MPG
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RETINA Filter Module

SPCL-00746



Recover lost receiver sensitivity by filtering co-located transmit noise

Special Features

- Low noise figure (Filter Bypass Mode)
- Configurable gain and filter modes
- Consolidates multiple receive antennae into a single antenna
- Provides 3 received path outputs
- Controlled via an easy-to-use GUI
- Controlled via USB

RETINA Filter Module

Overview

Broadband cellular SDR transceivers are used in many applications and are very sensitive to out of band noise generated by their co-located downlink transmissions. This can reduce the sensitivity of the receiver by more than 20 dB. The RETINA (Receive Extension by Transmit Noise Attenuation) product family significantly improves receive path performance of cellular SDR transceivers by filtering strong co-located transmit interferes of cellular SDR transceivers thereby significantly extended the range in which the receiver can operate. RETINA provides filtering across all cellular protocols across Frequency Division Duplexed (FDD) Bands 2, 4, 5, 12, 13, 14, 17, 25, 26, 30, 66, and 71 and is also compatible with bands 41, 42, 48, and 78 as well as future TDD bands.

Specifications

Band	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Notch Frequency (MHz)	Notch Rejection	Passband Loss (Amp Bypass)	Passband Gain (Amp Enabled)	Passband Loss (Amp & Filt Bypass)
71	663-716	617-652	617-652	45 dBc	>-12 dB Typ	>7 dB Typ	-9 dB Typ
12	663-716	729-746	729-768				
17	663-716	729-746					
13	777-787	746-756					
14	788-798	758-768					
4	1710-1755	2110-2155	1930-2200				
66	1710-1780	2110-2200					
2	1850-1910	1930-1990					
25	1850-1915	1930-1995					
5	824-849	869-894	859-894	30 dBc			
26	814-849	859-894					
30	2305-2315	2350-2360	2350-2360	45 dBc			
41	2500-2700	-	n/a	n/a		>5 dB Typ	
42	3400-3600	-					
48	3300-4000	-					
78	3300-4000	-					

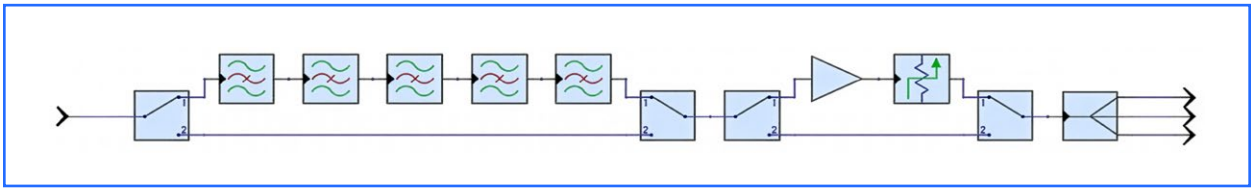
Typical Performance

Parameter	Performance
Frequency Range	0.6-4.0 GHz
Gain (Filter Bypass Mode)	>12 dB Typ
VSWR	2.0:1 Typ
Noise Figure (Filter Bypass Mode)	≤5.0 dB Typ
OP1dBm (LNA Performance)	+13 dBm Typ

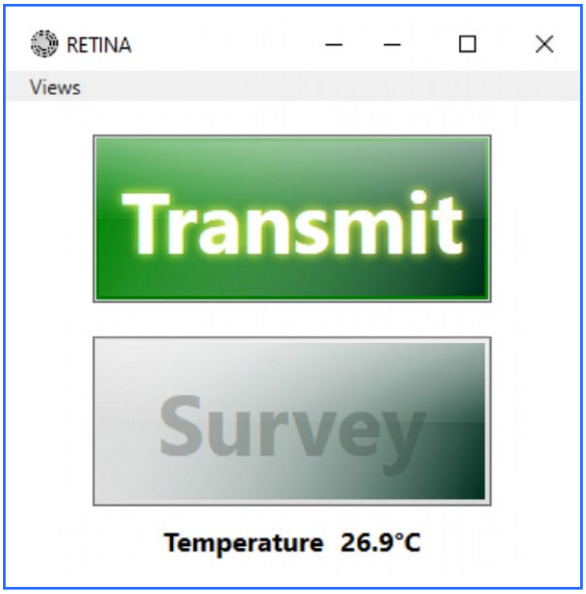
Absolute Maximum Ratings

Parameter	Performance
Supply Voltage	+12 VDC typ +16 VDC max
Supply Current	1.0 A max
RF Input Power	+16 dBm max
Storage Temperature	-40 to +85 °C
Operational Temperature	0 to +70 °C
ESD Sensitivity	Class 1 B
Weight	54 lbs max

