TUNABLE BANDPASS FILTERS

Product Catalogue

FILTER SELECTION

Selecting the right filter

Selecting the right filter for the job requires the designer have to take into account a number of aspects: technical performance, size/weight, and cost. The most important technical filter characteristics are:

- Insertion Loss;
- Bandwidth/Selectivity;
- RF Power Handling;
- Intercept Point (Third Order Intercept);
- Tuning Range;
- Tuning Speed;
- Power Consumption.

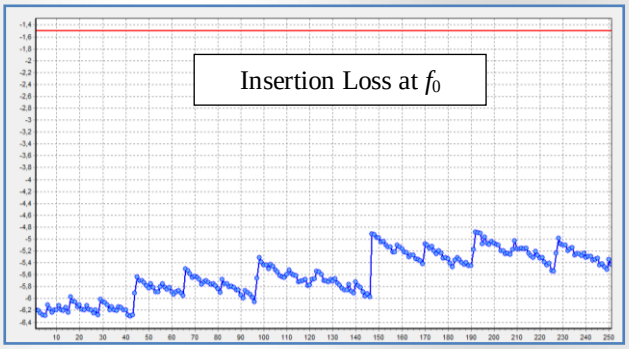
Additionally, the size and weight of the filter have to be chosen correctly, especially for portable equipment.

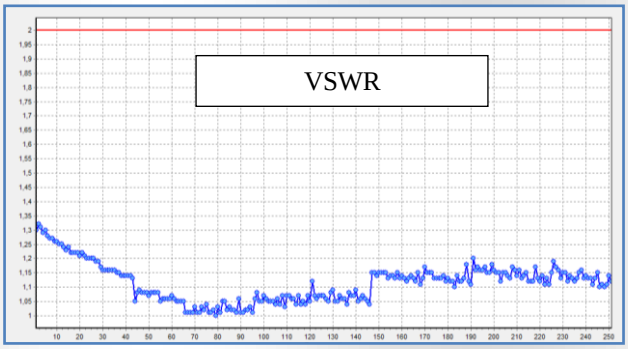
Tunable Bandpass Filters

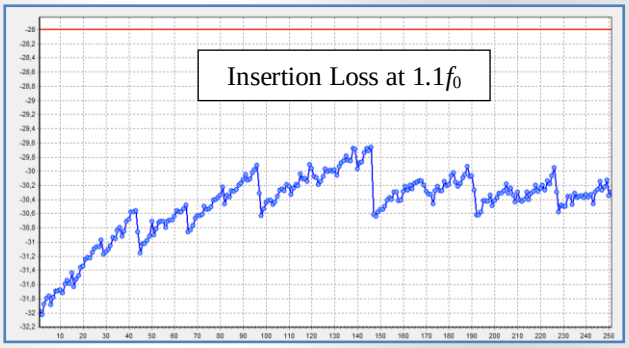
Filter	RH6321	RH6324	RH6323	RH6341	RH6331
Tuning Range, MHz	1.5 to 30	1.5 to 30	1.5 to 30	30 to 512	30 to 88
Shape factor (30 dB/3 dB)	6.8	6.8	6.8	6.8	6.8
In-band RF Power Handling, W	5	5	5	2	20
Outband RF Power Handling, W	20	20	20	10	50
In-band Third Order Intercept Point	40	40	40	40	50
DC Power Consumption	+5 VDC 0.2-1 A	+5 VDC 0.2-1 A	+5 VDC 0.2-1 A	+5 VDC 0.3-0.6 A	+5 VDC 0.8-2 A
	+12 VDC 100 mA	+12 VDC 100 mA	+12 VDC 100 mA	—	—
Tuning Speed, µs	150	150	10	10	25
Size, mm	146x88x38	166x92x48	146x88x18	114x104x24	109x86x67
Weight, g	520	750	180	600	600

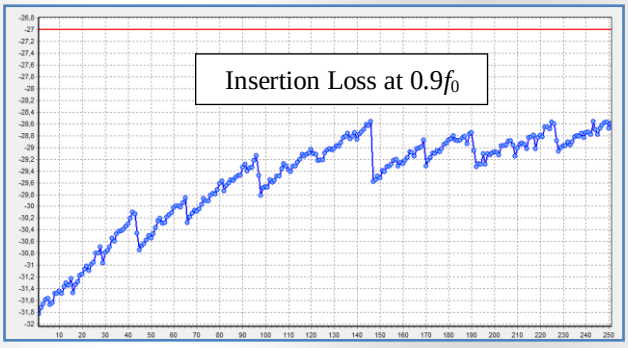
1.5-4 MHz filter performance

The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.9f_0$, Insertion Loss at $1.1f_0$ and VSWR at each tuning frequency for 1.5-4 MHz filter.



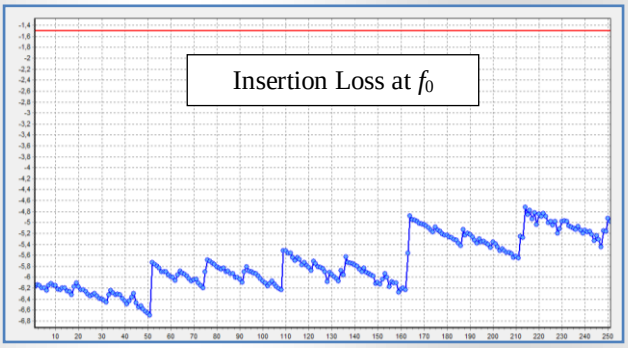


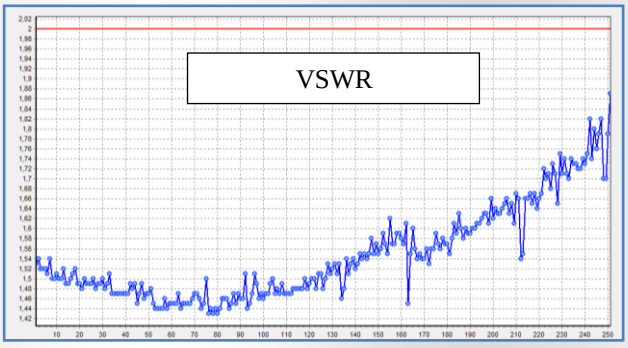


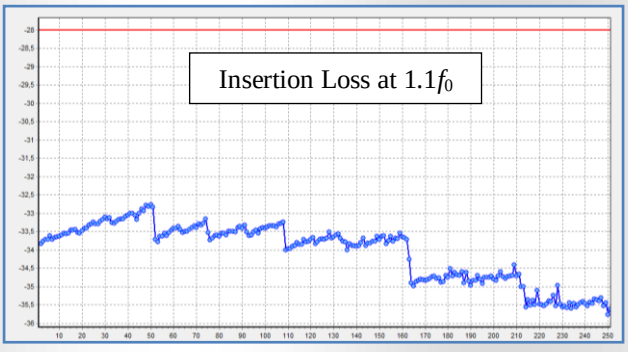


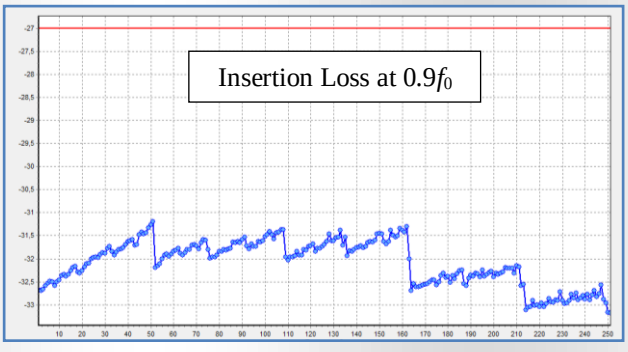
4-10 MHz filter performance

The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.9f_0$, Insertion Loss at $1.1f_0$ and VSWR at each tuning frequency for 4-10 MHz filter.



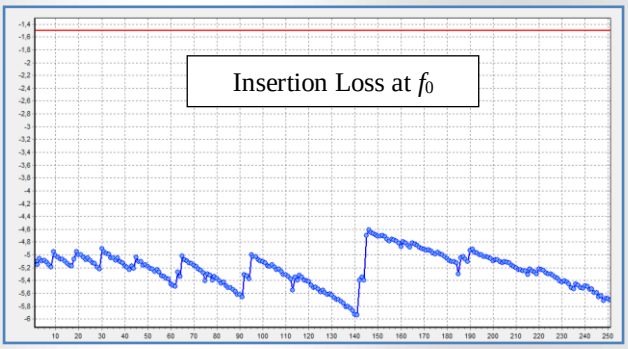


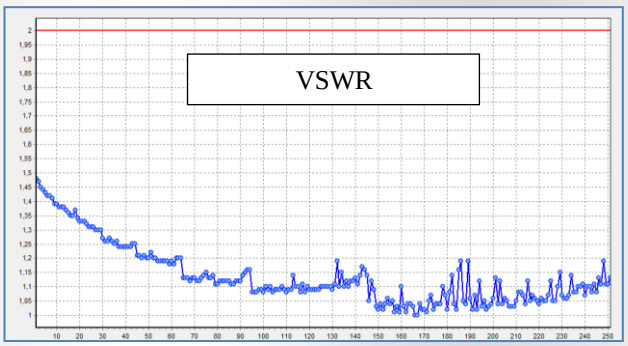


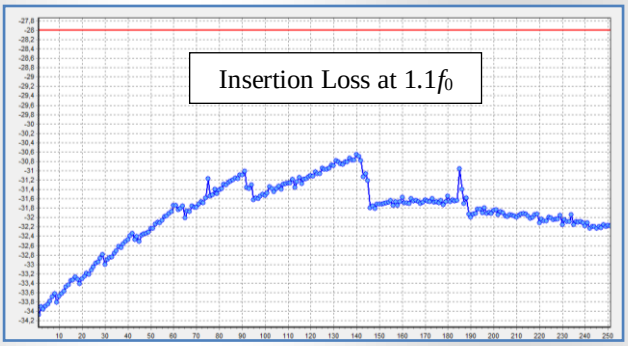


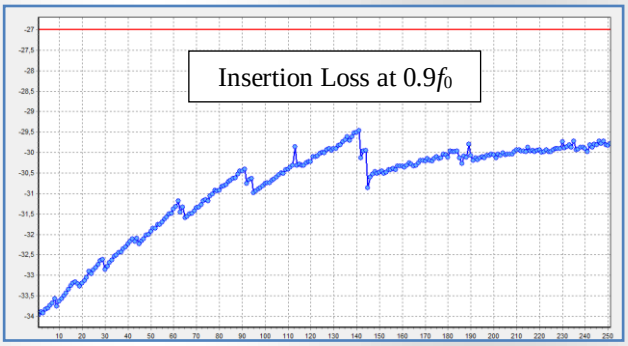
10-30 MHz filter performance

The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.9f_0$, Insertion Loss at $1.1f_0$ and VSWR at each tuning frequency for 10-30 MHz filter.









Pinout& Ratings

PIN #	Reference designator	Description	Notes
1-6, 10	N/C	No Connect	—
7, 9, 11	GND	Digital/RF Ground	—
8	VCC	+5V Power Supply Input	4.75 to 5.25V @800mA
12	VDD	+12V Power Supply Input	11.5 to 12.5V @300mA
13	STB	Strobe	Active: 5V; Inactive: 0V
14	CLK	Serial Clock	Active: 5V; Inactive: 0V
15	DI	Serial Data Input	Active: 5V; Inactive: 0V

Serial interface description

Serial interface consists of 3 signals: CLK (clock), DI (data input), STB (strobe). Data input is 11 bits code. First 8 bits determine the tuning frequency and the last 3 bits determine the frequency band.

