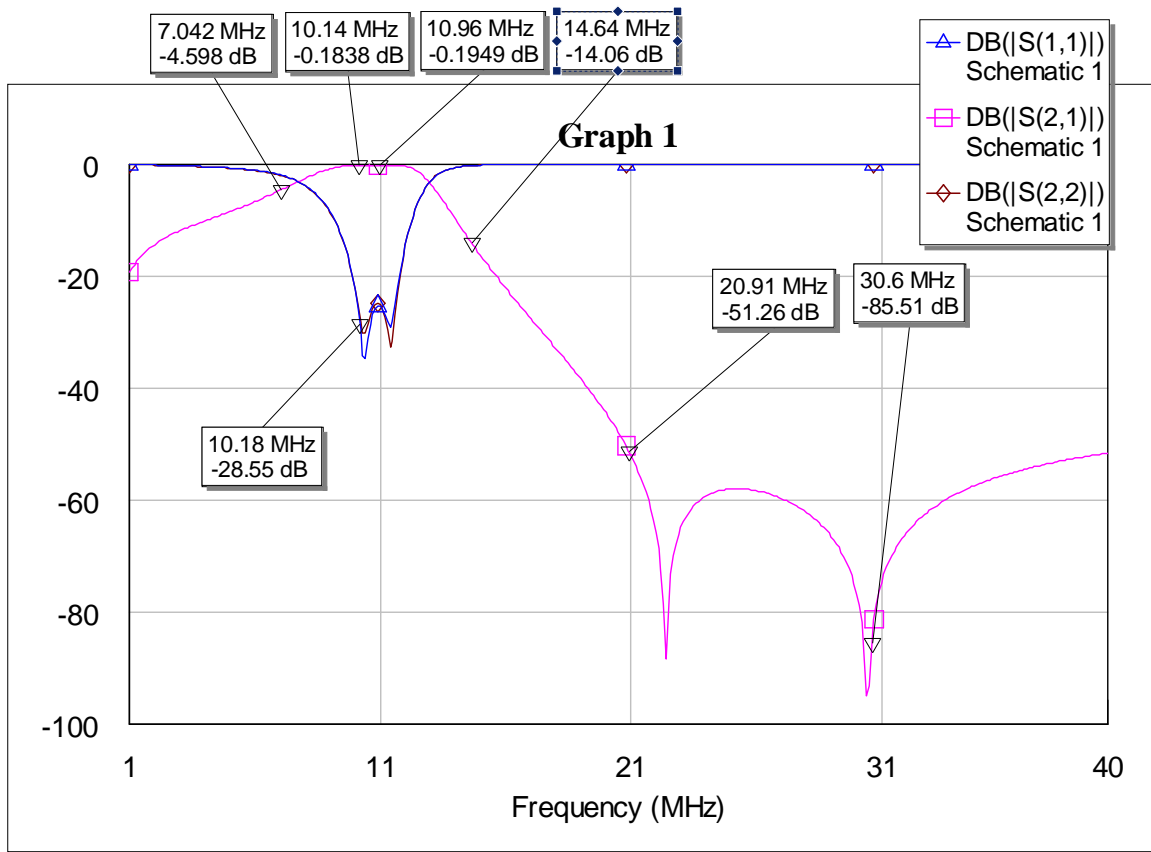
BP-LP response for 12m and 10m



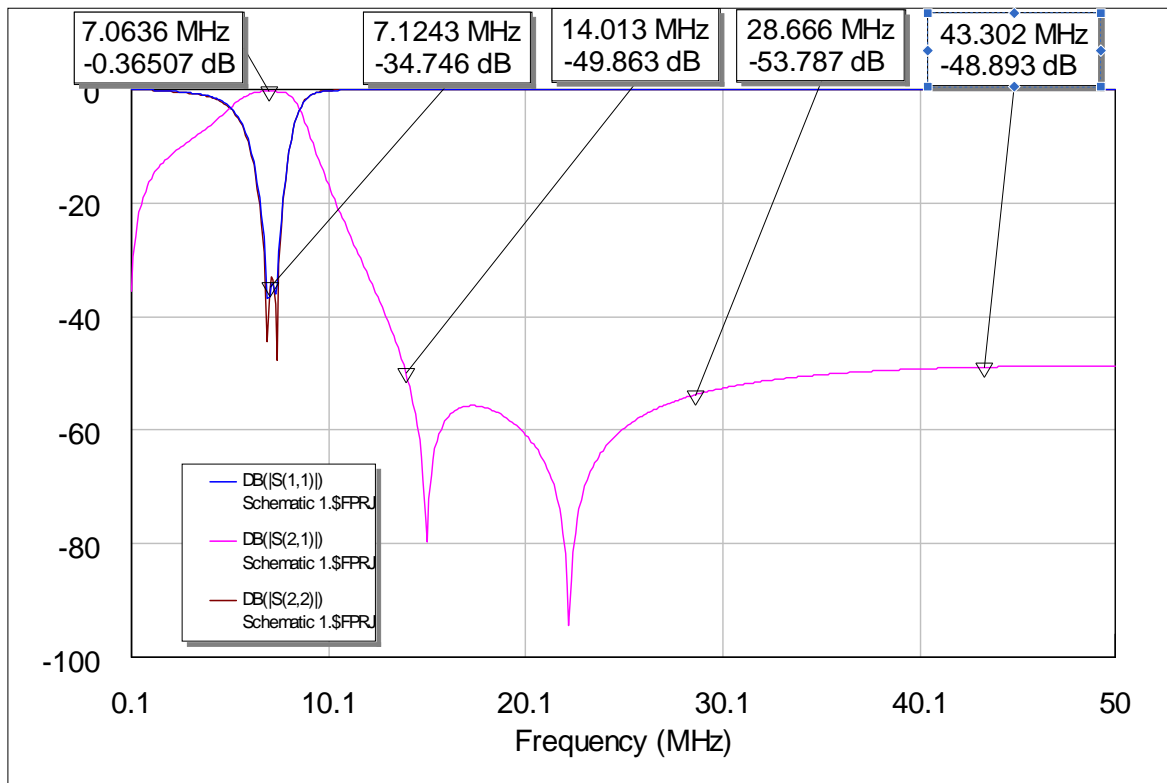
BP-LP response for 17m and 15m



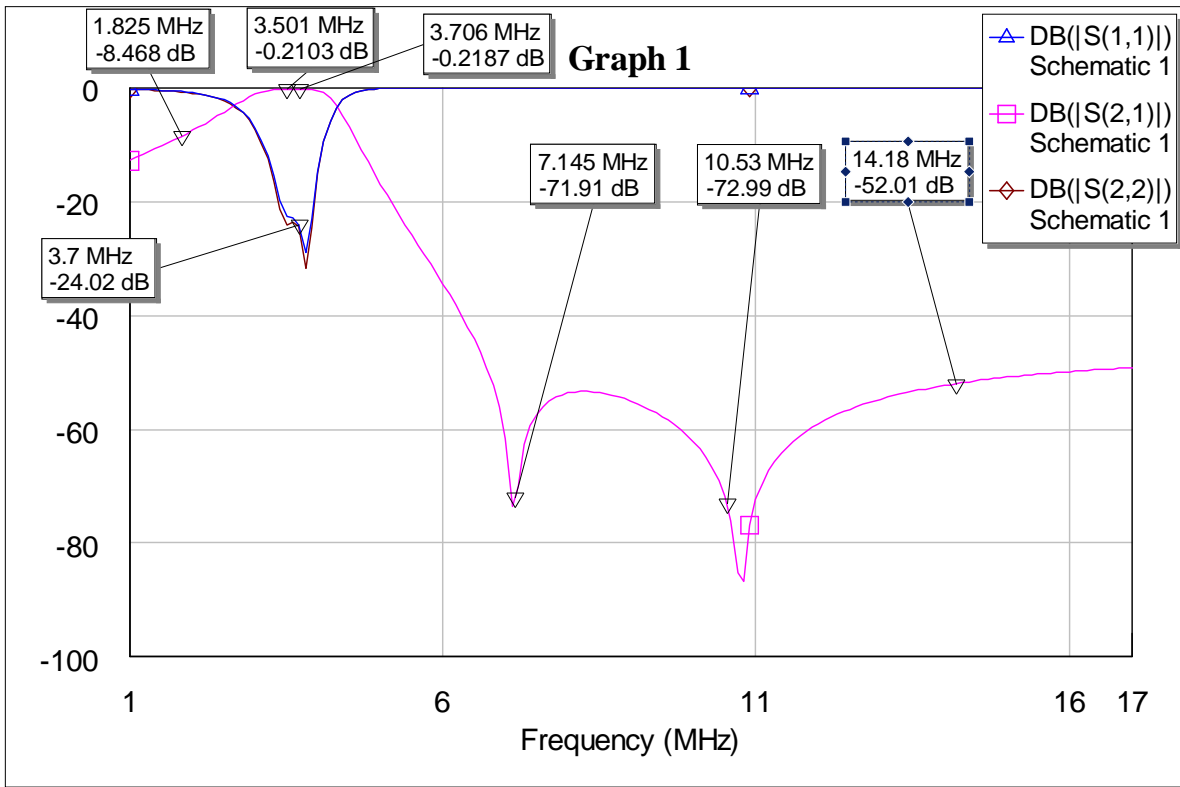