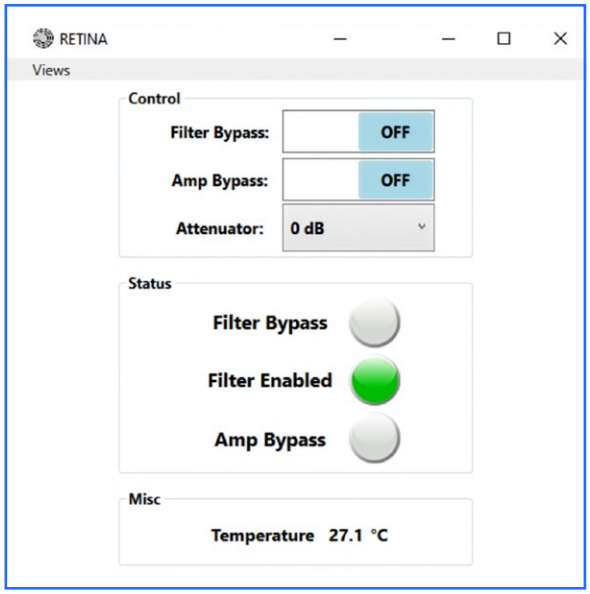
Functional Block Diagram



Software Interface

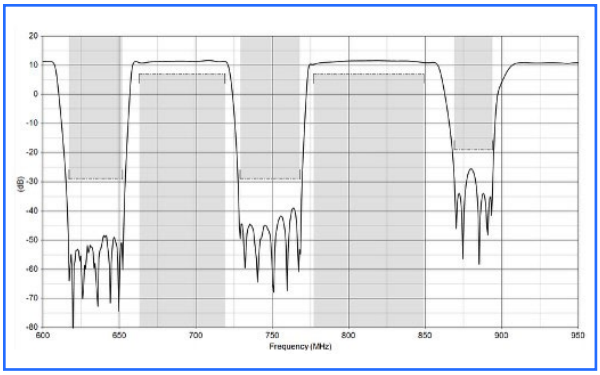


Software Interface, Basic Mode

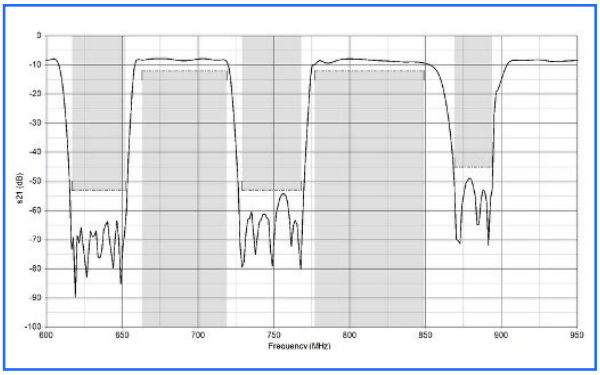


Software Interface, Advanced Mode

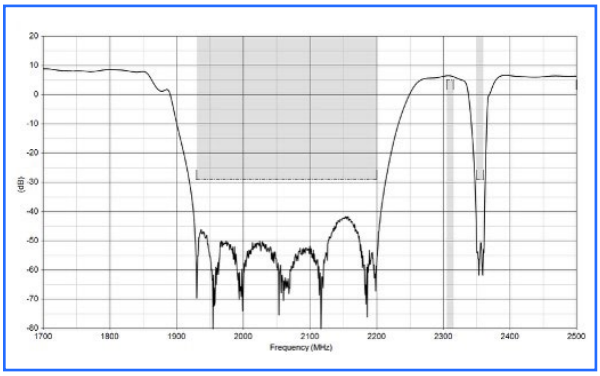
Typical Performance



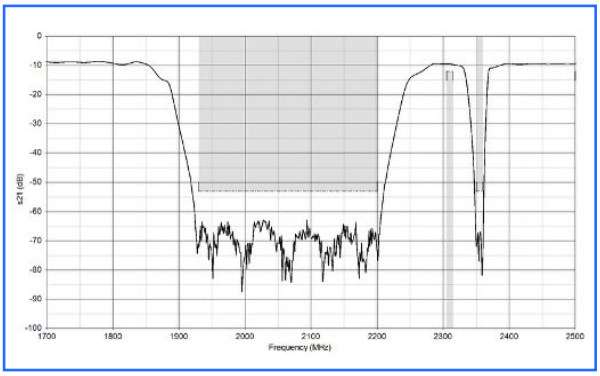
Gain: 17, 21, 17, 13, 14, 4, 66, 2, 25, & 5