Frequencybandcode

Frequency band	D9	D10	D11
1,5–4 MHz	1	0	0
4–10 MHz	0	1	0
10–30 MHz	0	0	1

Tuning frequency code

Tuning frequency code is calculated by X_{10} conversion into binary code. X_{10} is calculated by the formula:

$$X_{10} = \left(\frac{f_0 - f_l}{f_h - f_l}\right) \times 250\,,$$

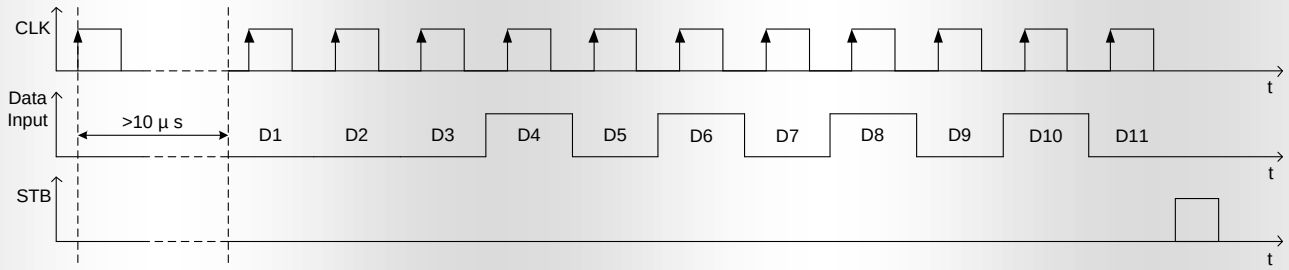
f_0 — tuning frequency; f_l — low frequency of the band; f_h — high frequency of the band.

Example

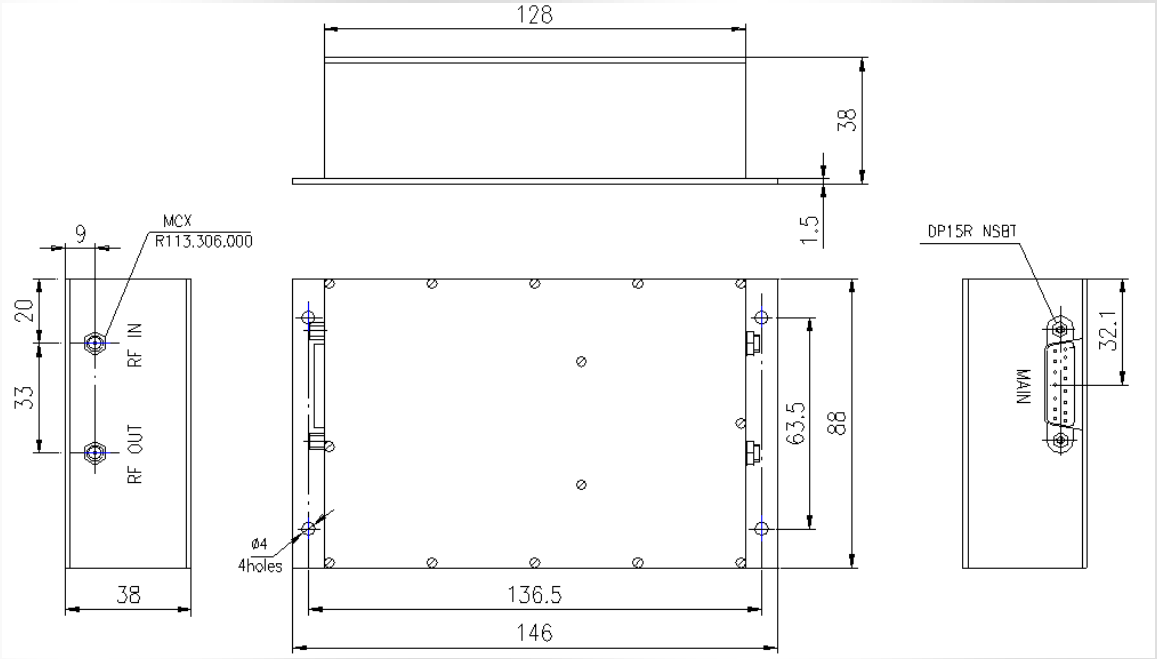
If you wish to tune to 8.02 MHz, the tune word is:

$$X_{10} = \left(\frac{8{,}02 - 4{,}00}{10{,}00 - 4{,}00}\right) \times 250 \approx 168;$$

$$168_2 = 10\ 10\ 10\ 00.$$



Mechanical Outline



Note:sizes are shown in millimeters.

The preselector RH6323 is digitally tunable filter operating from 1.5 MHz to 30 MHz. This module consists of two (2) internal tunable bandpass filters (the frequency range divided between them in the following way: 1.5-6.7 MHz and 6.7-30 MHz) and the internal amplifier (it compensates filter's insertion losses). RH6323 uses serial interface for tuning.

RH6323
Specification:

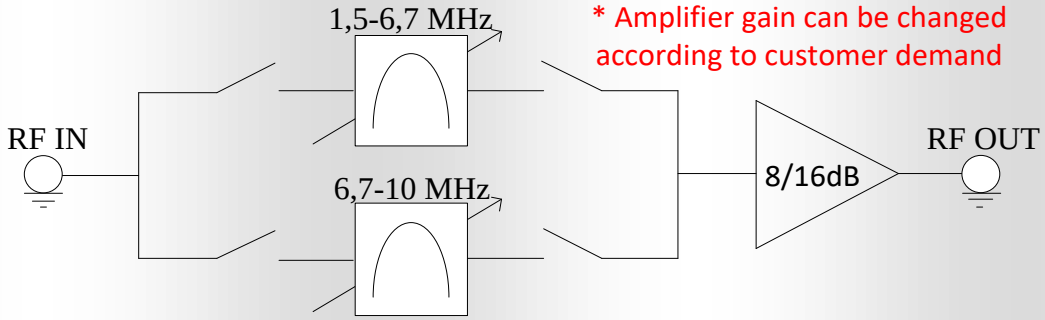
Frequency Coverage (3 bands)	1.5 to 30 MHz
Input/Output Impedance:	50 Ω
In-band Input/Output VSWR	2:1
In-band RF Power Handling	5 Watt (input)
Out-band RF Power Handling	Up to 20 Watt
In-band Second Order Intercept Point	+100 dBm(input)
In-band Third Order Intercept Point	+40 dBm (input)
Center Frequency Drift:	±80 PPM/ºC
Tuning Control	Serial
Tuning Speed	10 µS
DC Power Consumption (Static)	5V @800mA 12V @ 300mA
Shape Factor (30 dB/ 3 dB)	7 typical
Operating TemperatureRange	-40°C to +85°C
Size:	146x88x18.2 mm
Weight:	280 g
RF Connection	MCX

RH6323 filters' specification

FrequencyRange	#	Bandwidth (3 dB), %	Insertion Loss, dB	Shape factor (30 dB)		
				Overall	Low Side	High Side
1.5-6.7 MHz	5	4.6/5.5	5.0/5.9	5.8/6.1	6.8/7.3	4.8/4.9
	4	3.6/4.5	5.2/6.2	5.9/6.2	6.9/7.2	4.9/5.0
	3	2.5/3.5	5.6/6.5	5.8/6.2	6.8/7.1	4.8/5.0
	2	1.7/2.4	6.1/6.9	5.9/6.1	6.7/7.2	5.1/6.1
6.7-30 MHz	5	4.6/5.5	4.3/5.2	6.1/6.3	7.0/7.4	5.1/5.2
	4	3.6/4.5	4.7/5.8	6.1/6.5	7.3/8.0	4.9/5.2
	3	2.5/3.5	5.1/6.2	5.9/6.0	6.6/6.7	5.2/5.4
	2	1.7/2.4	5.4/6.6	5.8/6.1	6.6/7.2	5.0/6.1

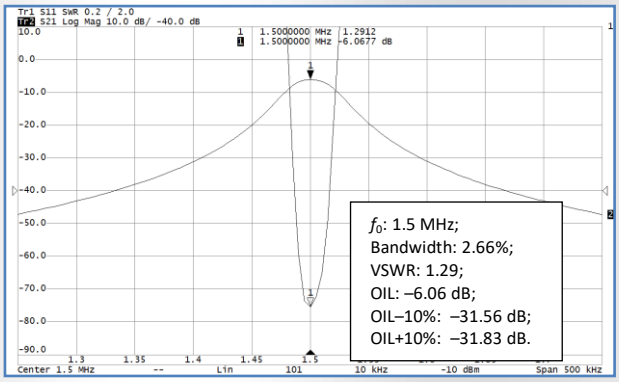
Note: table values are shown as average/maximum.

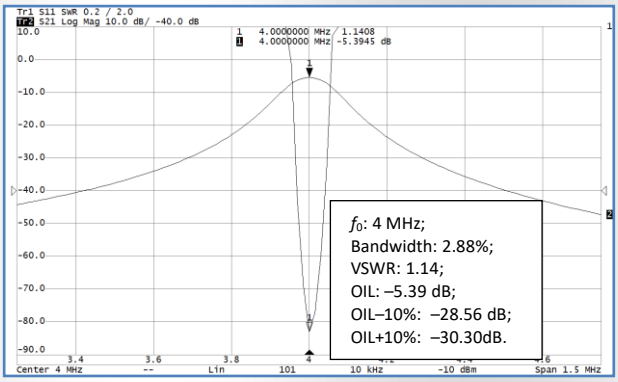
RH6323 block diagram

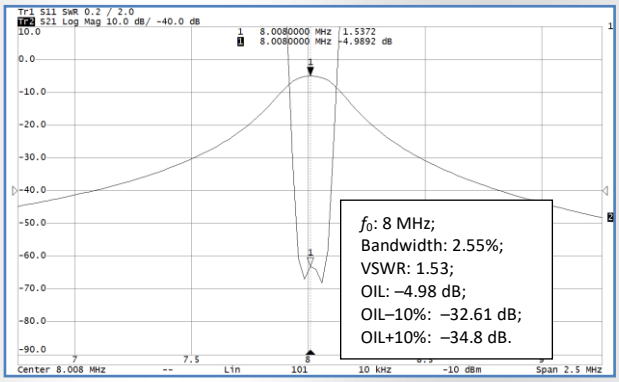


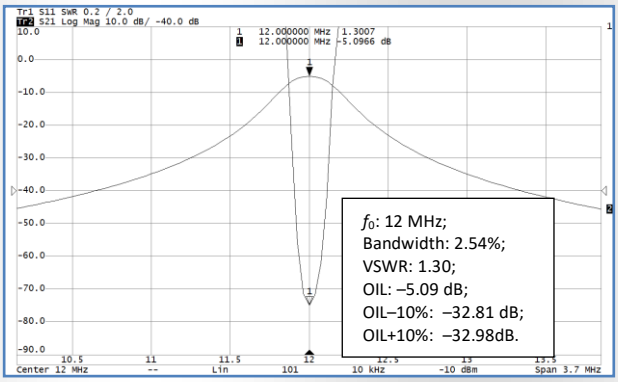
Frequency response functions and VSWR functions

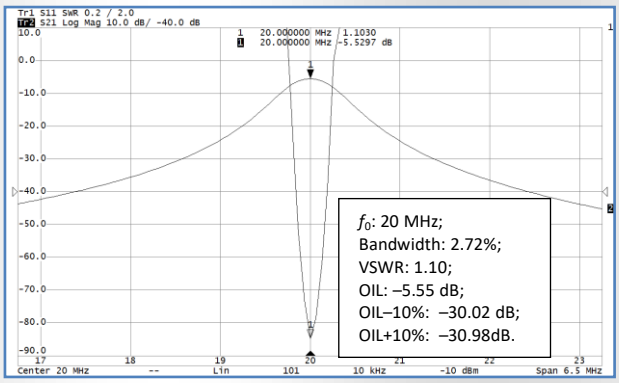
The first frequency range (1.5-6.7MHz) has 364 tuning frequencies and the second frequency range (6.7-30MHz) has 389 tuning frequencies. Some frequency response functions and VSWR functions are shown below:

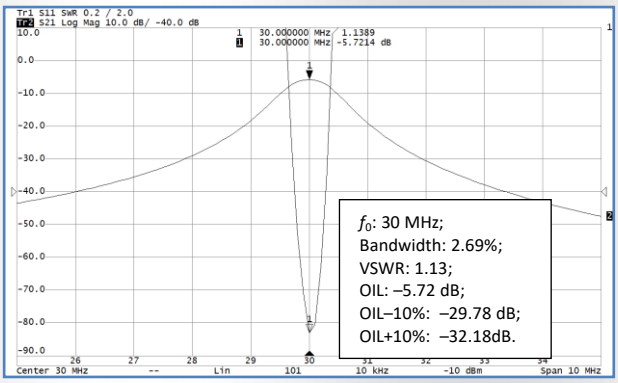








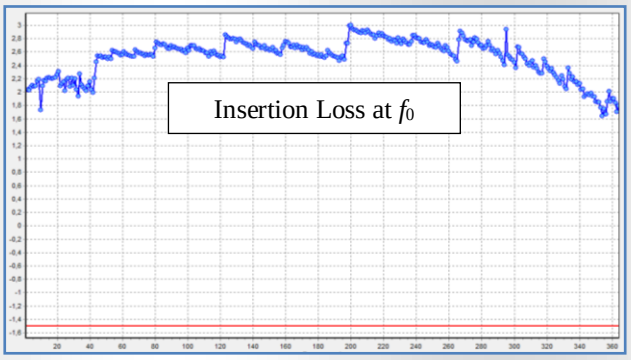


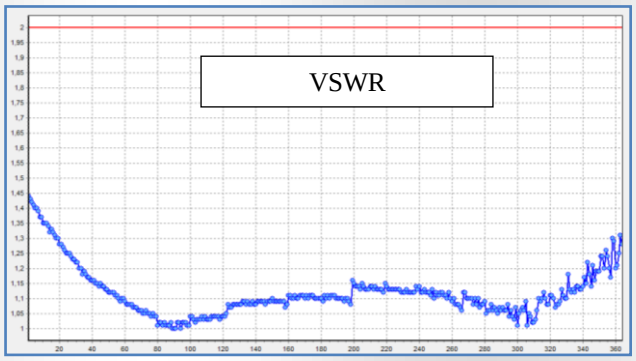


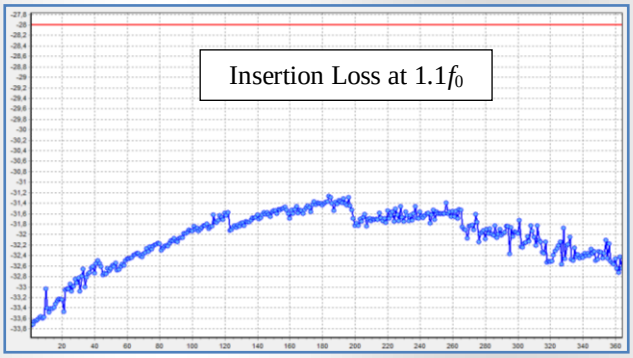
Note: f_0— tuning frequency;VSWR — VSWR at $f_0$frequency;OIL — insertion loss at f_0; OIL–10% — insertion loss at0,9f_0;OIL+10% — insertion loss at 1,1f_0.

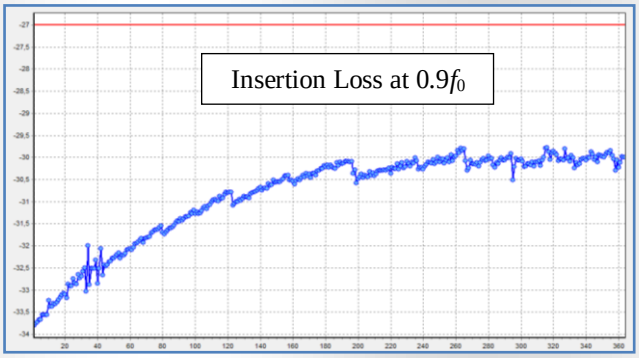
1.5-6.7 MHz filter performance

The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.9f_0$, Insertion Loss at $1.1f_0$ and VSWR at each tuning frequency for 1.5-6.7 MHz filter.



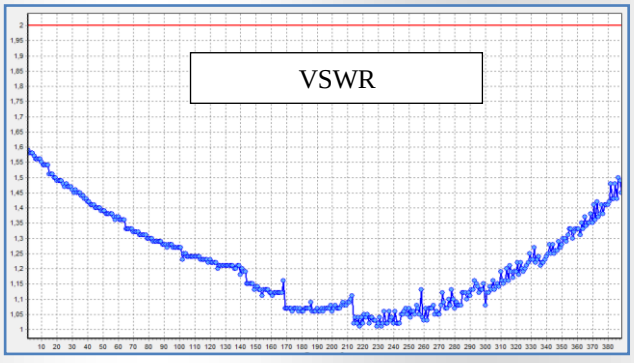


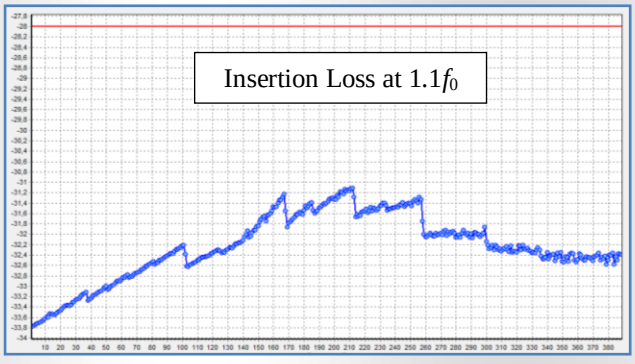


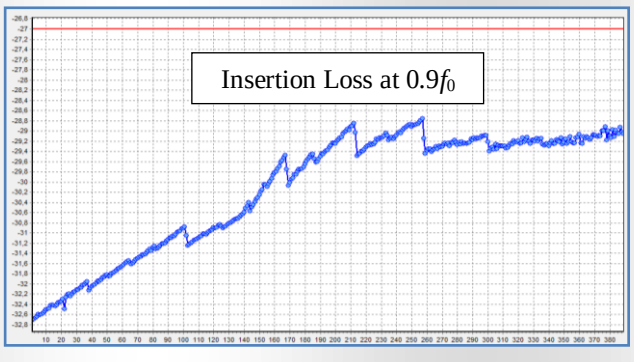


6.7-30 MHz filter performance

The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.9f_0$, Insertion Loss at $1.1f_0$ and VSWR at each tuning frequency for 6.7-30 MHz filter.







Pinout & Ratings

PIN #	Reference designator	Description	Notes
1-6, 10	N/C	No Connect	—
7, 9, 11	GND	Digital/RF Ground	—
8	VCC	+5V Power Supply Input	4.75 to 5.25V @800mA
12	VDD	+12V Power Supply Input	11.5 to 12.5V @300mA
13	STB	Strobe	Active: 5V; Inactive: 0V
14	CLK	Serial Clock	Active: 5V; Inactive: 0V
15	DI	Serial Data Input	Active: 5V; Inactive: 0V

Serial interface description

Serial interface consists of 3 signals: CLK (clock), DI (data input), STB (strobe). Data input is 11 bits code. First 8 bits determine the tuning frequency and the last 3 bits determine the frequency band.

Frequencybandcode

Frequency band	D9	D10	D11
1,5–4 MHz	1	0	0
4–10 MHz	0	1	0
10–30 MHz	0	0	1

Tuning frequencycode

Tuning frequency code is calculated by X_{10} conversion into binary code. X_{10} is calculated by the formula:

$$X_{10} = \left(\frac{f_0 - f_l}{f_h - f_l}\right) \times 250\,,$$

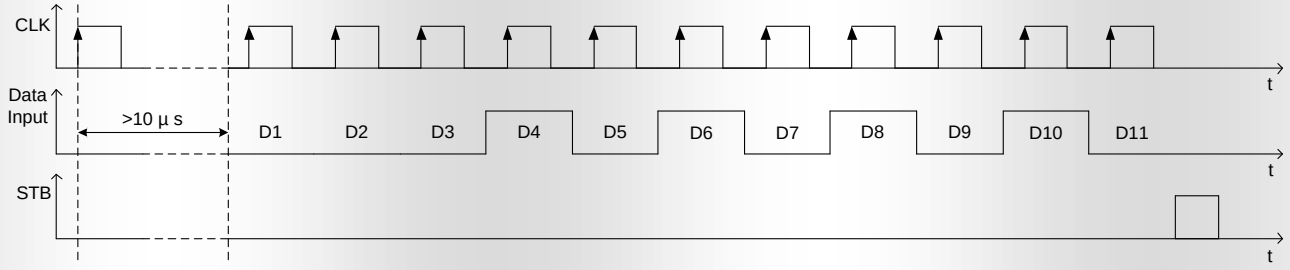
f_0 — tuning frequency; f_l — low frequency of the band;f_h — high frequency of the band.

Example

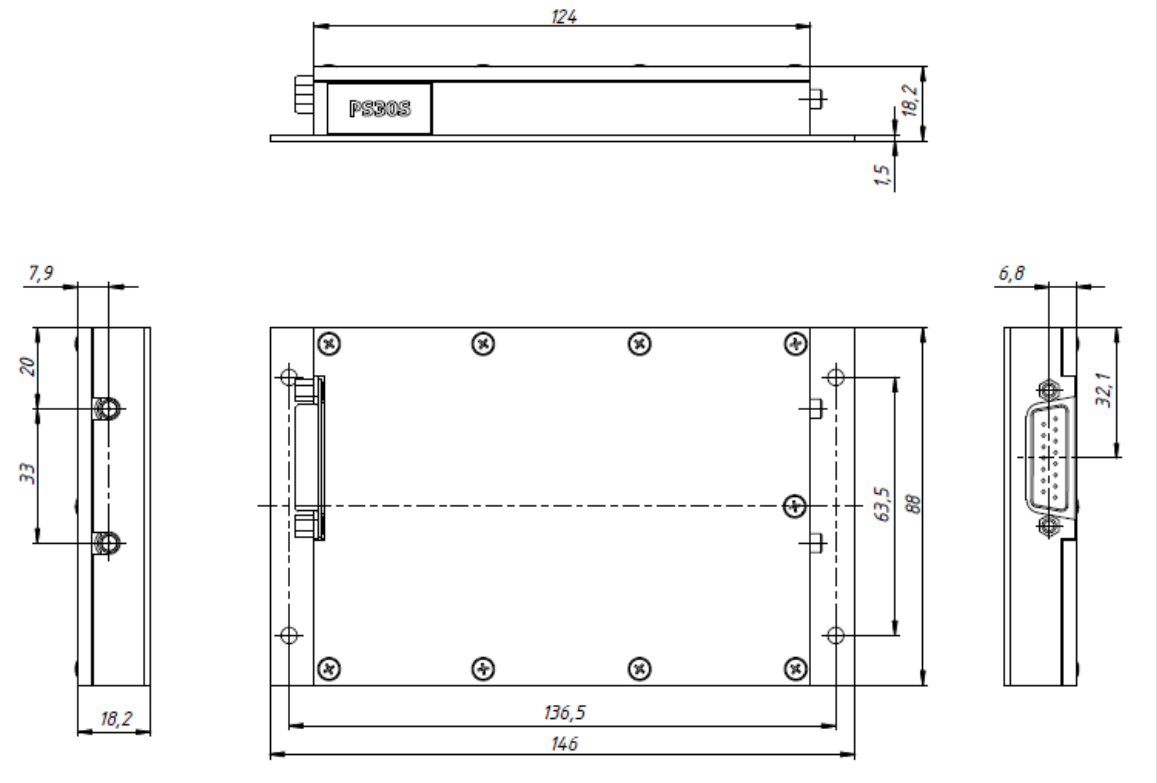
If you wish to tune to 8.02 MHz, the tune word is:

$$X_{10} = \left(\frac{8{,}02 - 4{,}00}{10{,}00 - 4{,}00}\right) \times 250 \approx 168;$$

$$168_2 = 10\ 10\ 10\ 00.$$



Mechanical Outline



Note:sizes are shown in millimeters.