BP-LP response for 20m



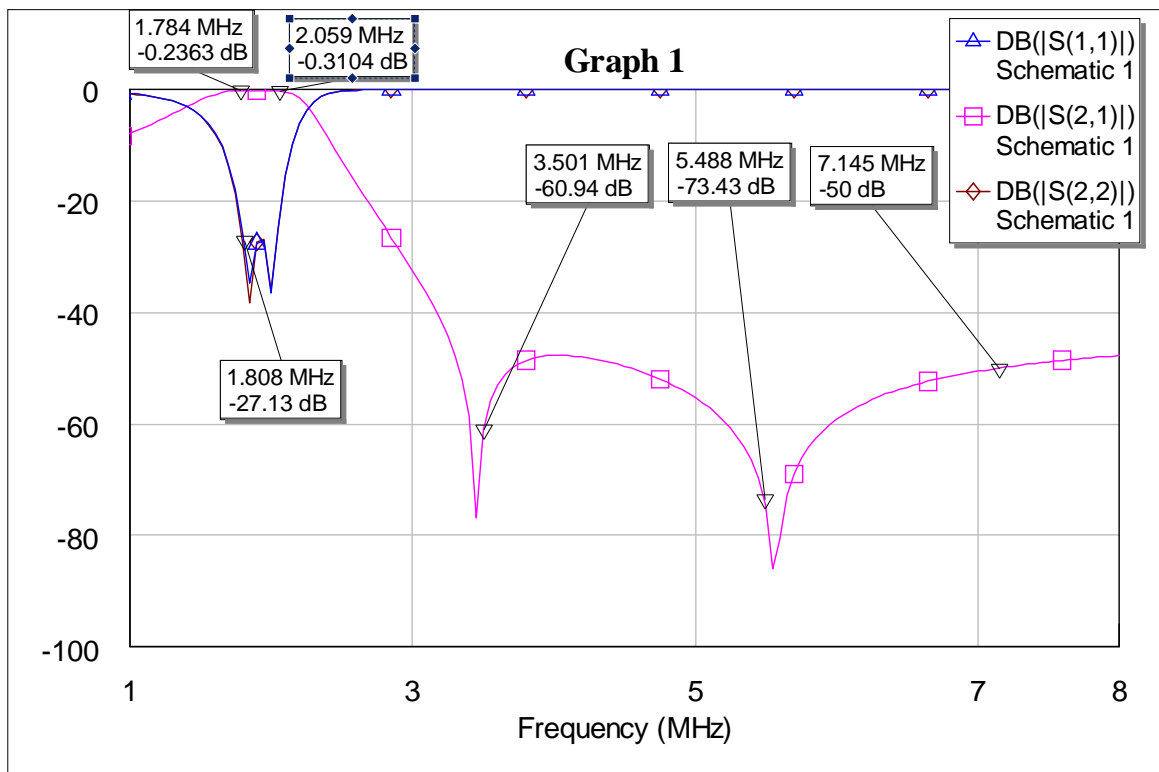
BP-LP response for 30m



BP-LP response for 40m



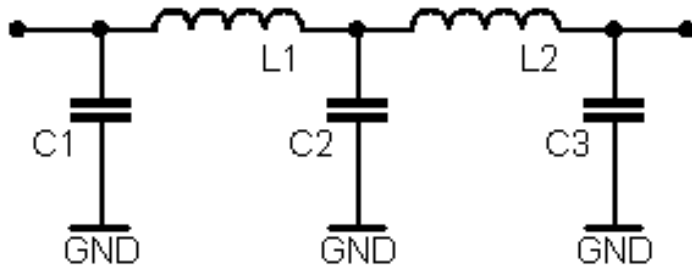
BP-LP response for 80m BP-LP response for 6m