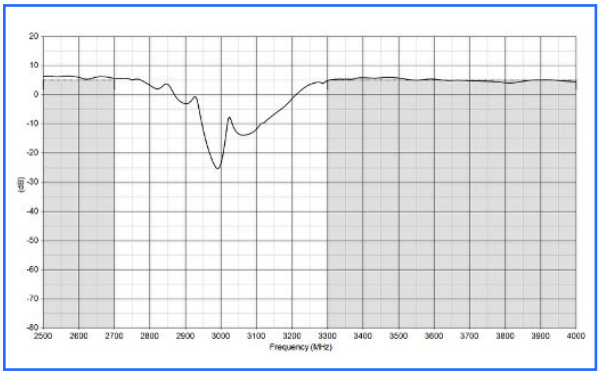
Amp Bypass: 17, 21, 17, 13, 14, 4, 66, 2, 25, & 5



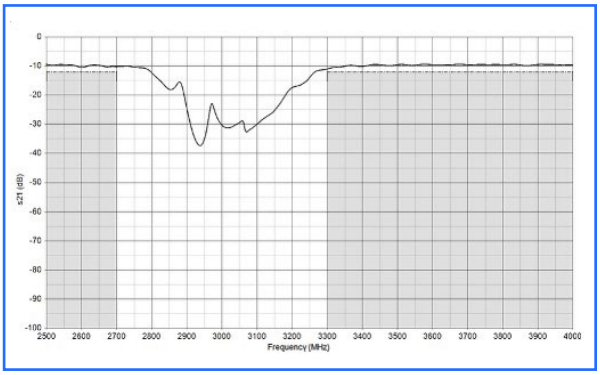
Gain: 30



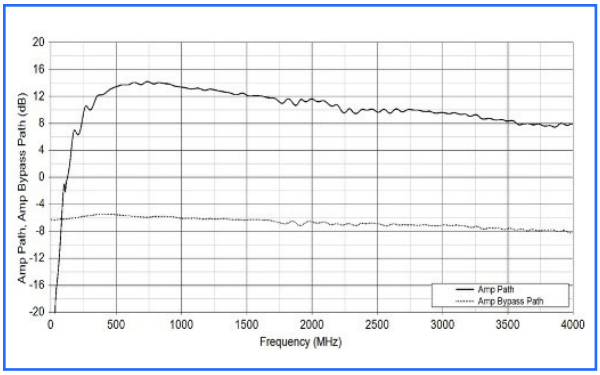
Amp Bypass: 30



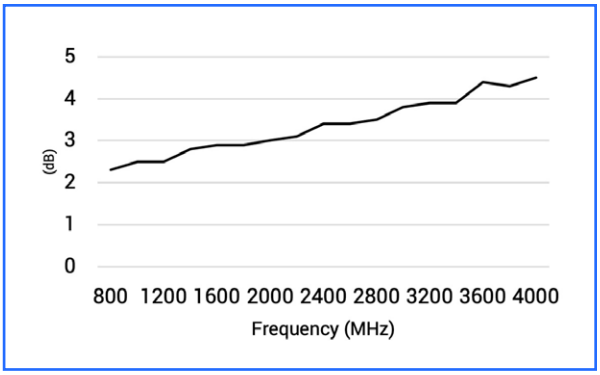
Gain: 41, 42, 48, & 78



Gain: 41, 42, 48, & 78



Filter Bypass & Filter/Amp Bypass



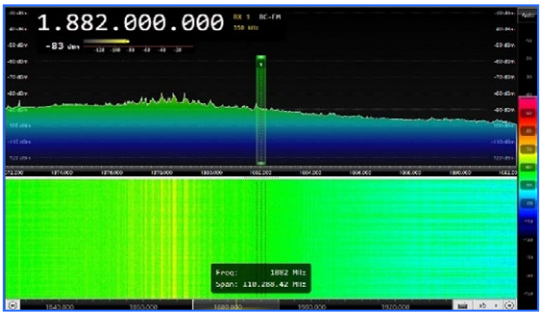
Noise Figure, Filter Bypass

RETINA Example

As an example, the figure at top right shows an EARFCN 925 uplink while a co-located transceiver transmits with an EIRP of about +45 dBm. The out of band interference increases the uplink noise floor by more than 20 dBm (pictured at top right).