RH6324
Specification:

Frequency Coverage (3 bands)	1.5 to 30 MHz
Input/Output Impedance:	50 Ω
In-band Input/Output VSWR	2:1
In-band RF Power Handling	5 Watt (input)
Out-band RF Power Handling	Up to 20 Watt
In-band Second Order Intercept Point	+100 dBm (input)
In-band Third Order Intercept Point	+40 dBm (input)
Center Frequency Drift:	±80 PPM/ºC
Tuning Control	Serial
Tuning Speed	150 µS
DC Power Consumption (Static)	5V @ 800mA 12V @ 300mA
Shape Factor (30 dB/ 3 dB)	7 typical
Operating TemperatureRange	-40°C to +85°C
Size:	162x92x48 mm
Weight:	420 g
RF Connection	MCX

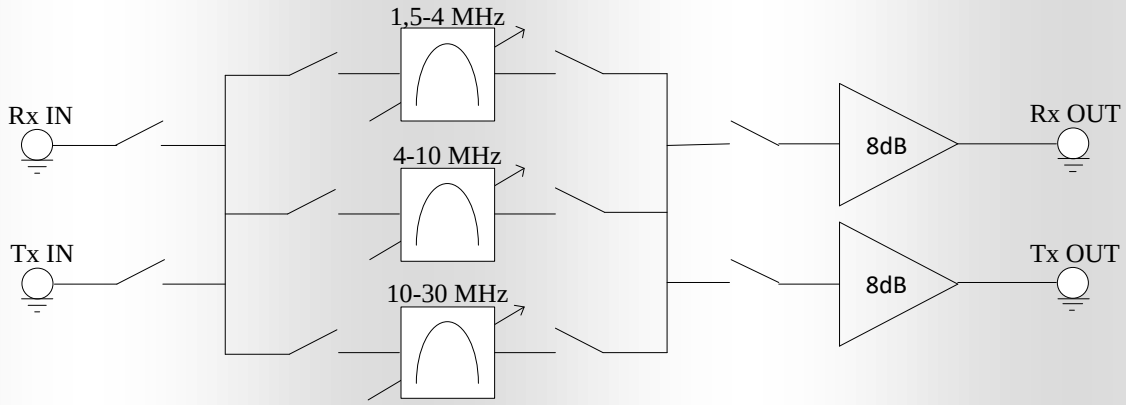
The pre-postselector RH6324 is digitally tunable filter operating from 1.5 MHz to 30 MHz. RH6324 can be included either in receiving or transmitting tract by input/output commutation. This module consists of three (3) internal tunable bandpass filters (the frequency range divided between them in the following way: 1.5-4 MHz, 4-10 MHz and 10-30 MHz) and two internal amplifiers which compensate filter's insertion losses (one of amplifiers works in receiving tract while another one works in the transmitting tract). RH6324 uses serial interface for tuning.

RH6324 filters' specification

FrequencyRange	#	Bandwidth (3 dB), %	Insertion Loss, dB	Shape factor (30 dB)		
				Overall	Low Side	High Side
1.5-4 MHz	5	4.6/5.5	5.0/5.9	5.8/6.1	6.8/7.3	4.8/4.9
	4	3.6/4.5	5.2/6.2	5.9/6.2	6.9/7.2	4.9/5.0
	3	2.5/3.5	5.6/6.5	5.8/6.2	6.8/7.1	4.8/5.0
	2	1.7/2.4	6.1/6.9	5.9/6.1	6.7/7.2	5.1/6.1
4-10 MHz	5	4.6/5.5	4.9/6.3	6.0/6.2	7.0/7.2	5.0/5.1
	4	3.6/4.5	5.3/6.7	5.9/6.2	7.1/7.6	4.8/5.0
	3	2.5/3.5	5.8/7.0	6.0/6.2	6.9/7.2	4.9/5.2
	2	1.7/2.4	6.2/7.3	6.1/6.2	6.9/7.0	5.3/5.4
10-30 MHz	5	4.6/5.5	4.3/5.2	6.1/6.3	7.0/7.4	5.1/5.2
	4	3.6/4.5	4.7/5.8	6.1/6.5	7.3/8.0	4.9/5.2
	3	2.5/3.5	5.1/6.2	5.9/6.0	6.6/6.7	5.2/5.4
	2	1.7/2.4	5.4/6.6	5.8/6.1	6.6/7.2	5.0/6.1

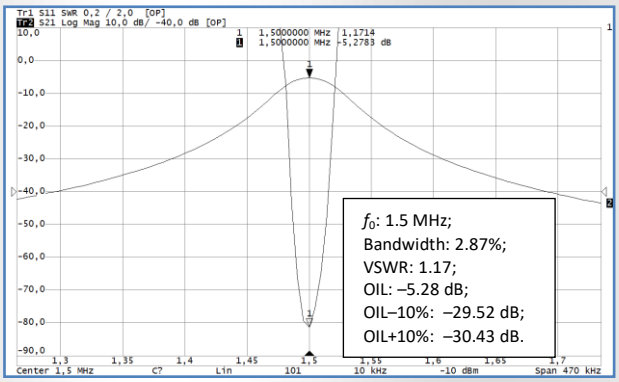
Note: table values are shown as average/maximum.

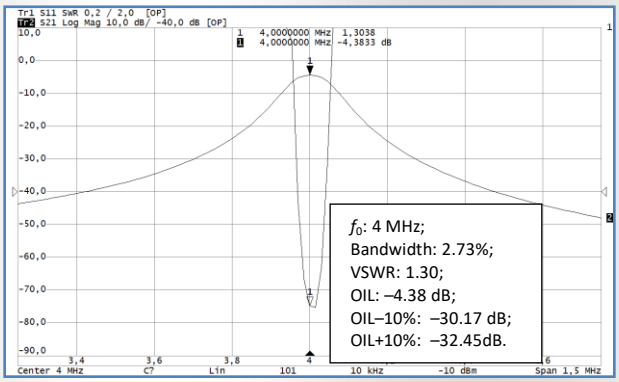
RH6324 block diagram

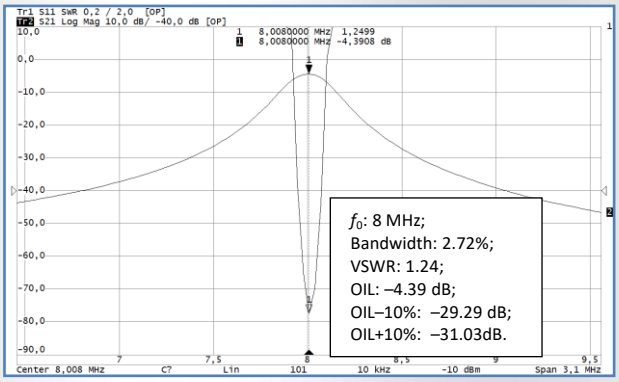


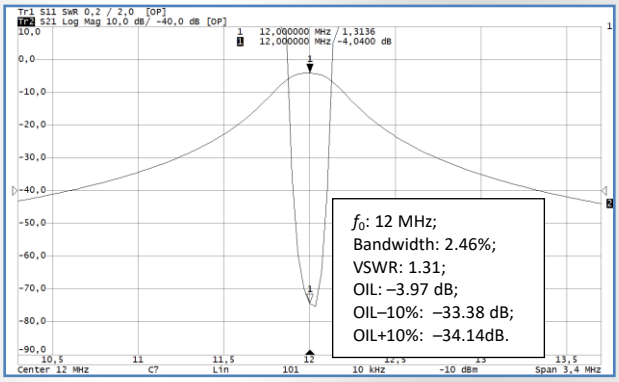
Frequency response functions and VSWR functions

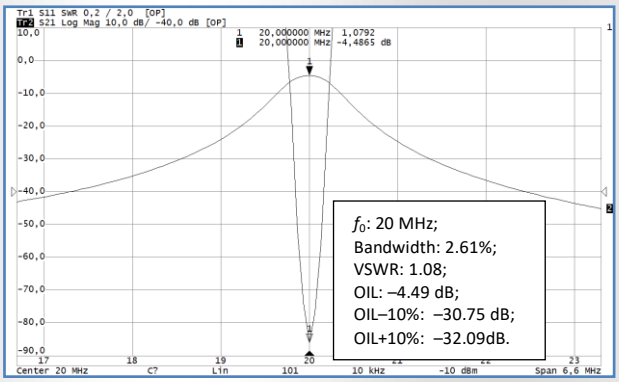
Each frequency range has 251 tuning frequencies. Some frequency response functions and VSWR functions are shown below:

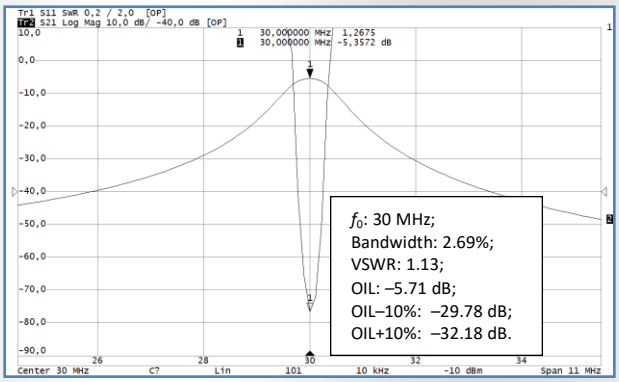








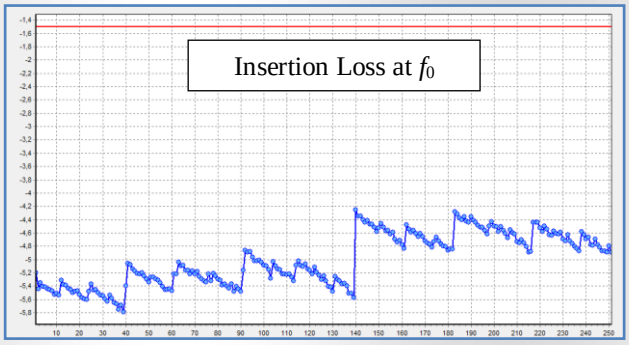


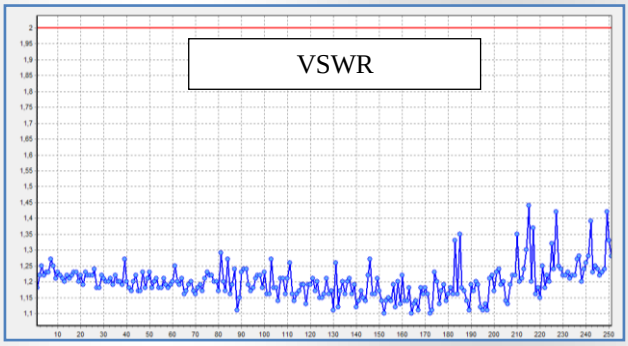


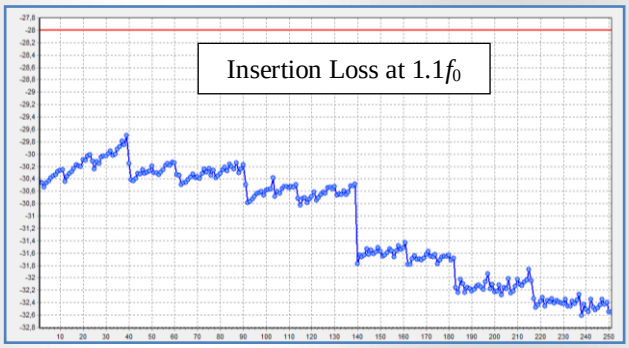
Note: f_0 — tuning frequency;VSWR — VSWR at f_0 frequency;OIL — insertion loss at f_0; OIL–10% — insertion loss at 0,9f_0;OIL+10% — insertion loss at 1,1f_0.