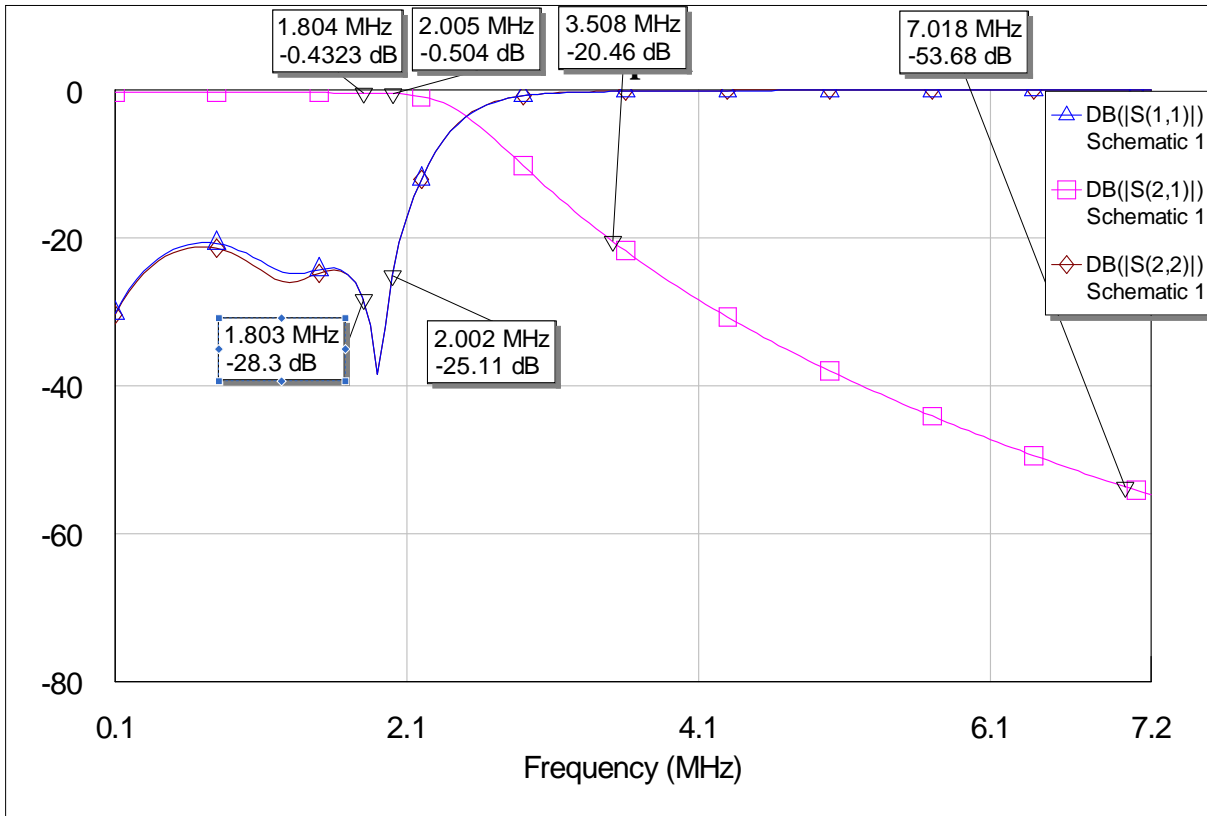
BP-LP response for 160m

2. HF/6m LP filter classic design

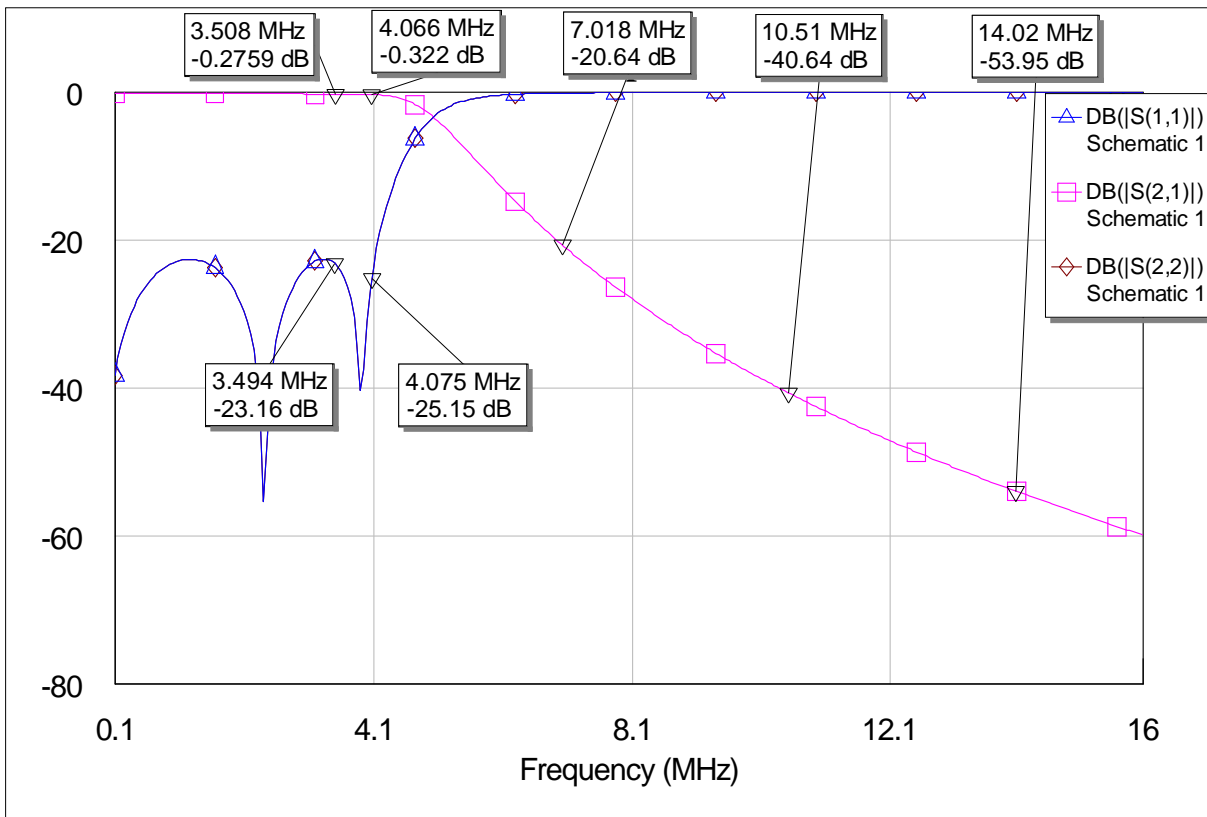
This is classic design and values for L and C are given in table down. I added also transfer characteristic for each filter bellow. This filter type will not be enough for clear spectrum for second harmonics according to the FCC regulation several dB will be miss in some cases. Unwanted signals will be much lower than normal 100W transceiver has at output. Unwanted signals will be lower than proposed 1mW. This type LP filters performances are good enough for harmonic suppression especially in the case push-pull RF amplifiers. The advantage of this design is simplicity and very good replication. This is a really uncritical realization.



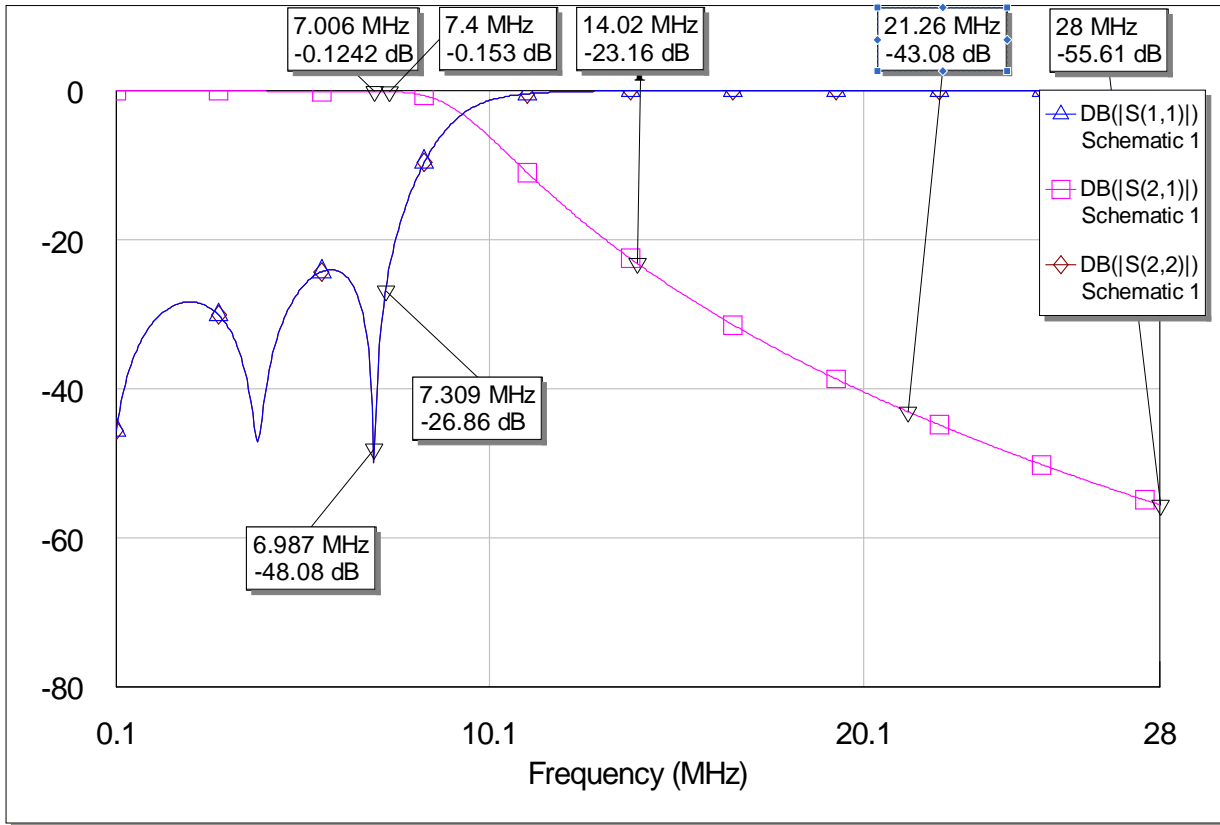
Band[MHz]	L1[uH]	L2[uH]	C1[pF]	C2[pF]	C3[pF]
1.8	5.15	5.15	1200	2700	1500
3.5	2.62	2.62	680	1000+330	680
7	1.45	1.45	330	680	330
10	1	1	220	470	220
14	0.74	0.74	180	390	220
18-21	0.517	0.517	120	240	120
24-28	0.355	0.355	100	180	82
50	0.196	0.196	47	100	56