The RETINA has improved the uplink noise floor to within 1 dB of the theoretical perfect noise floor by filtering the co-located transmitter (pictured at bottom right).

The RETINA can potentially double the effective range of CSS and ISMI systems alone.



Spectrum with EARFCN 925 Uplink Noise Floor ≈-93 dBm



Spectrum with EARFCN 925 Uplink and RETINA, Noise Floor Improved to ≈-112 dBm

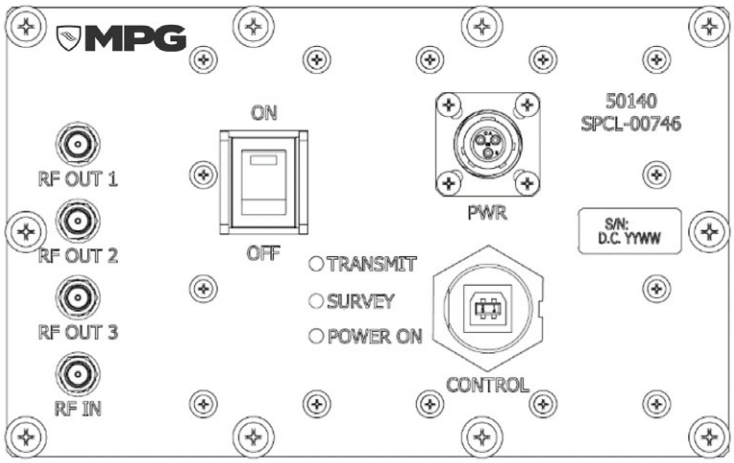
Specifications

Mechanical Interface

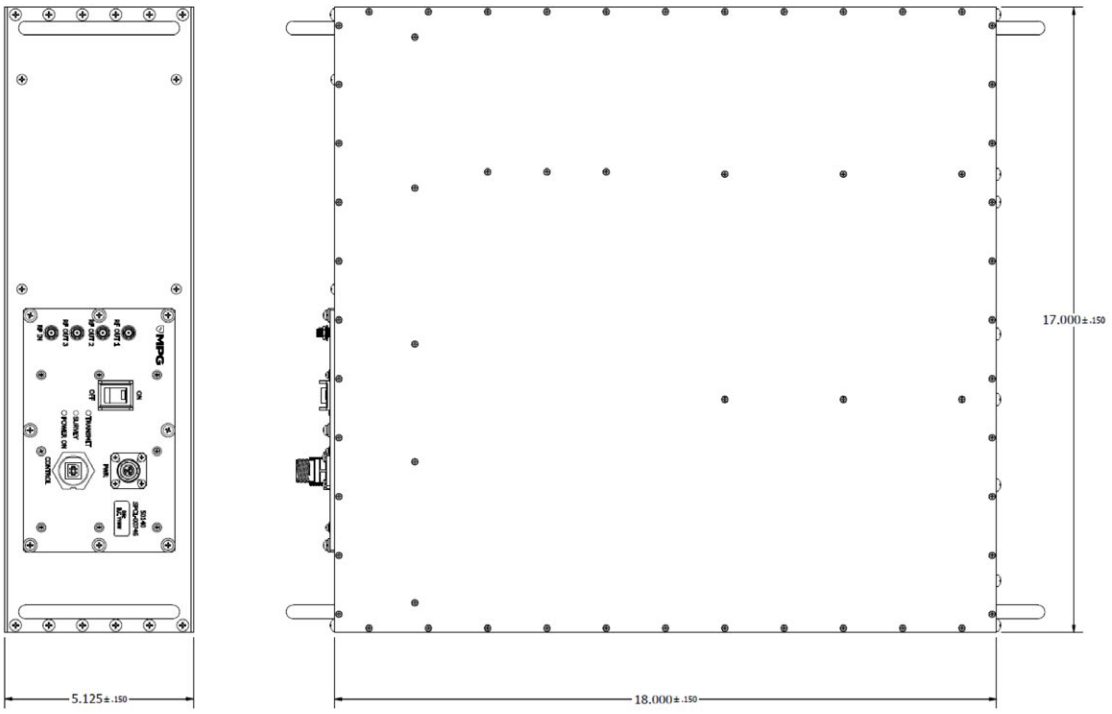
Connector	Type	Function	Pin Out
PWR	D38999/20KA98PN	DC Power Connection	Pin A – +12 VDC Pin B – Chassis GND Pin C – DC Return
Control	USB-Type B Female	Control/Computer Interface	Pin 1 – Vbus Pin 2 – D- Pin 3 – D+ Pin 4 - GND
RF In	SMA-Female	RF Input, 0.6-4.0 GHz	Center Pin – Signal Shell - GND
RF Out 1	SMA-Female	RF Output, 0.6-4.0 GHz	Center Pin – Signal Shell - GND
RF Out 2	SMA-Female	RF Output, 0.6-4.0 GHz	Center Pin – Signal Shell - GND
RF Out 3	SMA-Female	RF Output, 0.6-4.0 GHz	Center Pin – Signal Shell - GND