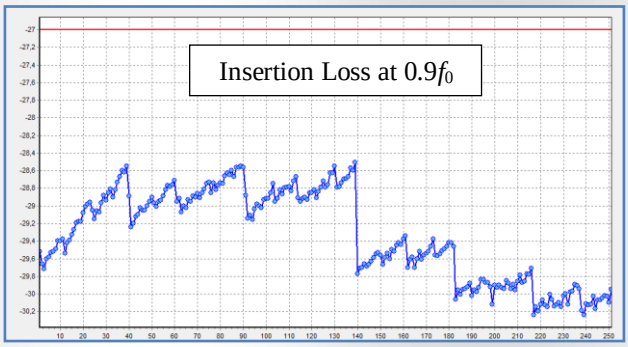
1.5-4 MHz filter performance

The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.9f_0$, Insertion Loss at $1.1f_0$ and VSWR at each tuning frequency for 1.5-4 MHz filter.



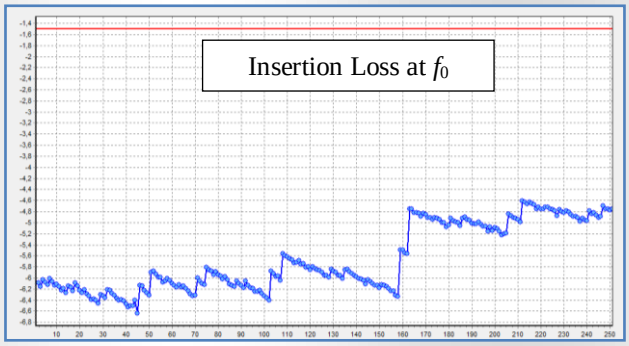


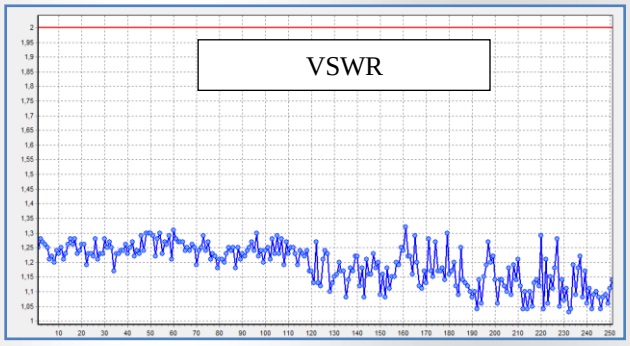


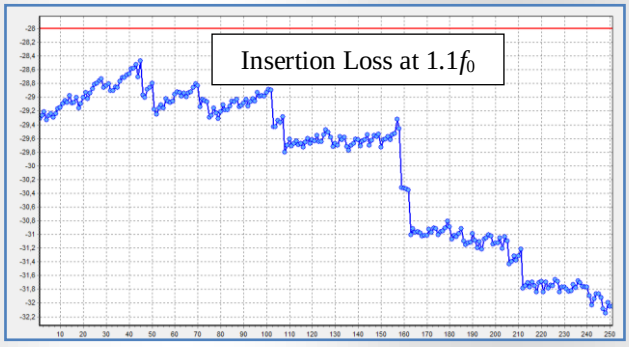


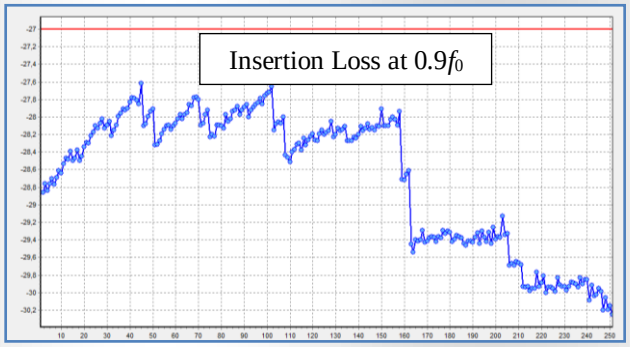
4-10 MHz filter performance

The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.9f_0$, Insertion Loss at $1.1f_0$ and VSWR at each tuning frequency for 4-10 MHz filter.



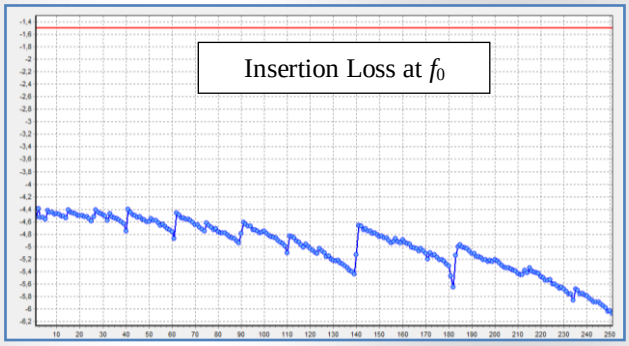


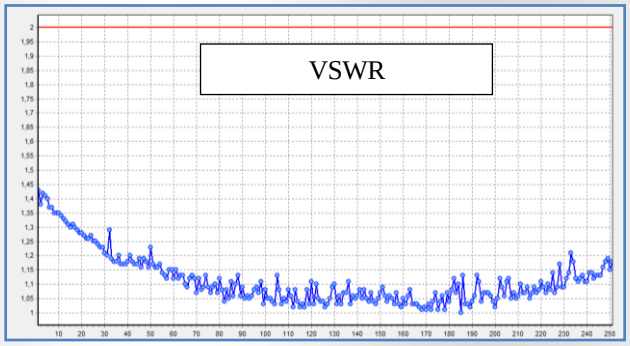


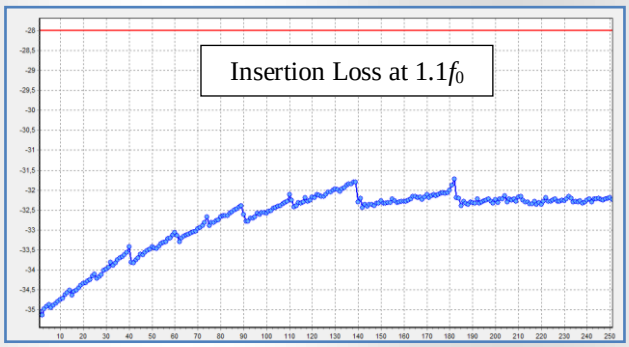


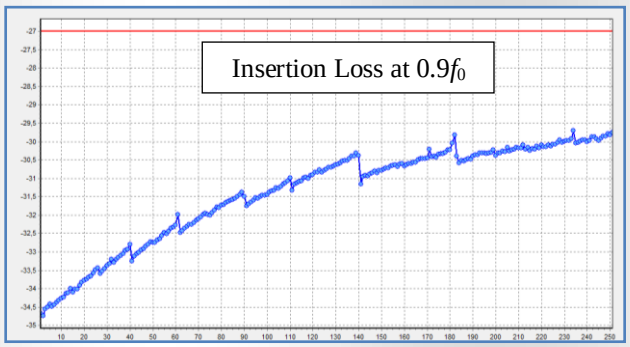
10-30 MHz filter performance

The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.9f_0$, Insertion Loss at $1.1f_0$ and VSWR at each tuning frequency for 10-30 MHz filter.









Pinout& Ratings

PIN #	Reference designator	Description	Notes
1-5, 10	N/C	No Connect	—
6	PTT	SWRX/TX	Rx mode: 5V; Tx mode: 0V
7, 9, 11	GND	Digital/RF Ground	—
8	VCC	+5V Power Supply Input	4.75 to 5.25V @ 800mA
12	VDD	+12V Power Supply Input	11.5 to 12.5V @ 300mA
13	STB	Strobe	Active: 0V; Inactive: +5V
14	CLK	Serial Clock	Active: 5V; Inactive: 0V
15	DI	Serial Data Input	Active: 5V; Inactive: 0V

Serial interface description

Serial interface consists of 3 signals: CLK (clock), DI (data input), STB (strobe). Data input is 11 bits code. First 8 bits determine the tuning frequency and the last 3 bits determine the frequency band.

Frequencybandcode

Frequency band	D9	D10	D11
1,5–4 MHz	1	0	0
4–10 MHz	0	1	0
10–30 MHz	0	0	1

Tuning frequencycode

Tuning frequency code is calculated by X_{10} conversion into binary code. X_{10} is calculated by the formula:

$$X_{10} = \left(\frac{f_0 - f_l}{f_h - f_l}\right) \times 250\,,$$

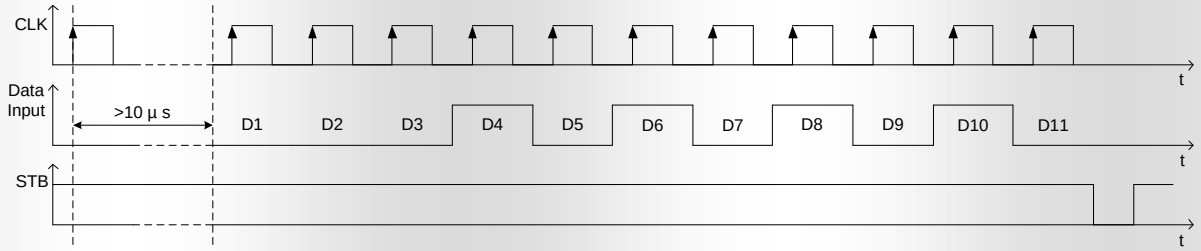
f_0 — tuning frequency; f_l — low frequency of the band; f_h — high frequency of the band.

Example

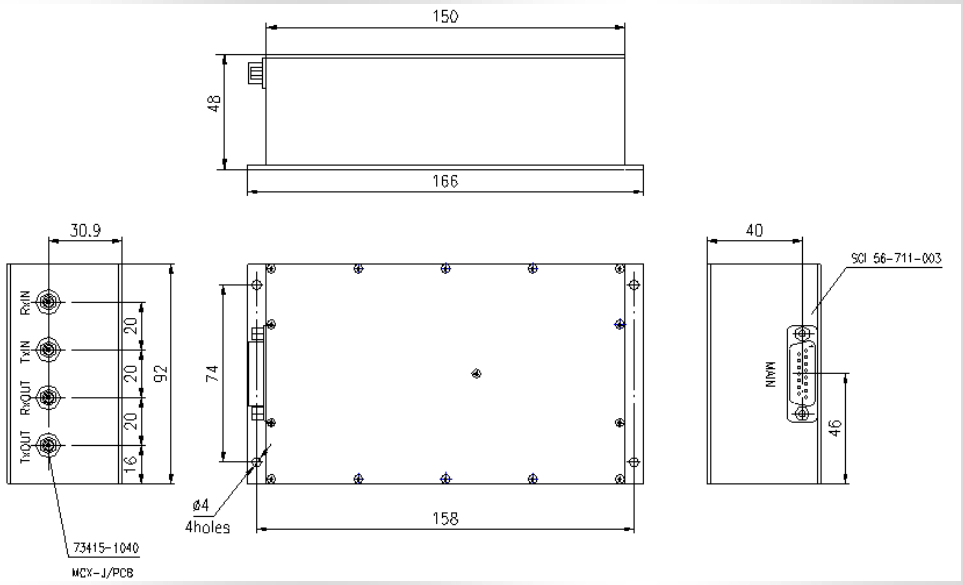
If you wish to tune to 8.02 MHz, the tune word is:

$$X_{10} = \left(\frac{8{,}02 - 4{,}00}{10{,}00 - 4{,}00}\right) \times 250 \approx 168;$$

$$168_2 = 10\ 10\ 10\ 00.$$



Mechanical Outline



Note:sizes are shown in millimeters.

The RH6331 is digitally tunable filter operating from 30 MHz to 88MHz. Parallel interface is used for tuning. The module can be installed either in receiving or transmitting tract. RH6331 has low insertion losses, high RF power handling, wide operating temperature range and fast tuning speed. The module can work in frequency-hopping spread spectrum mode.