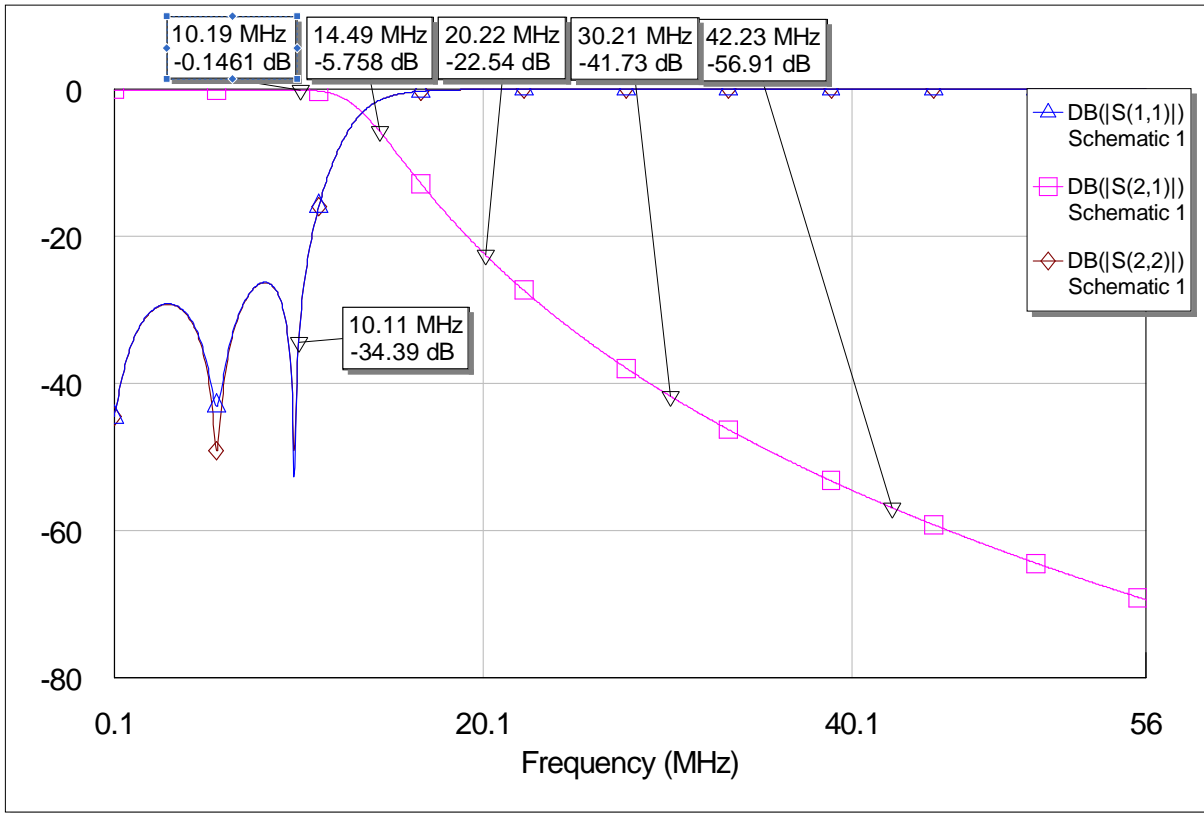
LP response for 160m



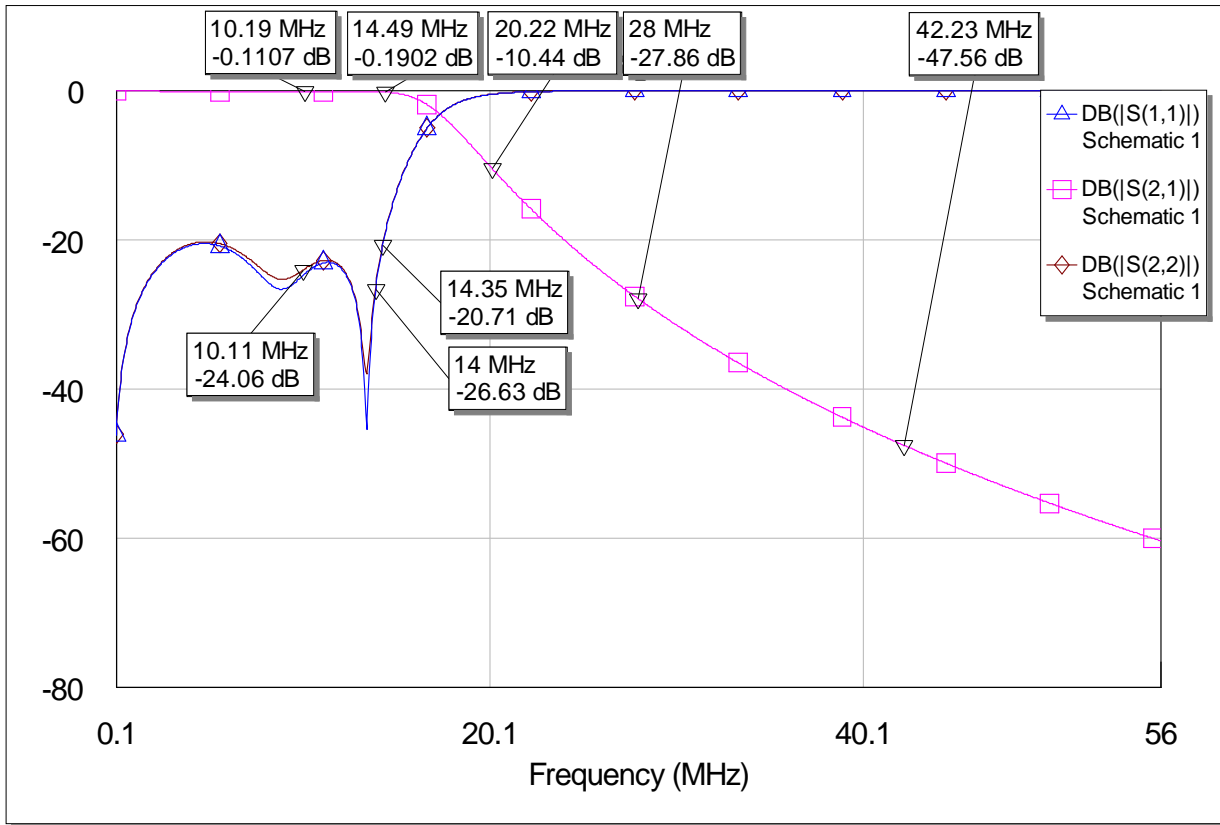
LP response for 80m



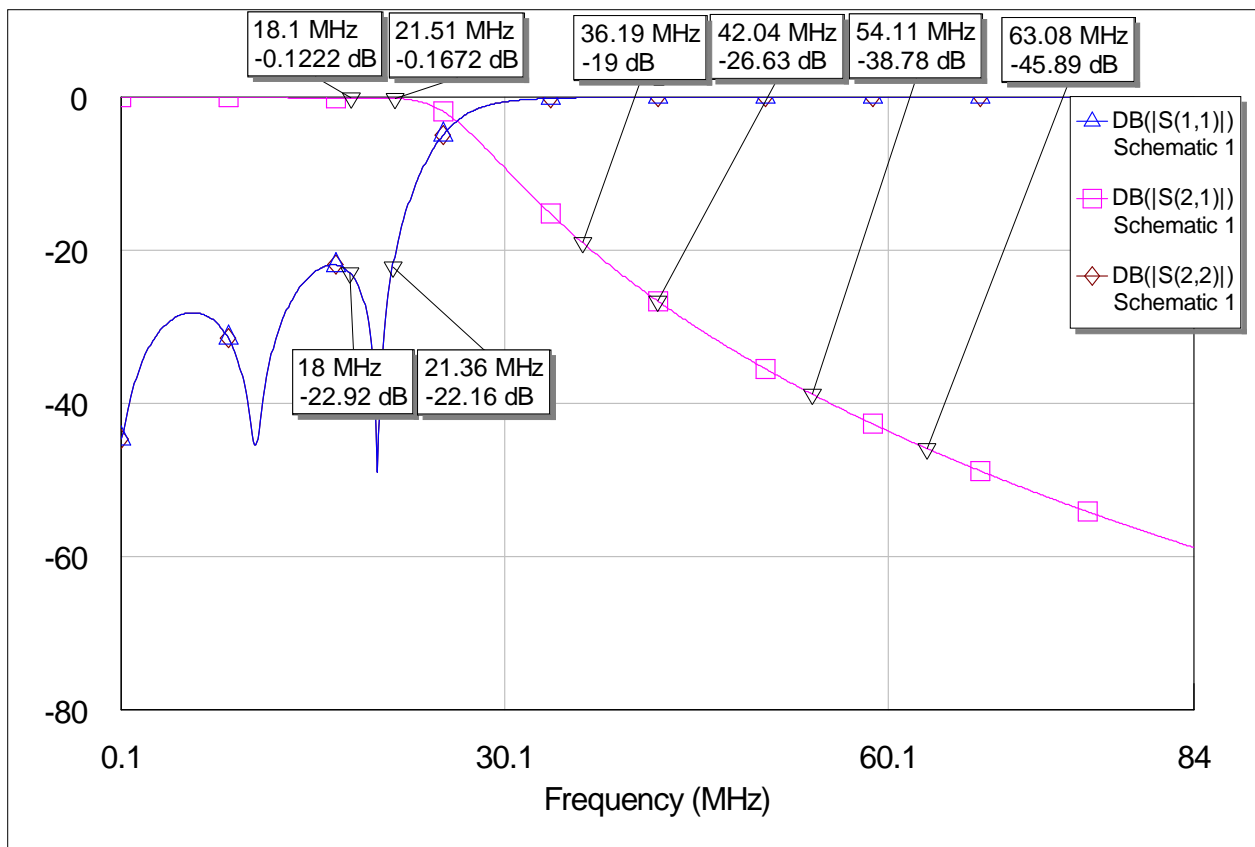
LP response for 40m



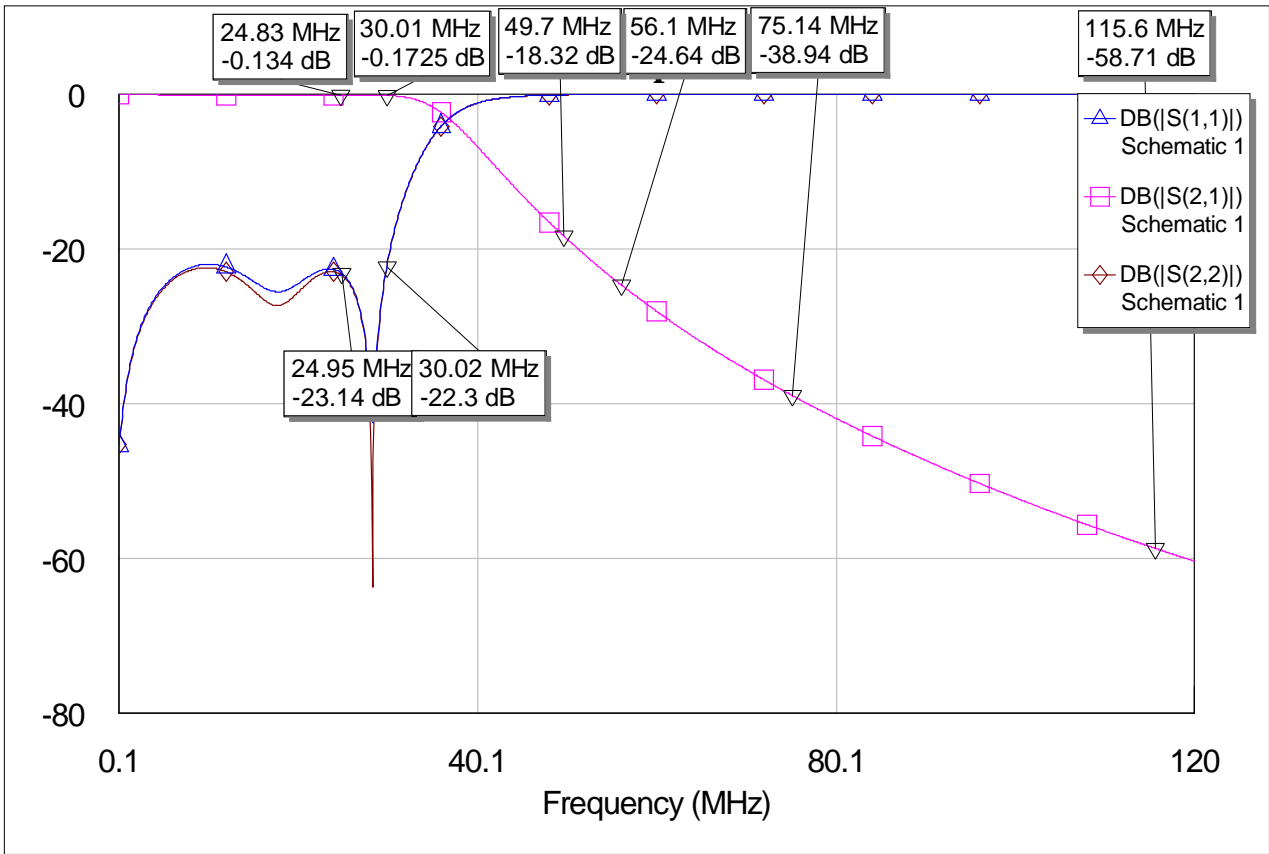
LP response for 30m



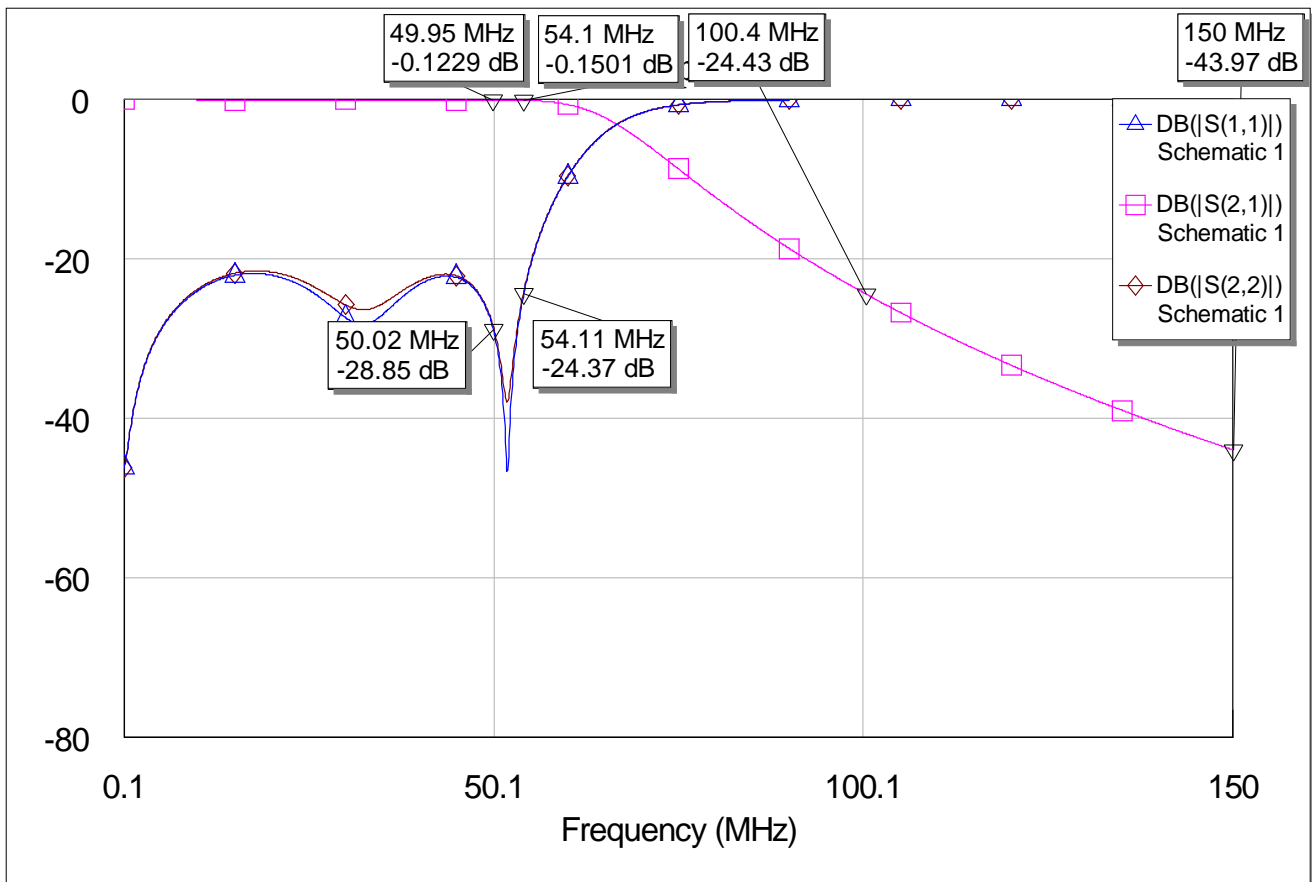
LP response for 30m



LP response for 17m and 15m



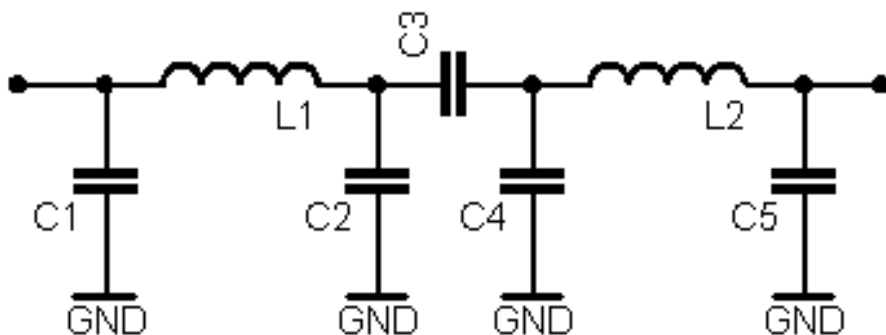
LP response for 12m and 10m