NOTE: UNUSED RF OUT MUST BE TERMINATED INTO A 50 Ω LOAD. Refer to Note 5.

Front Panel Interface



Mechanical Dimensions



Notes

1. Requires MPG's free software provided with each unit and is available upon request.
2. User manual available upon request, 409-UDF-0215, email support@mpgdover.com.
3. Mating power connector is 38999/26KA98SN.
4. USB control cable is not provided.
5. Unused RF Outputs must be terminated into a 50 Ω termination for maximum performance. Amphenol part number, SF8018-6005, or equivalent.

Watch our RETINA explainer video

About MPG – A Dover Company
MPG delivers spectrum-centric solutions at the speed of technology. We enable critical electronic warfare; intelligence, surveillance and reconnaissance; communications and space-based missions with ruggedized radio frequency components, subsystems and turnkey solutions. Our comprehensive portfolio encompasses the RF Spectrum (2 MHz to 40 GHz), the Solution Spectrum (low-noise amplifiers to complete signals intelligence systems), and the Domain Spectrum (land, sea, air and space). Government and commercial customers rely on our deep engineering expertise, seven manufacturing sites and Dover Corporation resources to deliver at spec, on time and within budget.

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MPG EUROPE

Connecting and protecting people by delivering solutions at the speed of technology.

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RETINA Filter Module

SPCL-00746 Family

(Part Number SPCL-00746-01 OCONUS1 Variant)



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Specifications

Band	Uplink Frequency (MHz)	Downlink Frequency (MHz)	Notch Frequency (MHz)	Notch Rejection	Uplink Loss (Amp Bypass)	Uplink Gain (Amp Enabled)	Uplink Loss (Amp & Filt Bypass)
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12	663-716	729-746	729-768	45 dBc			
17	663-716	729-746					
13	777-787	746-756					
14	788-798	758-768					
1	1920-1980	2110-2170	2110-2200	45 dBc			
10	1710-1770	2110-2170					
3	1710-1785	1805-1880	1805-1880	30 dBc			
8	880-915	925-960	925-960	30 dBc			
30	2305-2315	2350-2360	2350-2360	45 dBc			
41	2500-2700	-	n/a	n/a		>5 dB Typ	
42	3400-3600	-					
48	3300-4000	-					
78	3300-4000	-					

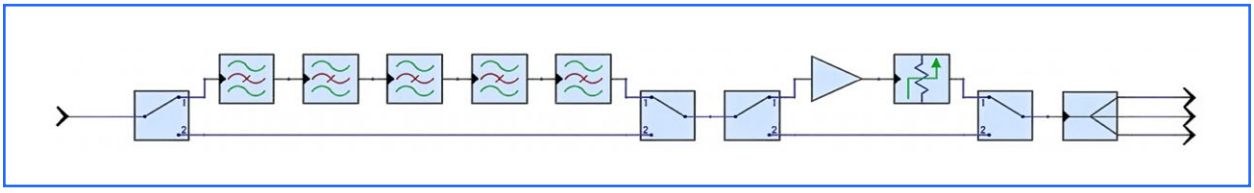
Typical Performance

Parameter	Performance
Frequency Range	0.6-4.0 GHz
Gain (Filter Bypass Mode)	>12 dB Typ
VSWR	2.0:1 Typ
Noise Figure (Filter Bypass Mode)	≤5.0 dB Typ
OP1dBm (LNA Performance)	+13 dBm Typ