RH6331
Specification:

Frequency Coverage	30 to 88 MHz
Input/Output Impedance:	50 Ω
In-band Input/Output VSWR	2:1
In-band RF Power Handling	20 Watt (input)
Out-band RF Power Handling	Up to 50 Watt
In-band Second Order Intercept Point	+100 dBm (input)
In-band Third Order Intercept Point	+50 dBm (input)
Center Frequency Drift:	±80 PPM/ºC
Tuning Control	Parallel
Tuning Speed	25 µS
DC Power Consumption (Static)	5V @ 2A
Shape Factor (30 dB/ 3 dB)	7 typical
Operating TemperatureRange	-40°C to +65°C
Size:	102x76x65 mm
Weight:	460 g
RF Connection	SMA

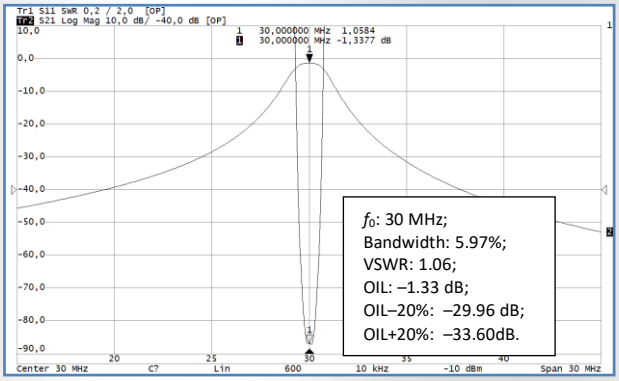
RH6331 specification

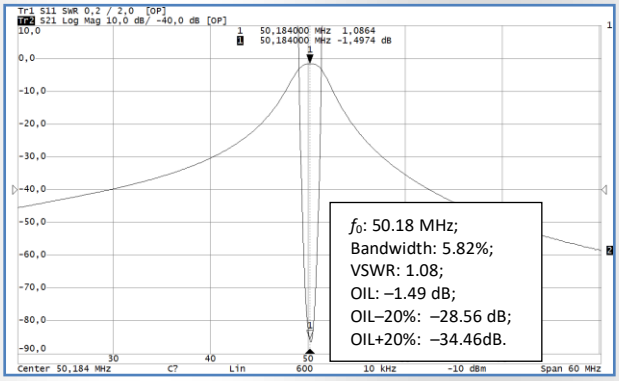
#	Bandwidth (3 dB), %	Insertion Loss, dB	Shape factor (30 dB)		
			Overall	Low Side	High Side
4	3.5/4.5	2.9/3.6	6.1/6.5	6.8/7.2	5.1/5.6
6	5.5/6.5	1.4/1.7	6.5/6.8	7.25/7.65	5.35/5.8

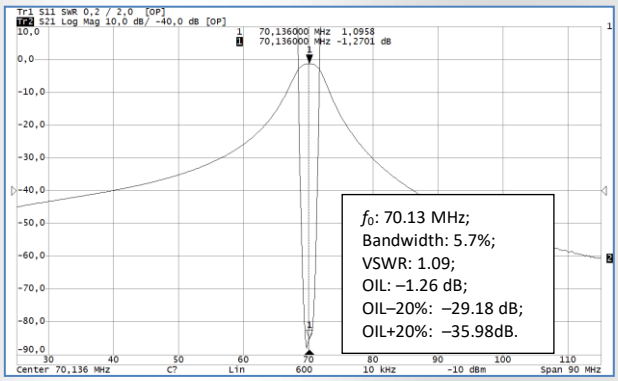
Note: table values are shown as average/maximum.

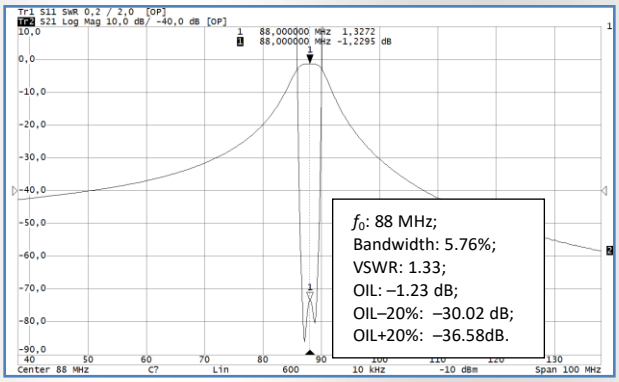
Frequency response functions and VSWR functions

Some frequency response functions and VSWR functions are shown below:





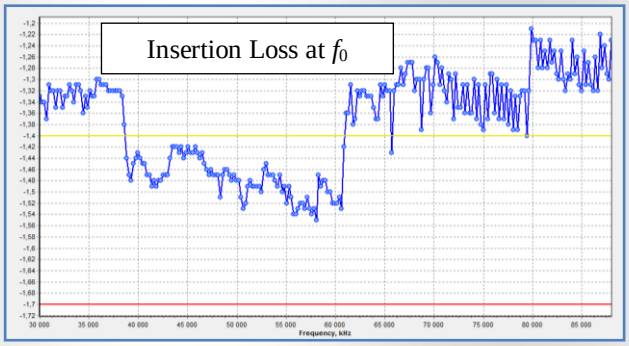


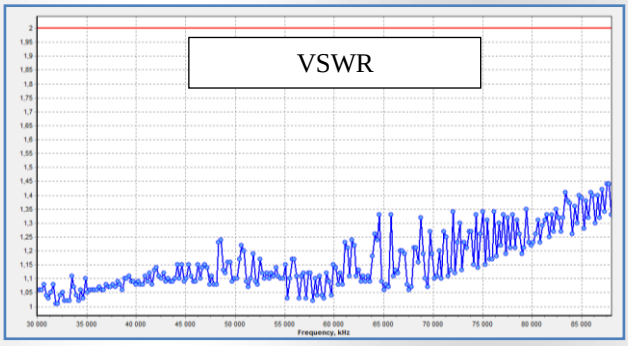


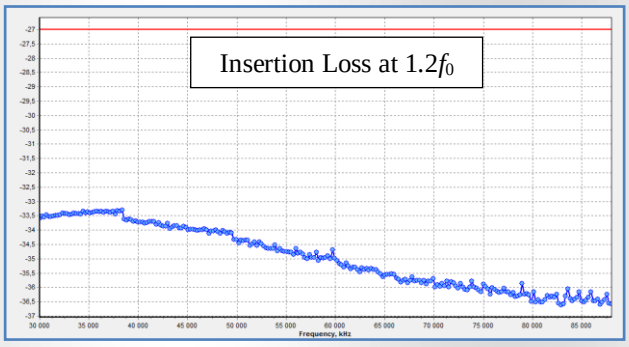
Note: f_0 — tuning frequency;VSWR — VSWR at f_0 frequency;OIL — insertion loss at f_0; OIL–20% — insertion loss at $0{,}8f_0$;OIL+20% — insertion loss at $1{,}2f_0$.

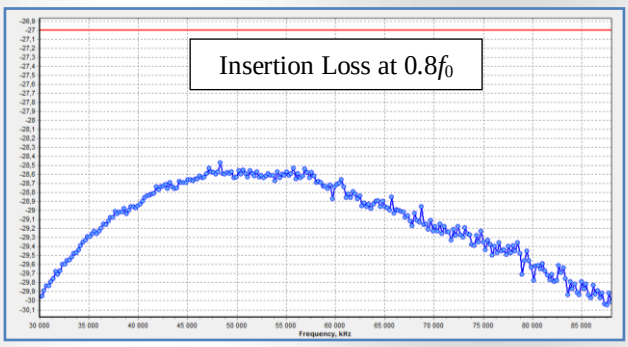
RH6331 performance

The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.8f_0$, Insertion Loss at $1.2f_0$ and VSWR at each tuning frequency.









Pinout & Ratings

PIN #	Reference designator	Description	Notes
1	A2	Tune Bit 2	Active: 5V; Inactive: 0V
2	A3	Tune Bit 3	Active: 5V; Inactive: 0V
3	A4	Tune Bit 4	Active: 5V; Inactive: 0V
4	A5	Tune Bit 5	Active: 5V; Inactive: 0V
5	A6	Tune Bit 6	Active: 5V; Inactive: 0V
6	A7	Tune Bit 7	Active: 5V; Inactive: 0V
7, 9, 11, 12	GND	Digital/RF Ground	—
8	VCC	+5V Power Supply Input	4.75 to 5.25V @ 800mA
10	N/C	No Connect	—
13	STB	Strobe	Active: 0V; Inactive: +5V
14	A0	Tune Bit 0	Active: 5V; Inactive: 0V
15	A1	Tune Bit 1	Active: 5V; Inactive: 0V

Parallel interface description

Serial interface consists of 9 signals: A0-A7 (tuning frequency code) and STB (strobe). Tuning frequency code is calculated by X_{10} conversion into binary code. X_{10} is calculated by the formula:

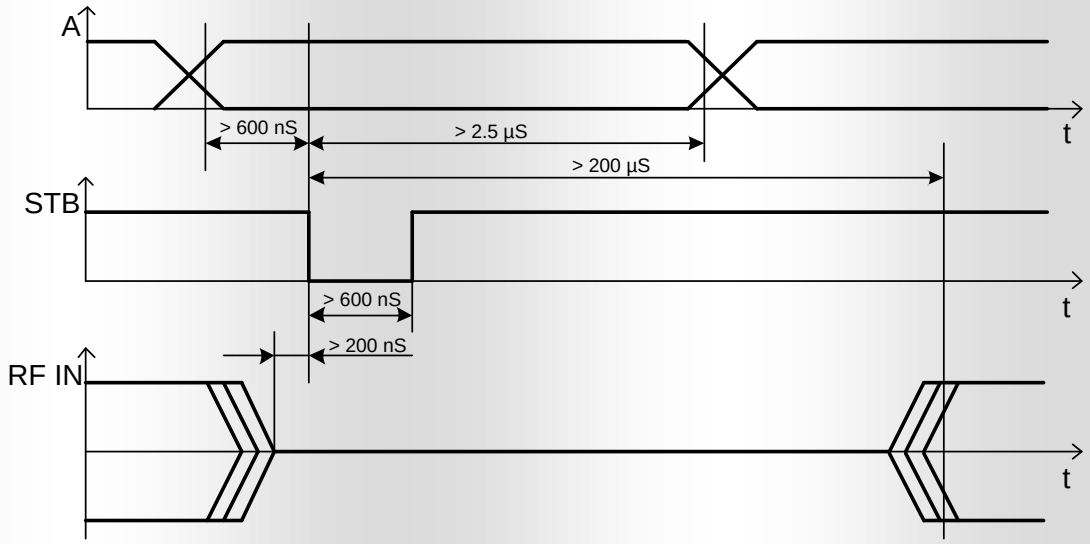
$$X_{10} = \left(\frac{f_0 - f_l}{f_h - f_l}\right) \times 250\,,$$

f_0 — tuning frequency; f_l — low frequency of the band; f_h — high frequency of the band.If you wish to tune to 62.48 MHz, the tune word is:

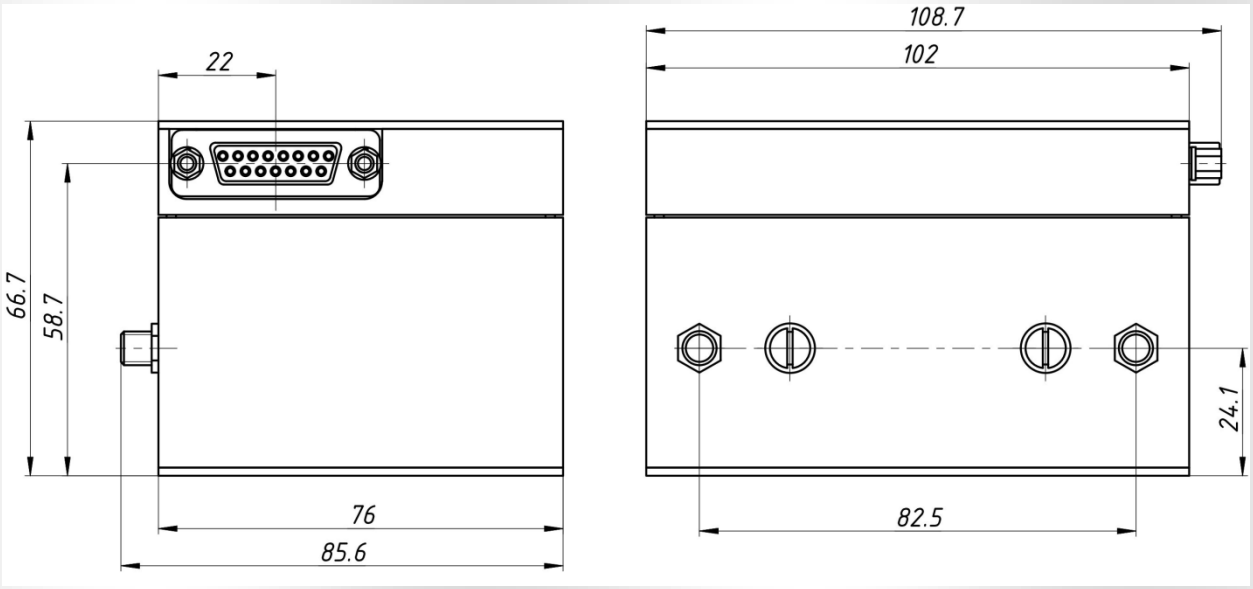
$$X_{10} = \left(\frac{62.48 - 30}{88 - 30}\right) \times 250 = 140;$$

$$140_2 = 10\ 00\ 11\ 00.$$

Time carts are shown below.