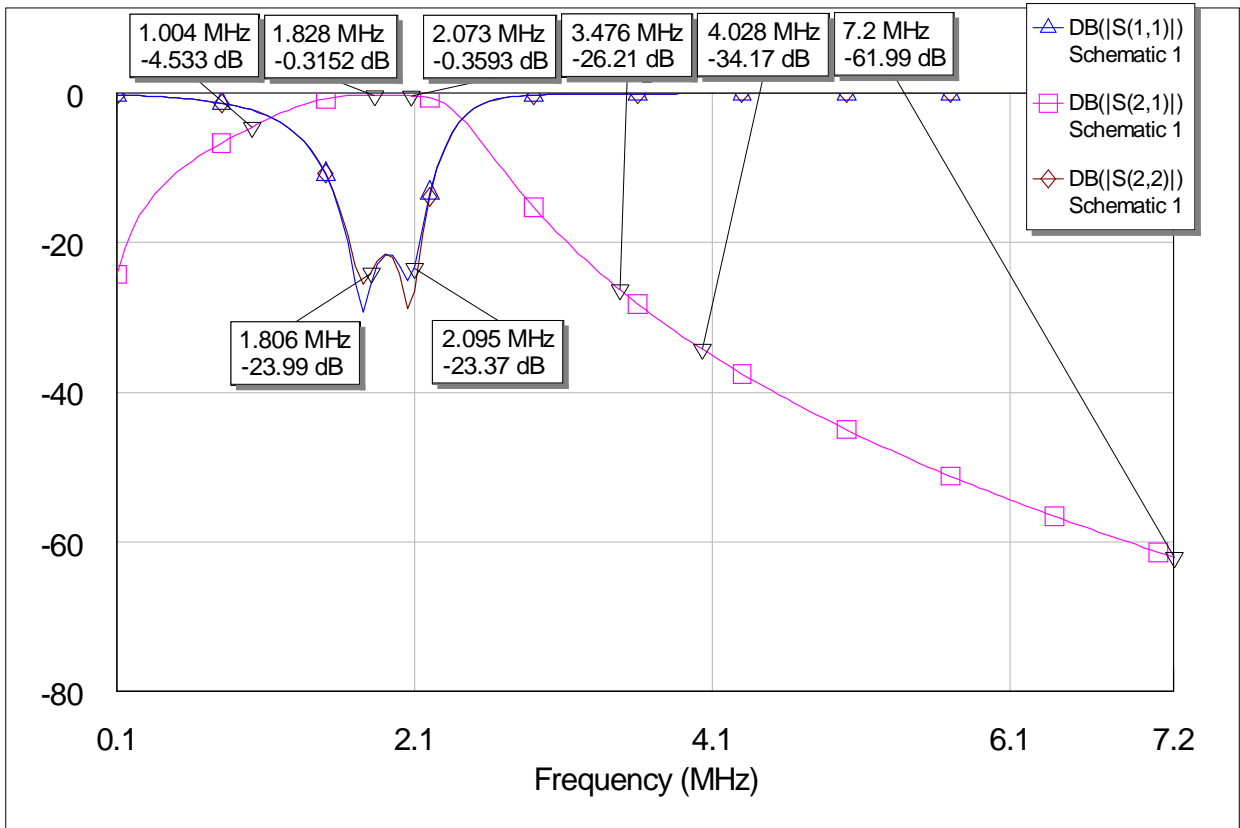
LP response for 6m

3. HF/6m LP-BP Filter Design Simple as Possible

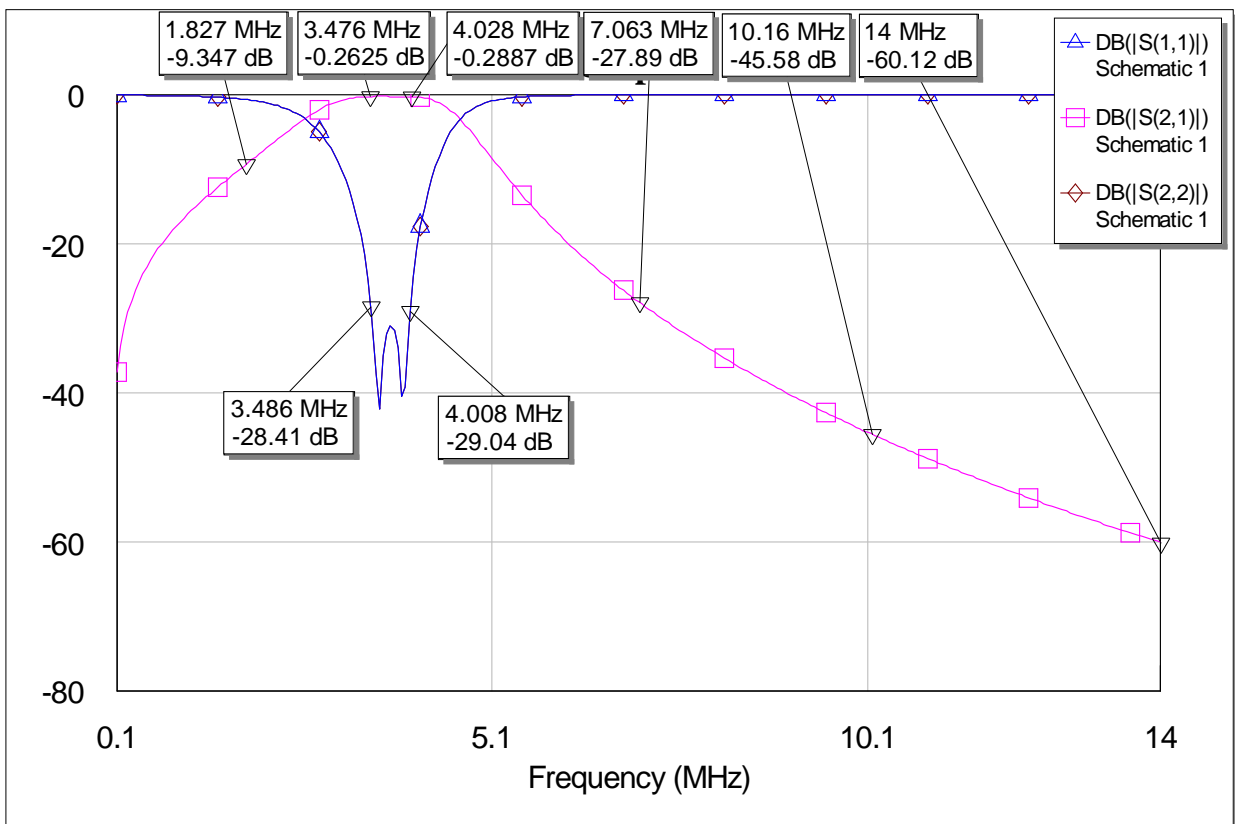
This design is derivative of classic LP (low pass) to BP (band-pass) with minimum built in components two L and five C. The values for each band are given in table down. I added also transfer characteristic for each filter below. The idea for this realization comes from RSGB