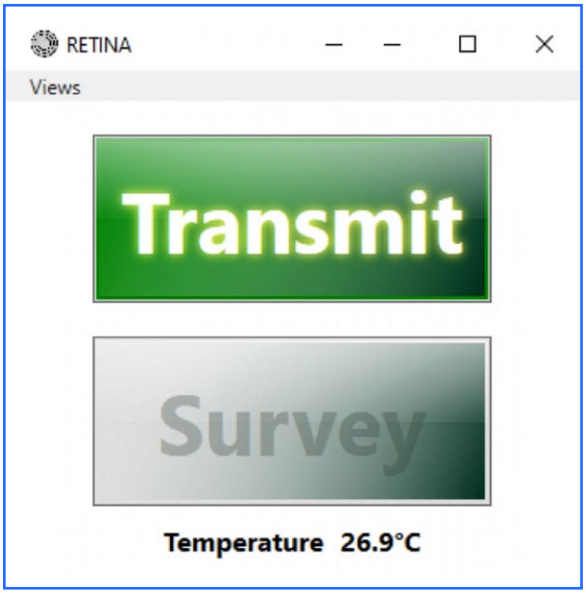
Absolute Maximum Ratings

Parameter	Performance
Supply Voltage	+12 VDC typ +16 VDC max
Supply Current	1.0 A max
RF Input Power	+16 dBm max
Storage Temperature	-40 to +85 °C
Operational Temperature	0 to +70 °C
ESD Sensitivity	Class 1 B
Weight	54 lbs max