Mechanical Outline



Note:sizes are shown in millimeters.

The preselector RH6341 is digitally tunable filter operating from 30 MHz to 512 MHz. This module consists of three (3) internal tunable bandpass filters (the frequency range divided between them in the following way: 30-96 MHz, 96-262 MHz and 262-512 MHz). RH6341 uses serial or parallel interface for tuning.

RH6341
Specification:

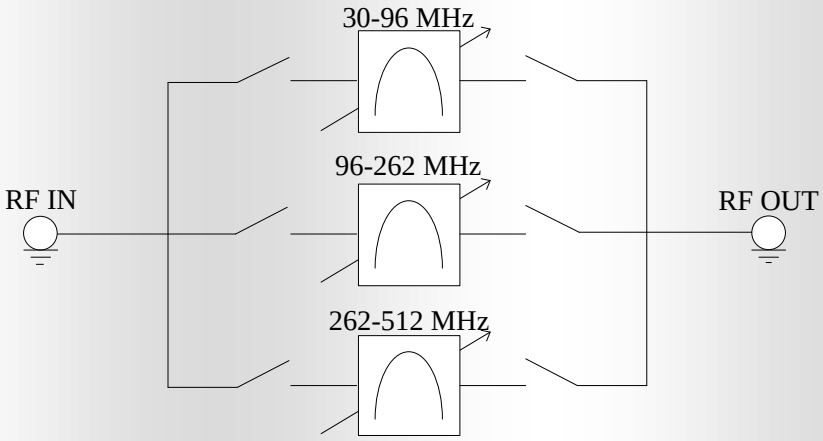
Frequency Coverage (3 bands)	30 to 512 MHz
Input/Output Impedance:	50 Ω
In-band Input/Output VSWR	2:1
In-band RF Power Handling	2 Watt (input)
Out-band RF Power Handling	Up to 20 Watt
In-band Second Order Intercept Point	+100 dBm(input)
In-band Third Order Intercept Point	+40 dBm (input)
Center Frequency Drift:	±80 PPM/ºC
Tuning Control	Parallel, Serial
Tuning Speed	10 µS
DC Power Consumption (Static)	5V @1A
Shape Factor (30 dB/ 3 dB)	8 typical
Operating TemperatureRange	-40°C to +65°C
Size:	107x104x24.7 mm
Weight:	600 g
RF Connection	SMA

RH6341 filters' specification

FrequencyRange	#	Bandwidth (3 dB), %	Insertion Loss, dB	Shape factor (30 dB)		
				Overall	Low Side	High Side
30-96 MHz	7	6.5/7.5	2.4/3.0	6.5/7.1	7.5/9.0	4.8/6
	5	4.6/5.5	5.0/5.9	5.8/6.1	6.8/7.3	4.8/4.9
	3	2.5/3.5	5.6/6.5	5.8/6.2	6.8/7.1	4.8/5.0
96-262 MHz	7	6.5/7.5	2.5/3.0	6.5/7.1	8.2/9.2	4.8/5.8
	5	4.6/5.5	4.9/6.3	6.0/7.2	7.0/7.2	5.0/5.5
	3	2.5/3.5	5.8/7.0	6.0/6.2	6.9/7.2	4.9/5.2
262-512 MHz	7	6.5/7.5	2.6/3.0	6.5/7.1	8.5/9.5	4.7/5.5
	5	4.6/5.5	4.3/5.2	6.1/6.3	7.0/7.4	5.1/5.2
	3	2.5/3.5	5.1/6.2	5.9/6.0	6.6/6.7	5.2/5.4

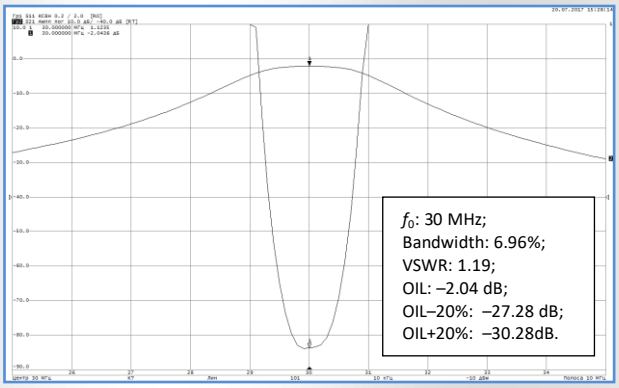
Note: table values are shown as average/maximum.

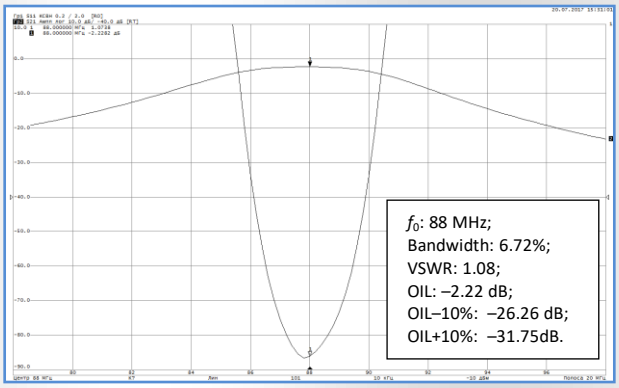
RH6341 block diagram

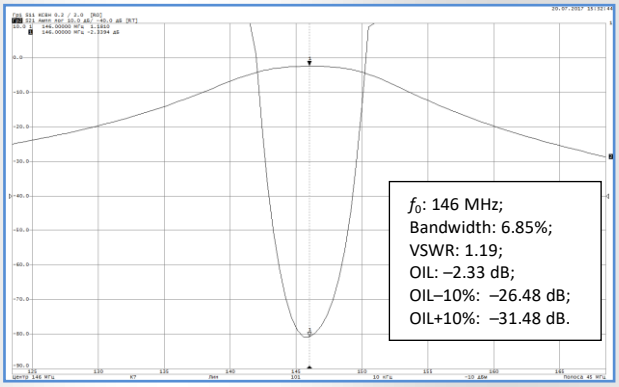


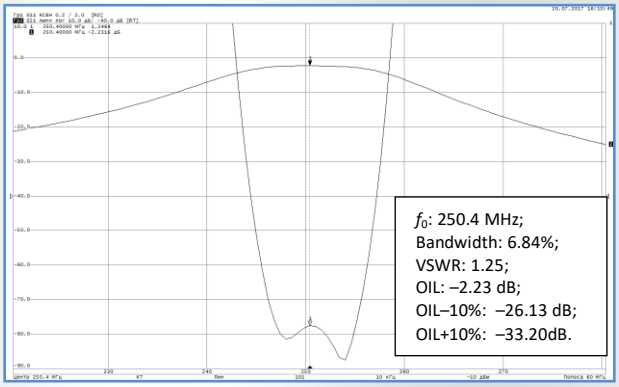
Frequency response functions and VSWR functions

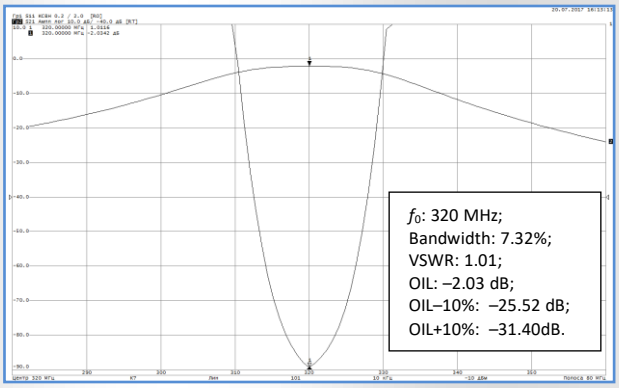
Some frequency response functions and VSWR functions are shown below:

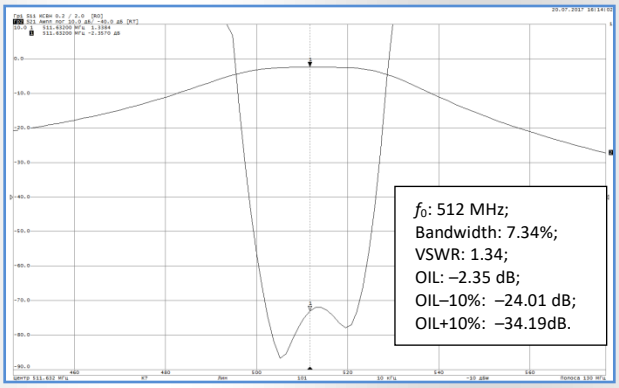








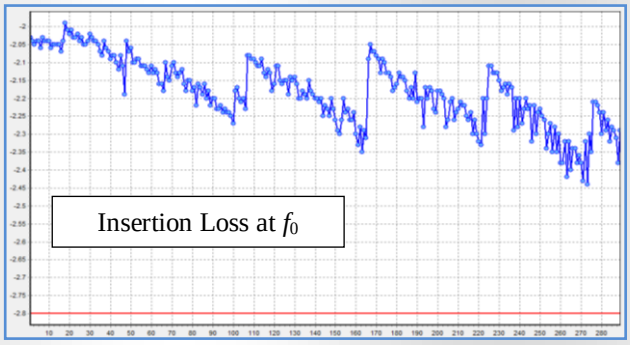


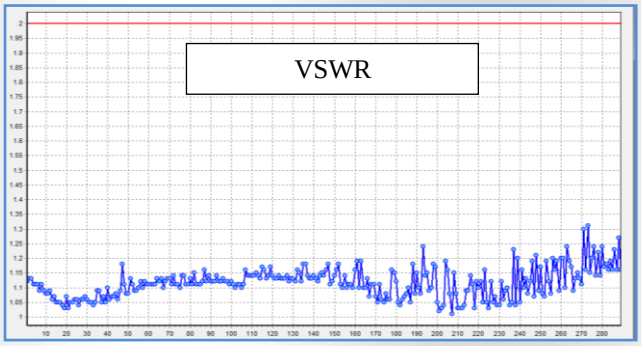


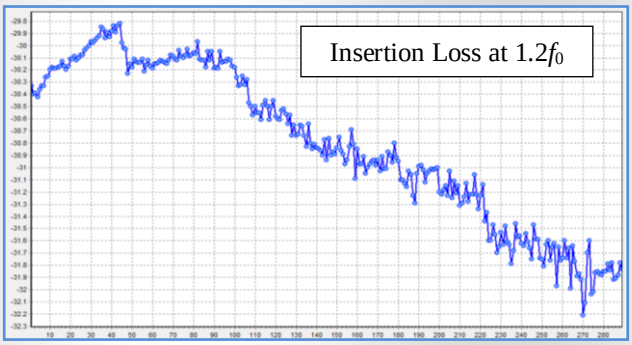
Note:f_0— tuning frequency;VSWR — VSWR at $f_0$frequency;OIL — insertion loss at f_0; OIL–20% — insertion loss at0,8f_0;OIL+20% — insertion loss at 1,2f_0.