Radio Communication Handbook eight edition BP-LP from DJ8ES for 2m [page 9.37].



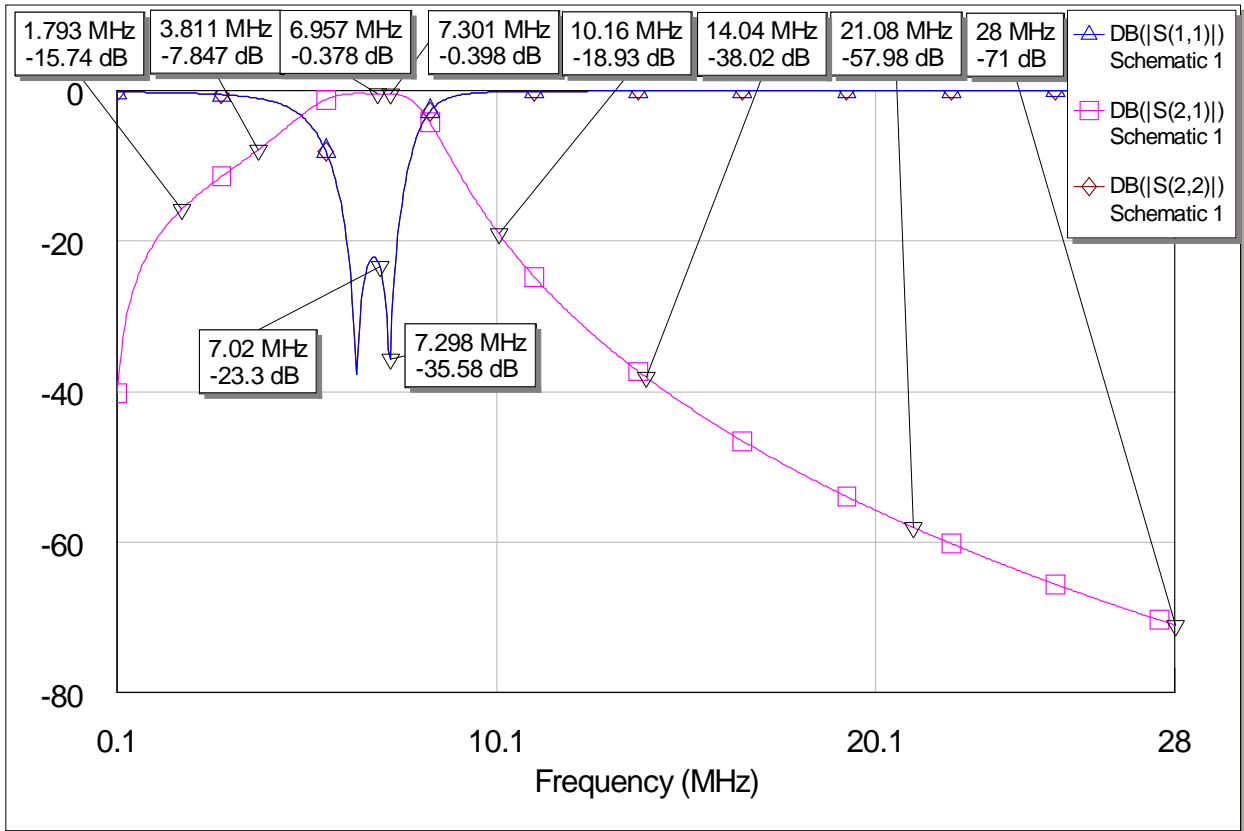
Band[MHz]	L1[uH]	L2[uH]	C1[pF]	C2[pF]	C3[pF]	C4[pF]	C5[pF]
1.8	6.8	6.8	1500	1000	1000	910	1500
3.5	4.7	4.7	560	330	220	330	560
7	2.2	2.2	470	240	150	240	470
10	1.8	1.8	330	150	68	150	330
14	1.5	1.5	240	82	22	82	240
18-21	1	1	100	56	33	56	100
24-28	0.47	0.47	120	68	56	68	120
50	0.27	0.27	82	39	18	39	82