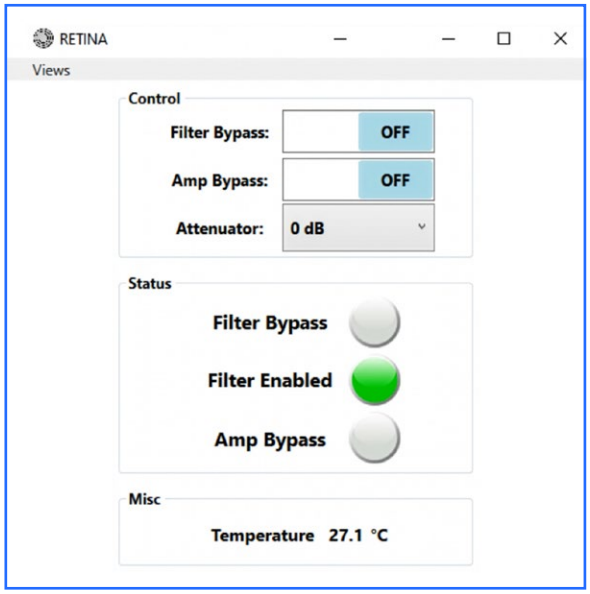
Functional Block Diagram



Software Interface

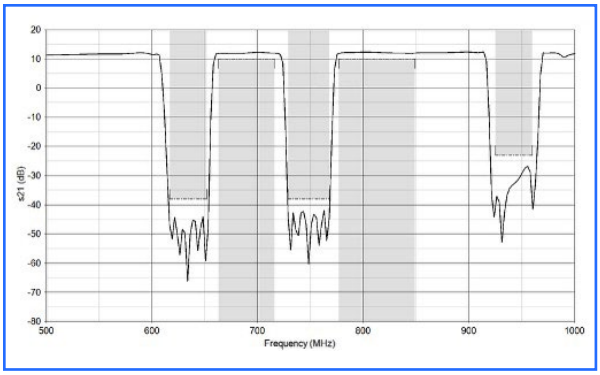


Software Interface, Basic Mode

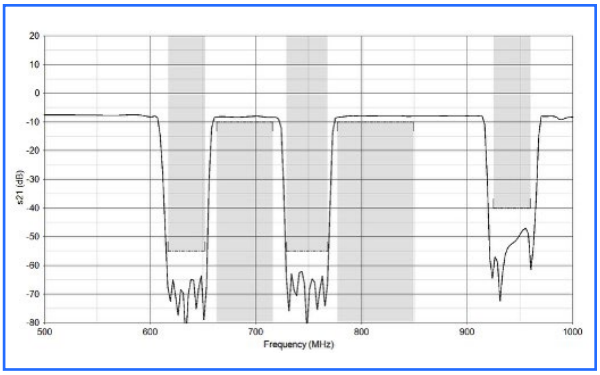


Software Interface, Advanced Mode

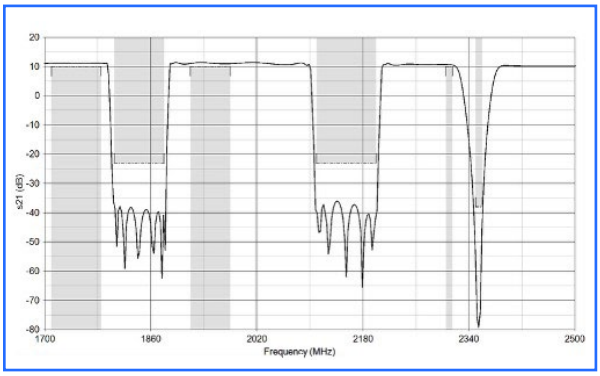
Typical Performance



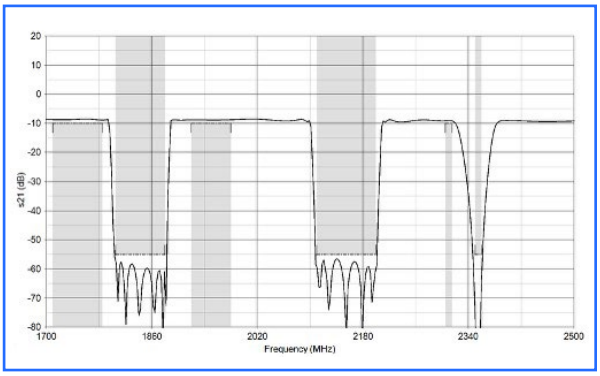
Gain: 71, 12, 17, 13, 14 & 8



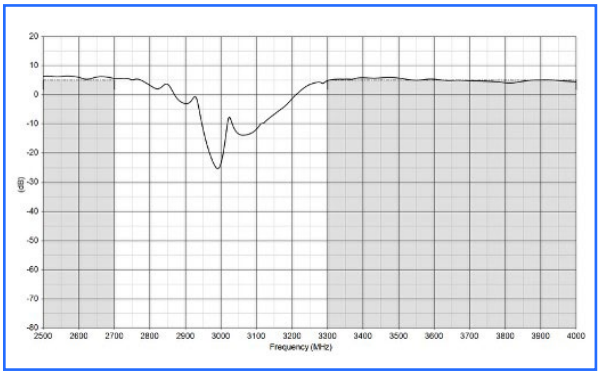
Amp Bypass: 71, 12, 17, 13, 14 & 8



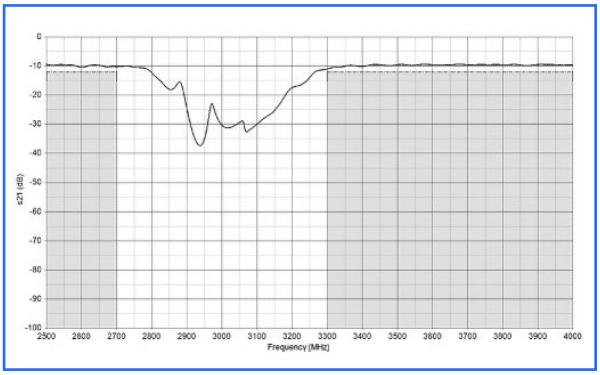
Gain: 1, 10, 3 & 30



Amp Bypass: 1, 10, 3 & 30



Gain: 41, 42, 48, & 78



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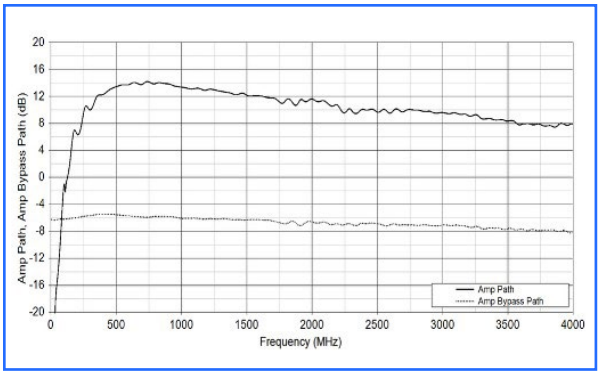
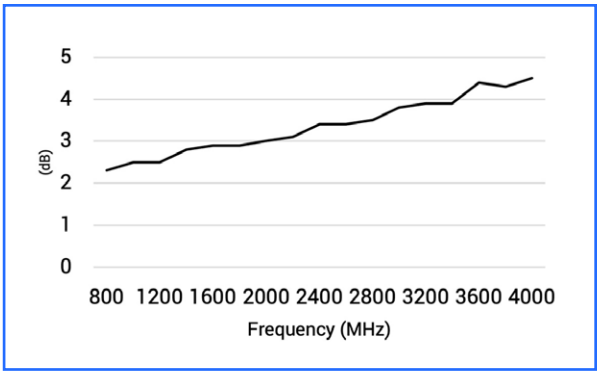