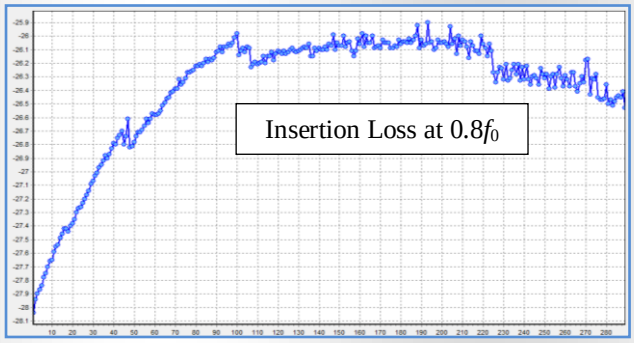
30-96 MHz filter performance

The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.8f_0$, Insertion Loss at $1.2f_0$ and VSWR at each tuning frequency for 30-96 MHz filter.



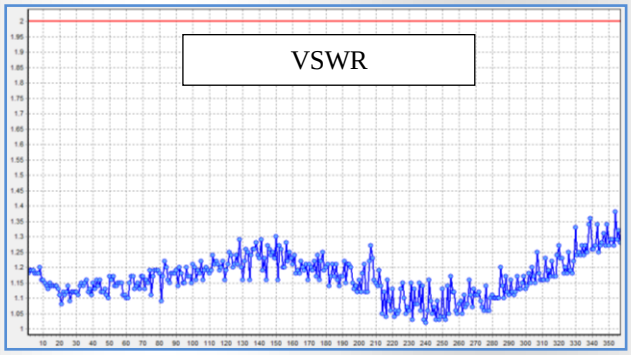


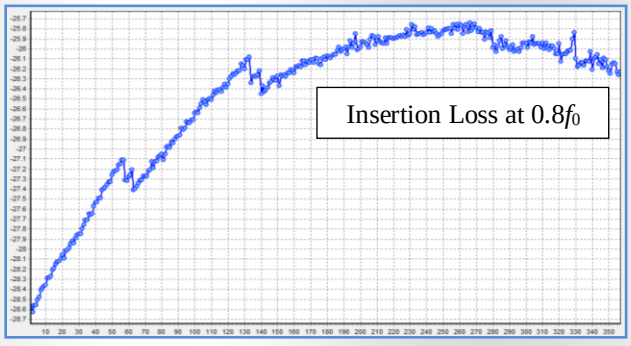




96-262 MHz filter performance

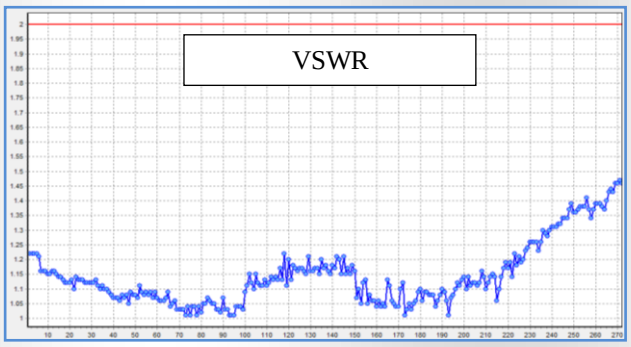
The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.8f_0$, Insertion Loss at $1.2f_0$ and VSWR at each tuning frequency for 96-262 MHz filter.

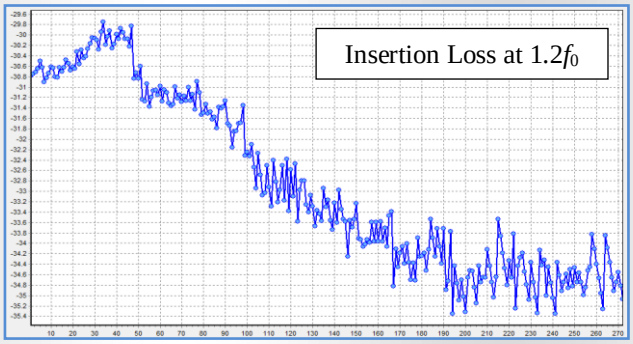


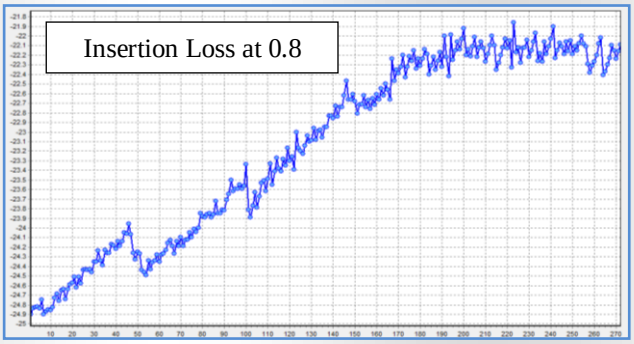


262-512 MHz filter performance

The following diagrams show value of Insertion Loss at f_0, Insertion Loss at $0.8f_0$, Insertion Loss at $1.2f_0$ and VSWR at each tuning frequency for 262-512 MHz filter.







Pinout & Ratings

PIN #	Reference designator	Description	Notes
1	A2	Tune Bit 2	Active: 5V; Inactive: 0V
2	A3	Tune Bit 3	Active: 5V; Inactive: 0V
3	A4	Tune Bit 4	Active: 5V; Inactive: 0V
4	A5	Tune Bit 5	Active: 5V; Inactive: 0V
5	A6	Tune Bit 6	Active: 5V; Inactive: 0V
6	A7	Tune Bit 7	Active: 5V; Inactive: 0V
7, 9, 11, 12	GND	Digital/RF Ground	—
8	VCC	+5V Power Supply Input	4.75 to 5.25V @ 800mA
10	N/C	No Connect	—
13	STB	Strobe	Active: 0V; Inactive: +5V
14	A0, CLK	Tune Bit 0, Serial Clock	Active: 5V; Inactive: 0V
15	A1, DI	Tune Bit 1, Serial Data Input	Active: 5V; Inactive: 0V

Serial interface description

Serial interface consists of 3 signals: CLK (clock), DI (data input), STB (strobe). Data input is 11 bits code. First 8 bits determine the tuning frequency and the last 3 bits determine the frequency band.

Parallel interface description

Serial interface consists of 9 signals: A0-A7 (tuning frequency code) and STB (strobe).

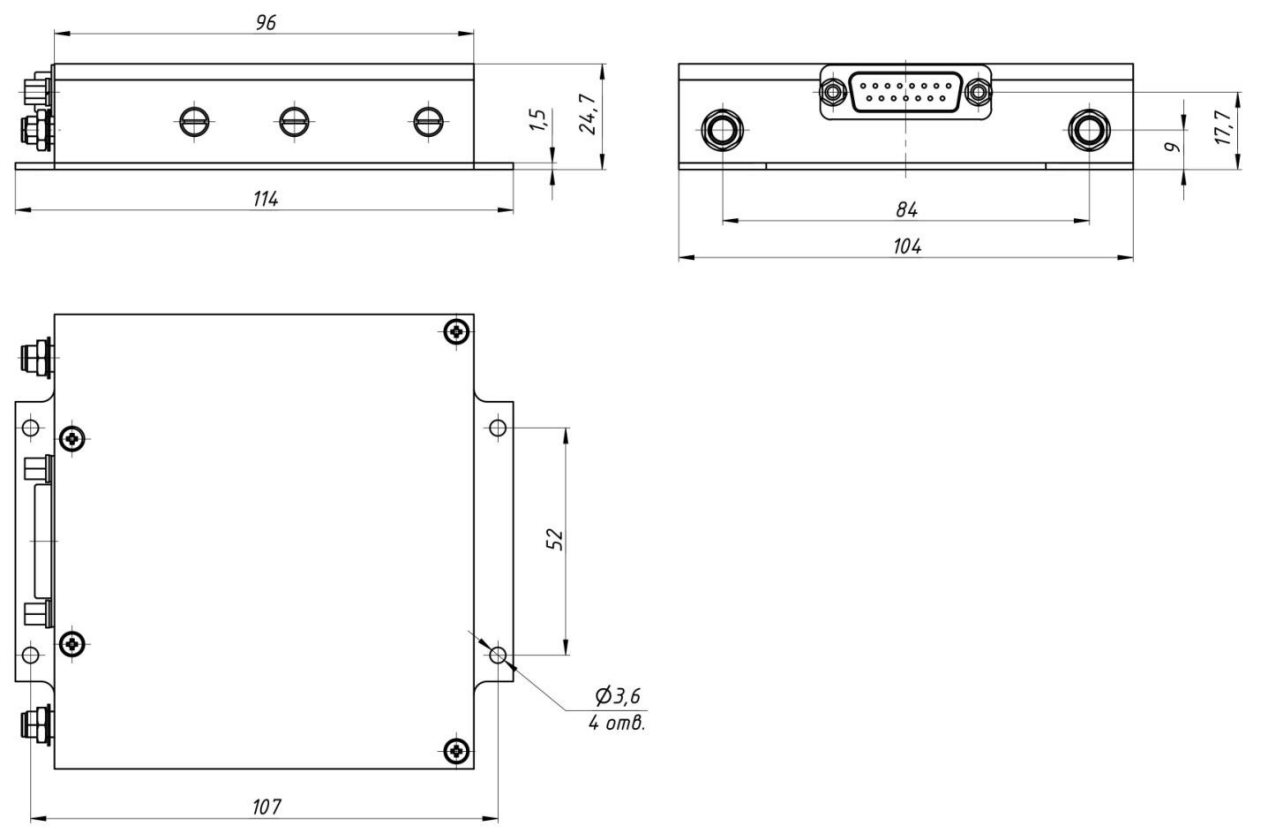
Tuning frequencycode

Tuning frequency code is calculated by X_{10} conversion into binary code. X_{10} is calculated by the formula:

$$X_{10} = \left(\frac{f_0 - f_l}{f_h - f_l}\right) \times 250\,,$$

f_0 — tuning frequency; f_l — low frequency of the band; f_h — high frequency of the band.

Mechanical Outline



Note:sizes are shown in millimeters.

GLOSSARY

ATTENUATION – The reduction in amplitude, measured in dB, ofa signal passing through a dissipative network or other medium.

BANDWIDTH – The width in frequency of a filter's response,typically measured between the 3 dB points.

BANDPASS FILTER – A filter that passes one band offrequencies, while rejecting both higher and lower frequencies.

CENTER FREQUENCY (f_0) – A measure of the central frequency,between the upper and lower cutoff frequencies. It can bedefined as the either the arithmetic mean or geometric mean.

DECIBEL – A logarithmic unit of measurement expressing signalmagnitude relative to a specified or implied reference level.

FALL TIME – The time required for a signal to change from aspecified high value to a specified low value, typically definedas 90% and 10% of the steady state value.

INSERTION LOSS – The decrease in transmitted signal powerresulting from the insertion of a device. It is usually expressedrelative to the signal power delivered to that same part beforeinsertion, and is usually expressed in decibels (dB).

PASSBAND – The range of frequencies that can be passedthrough a filter, bounded by limits often specified as thehalf-power points (i.e. 3 dB below the nominal).

PERCENT BANDWIDTH – The width of a filter's responsebetween the 3 dB points, based on a percentage of the center frequency.

RISE TIME – The time required for a signal to change from aspecified low value to a specified high value, typically definedas 10% and 90% of the steady state value.

SELECTIVITY – A measure of the attenuation provided atfrequencies removed from the center frequency relativeto the center frequency response.

SHAPE FACTOR – A dimensionless parameter giving anindication of the amount of selectivity provided by a given filter.Typically calculated as the ratio between the 30 dB bandwidthand 3 dB bandwidth.