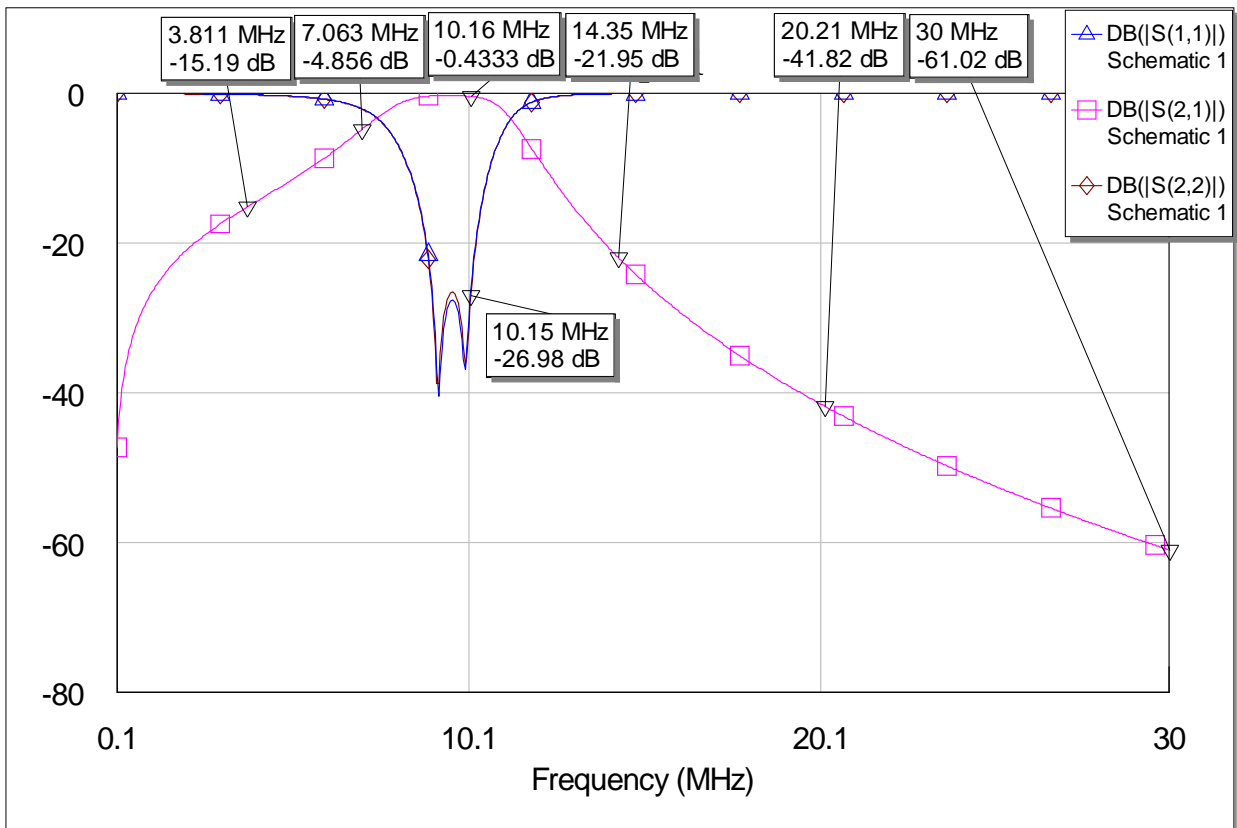
LP response for 160m



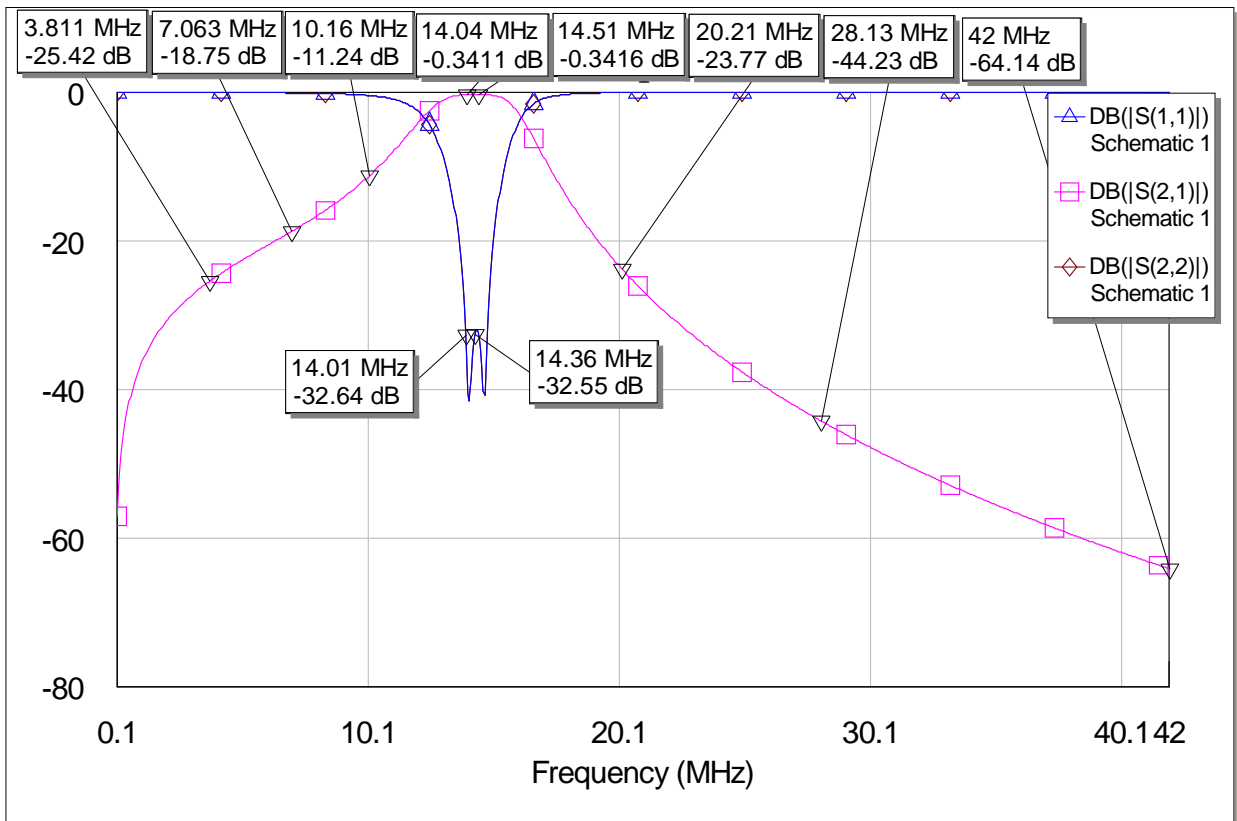
LP response for 80m



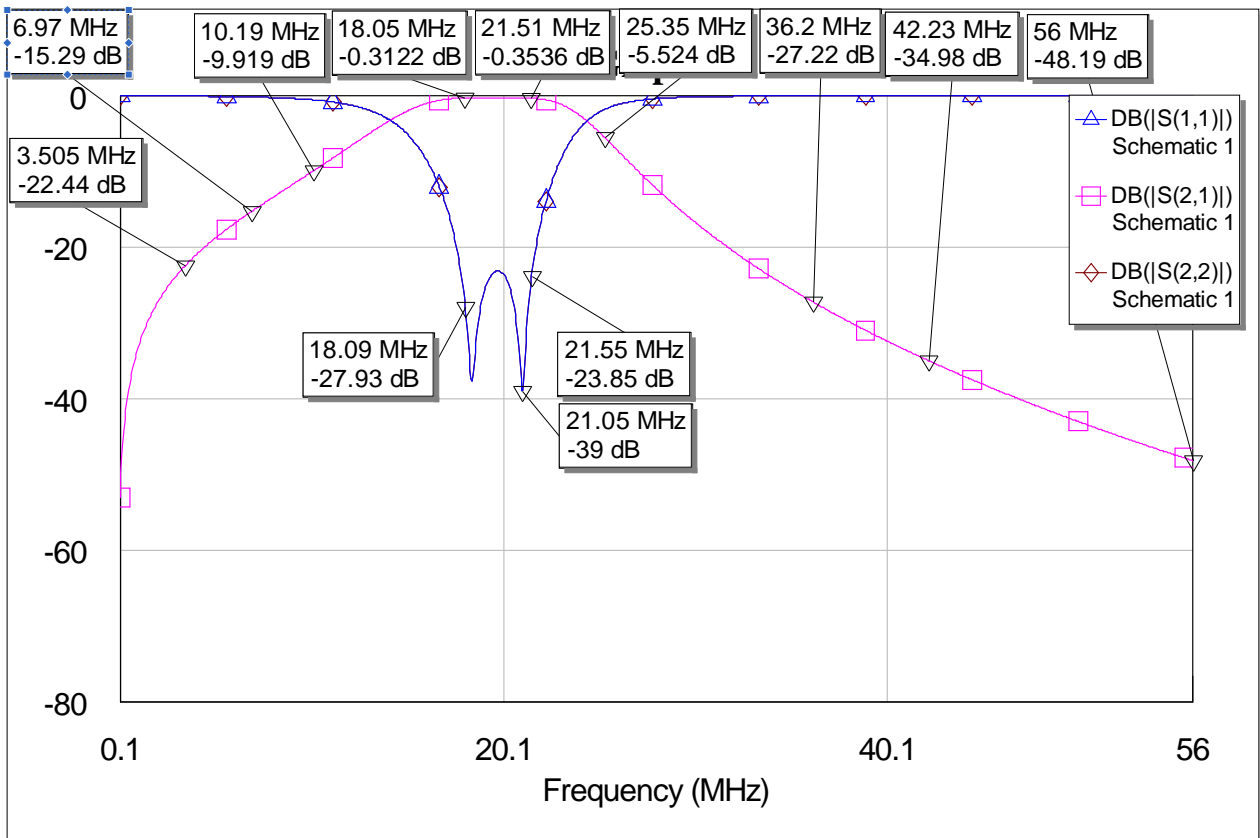
LP response for 40m



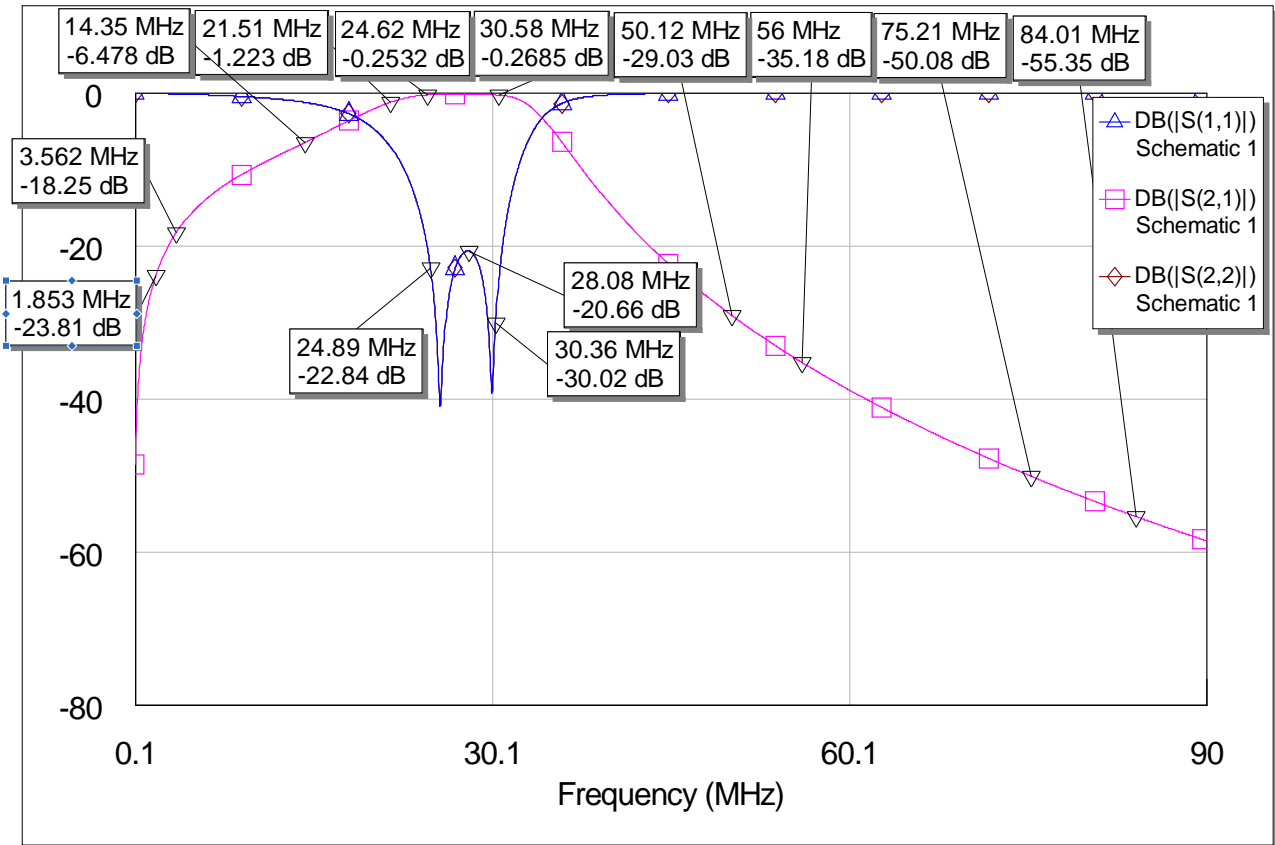
LP response for 30m



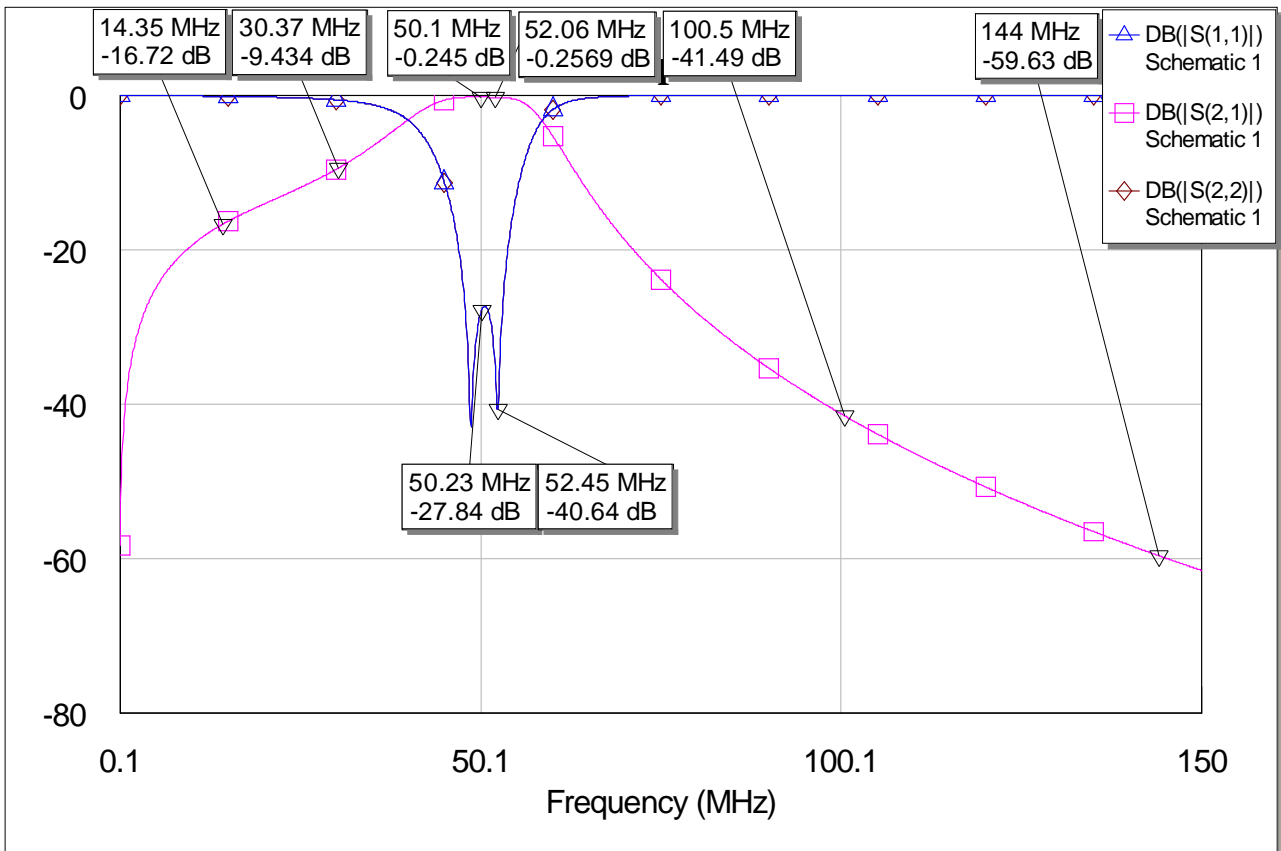
LP response for 20m



LP response for 17m and 15m



LP response for 12m and 10m



LP response for 6m

Summary

It is possible realized very simple LP or LP-BP filter at the output of SDR transceivers Genesis G****, AVALA series, HF CER-01 transceivers or any other transceiver as minimal number component approach. The number of turns on ring cores or air coils can be easy calculated with freeware software written by Wilfried DL5SWB. Please take care about component quality build in these filter because un-adequate component lead to output transistor destruction!!! Some details you will be able read in references and in the articles which are in preparation and they will be published very soon at these WEB pages. The filters are with 3 equal coils! For BP filters are very important component accuracy to obtain good RF specifications!

I wish you successful BP realization and I apologize for some possible mistakes. I made great effort to share my projects with all who are interesting for. Anyway, send me your comments positive or negative, results or photos of your realization please.

August 2008, rewritten July 2009

VY 73/72 and GL in homebrew Tasa YU1LM/QRP

tasayu1lm@gmail.com

tasa@insimtel.com

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