Filter Bypass & Filter/Amp Bypass



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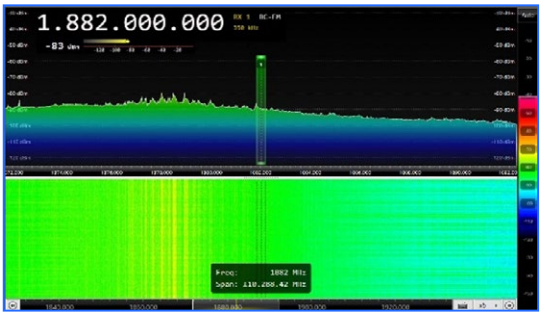

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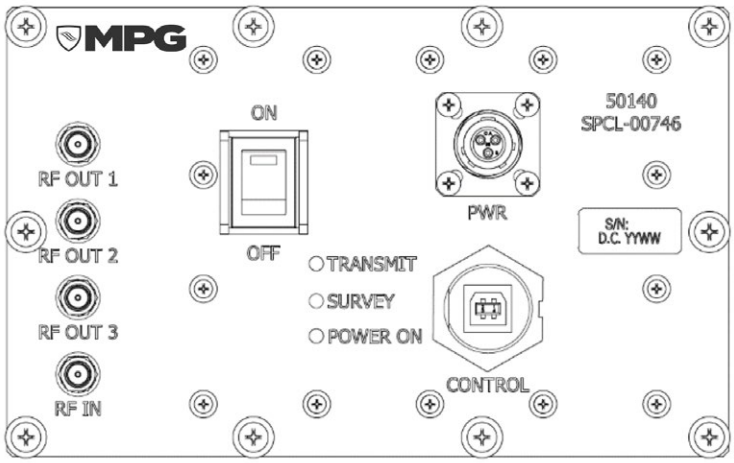
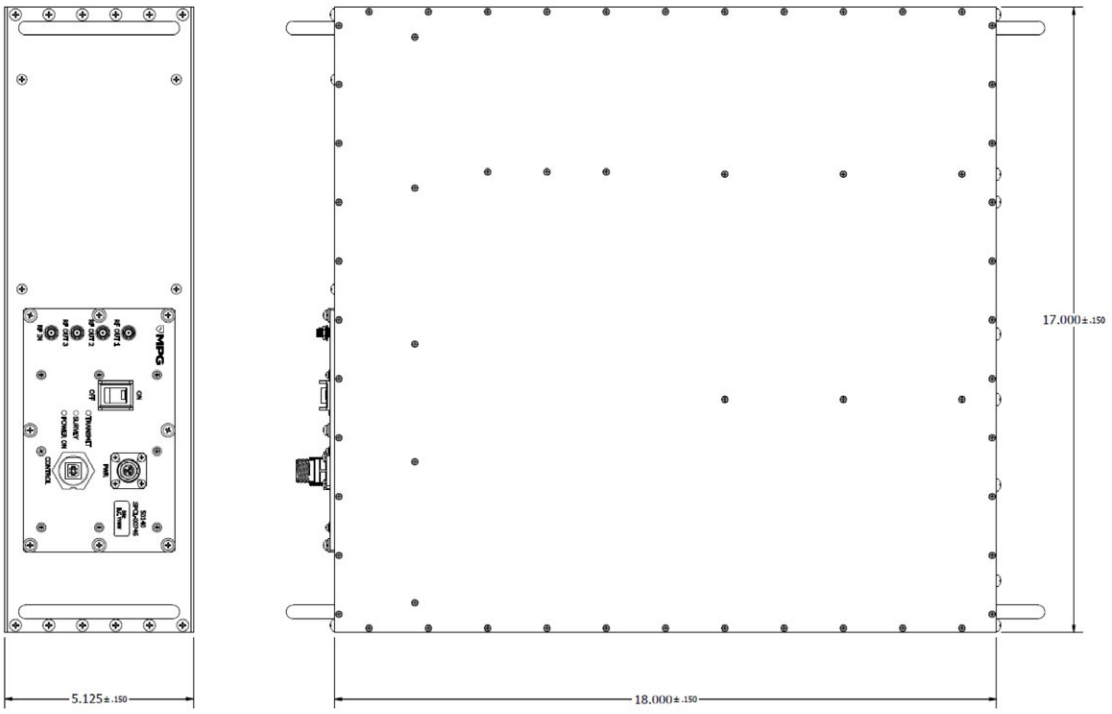
NOTE: UNUSED RF OUT MUST BE TERMINATED INTO A 50 Ω LOAD. Refer to Note 5.

Front Panel Interface



Mechanical Dimensions



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