

# Boulder Amateur Television Club TV Repeater's REPEATER

December, 2019  
2ed - Special Edition

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## SPECIAL NEWS FLASH !!!

Mike, WA6SVT, of the Amateur Television Network (ATN) has just called our attention to a pressing issue related to our amateur microwave bands.

*"The ARRL just found out two days ago that the FCC plans to make a decision December 12th to adopt an NPRM (see link below) that would **remove all secondary users from the 3.3-3.6 GHz band** as well as allow new commercial primary users (we are secondary) in the 5850-5925 MHz part of the 5.8 GHz band. ATN plans to join the fight with the ARRL. More details to come ASAP. ATN and the ARRL had a fight about 18 years ago and we were successful to keep experimental licenses from approval and the 1st license approved to be cancelled that involved local government placing video in the 2.4 GHz band. Any group wanting to join in the fight, please contact me."*

73 de Mike WA6SVT ( [wa6svt@gmail.com](mailto:wa6svt@gmail.com) )

The FCC Fact Sheet on this docket can be found online in PDF format at:

<https://docs.fcc.gov/public/attachments/DOC-360941A1.pdf>

**It is urgent that this message get out immediately and interested ham groups should be contacting both Mike and the ARRL right away.**

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**Future Newsletters:** If you have contributions for future newsletters, please send them to the editor. We love to also include news from other ATV groups.

## AMPLIFIERS for MICROWAVE HAM BANDS

Jim, KH6HTV

In the previous issue, I mentioned a new project to evaluate some of the new, inexpensive, microwave components now coming out of China. These are items being marketed on internet web sites, including: Amazon, E-Bay, Alibaba, Banggood, etc. While these web sites offer intriguing products, they are very skimpy on specifications, or completely non-existent. Some just say "6 GHz Amplifier", for example, and give no other details. Some of the stuff turns out to be "junk" while other stuff is in fact, good stuff of value. How to know? Well, as always "Buyer Beware". Best to rely upon your friends' recommendations. Unfortunately, with the dynamic characteristic of today's internet marketing -- an item listed today, may not be there tomorrow. Totally unlike buying a known item from Mouser <https://www.mouser.com/> or Digi-Key <https://www.digikey.com/>

So, I have ordered a bunch of stuff from China and some of it is now trickling in. This has included some amplifiers. Upon testing them, I came to the conclusion that several of my small, ultra-wide-band amplifiers and low-noise amplifiers (LNAs) actually worked better. What I did however discover is the Chinese are marketing their amplifiers in both bare pc board configurations and also packaged in nice, all metal enclosures. So, this made me rethink my marketing approach. Perhaps, I should also market my amplifiers as a simple, assembled and tested, printed circuit board, complete with SMA connectors. As it turns out, the cost of an enclosure, rf connectors, and feed-thru capacitors for DC power, usually dominates the manufacturing cost of building such components. I also found that out many years ago when I had my own company building ultra-wideband, microwave components along with electronic test instruments. It was Picosecond Pulse Labs, which was later sold to Tektronix.

So, I am now offering for sale, the following amplifiers at new, discounted prices. The price for any of them as an assembled & tested pc board is now **\$35** each. Packaged in an all metal enclosure with feed-thru capacitor for DC power, the price is now **\$65** each.

UWBA-100: 1 kHz - 2 GHz (3dB BW), useful to 5 GHz, 20 dB gain, +20 dBm

UWBA-101: low noise 2.4 dB NF, 1 kHz - 1.5 GHz (3dB BW), useful to 7 GHz,  
23 dB gain, +12 dBm

UWBA-102: 1 kHz - 5 GHz, (3dB BW), useful to 10 GHz, 11 dB gain, +14 dBm

UWBA-103: 250 kHz - 3 GHz (3dB BW), useful to 8 GHz, 20 dB gain, +22 dBm

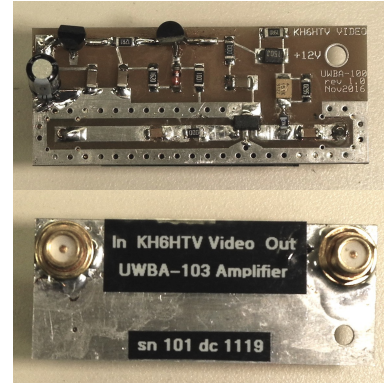
WB-LNA-1: 1 dB NF, useful from 0.4 - 3.5 GHz, 15 dB, +18 dBm

WB-LNA-2: 2.5 dB NF, useful from 0.9 - 5.8 GHz, 18 dB, +12 dBm

Detailed spec. sheets for these amplifiers are found on the following pages:



**Model UWBA-100  
ULTRA - WIDE - BAND  
20 dB, 2 GHz  
AMPLIFIER**



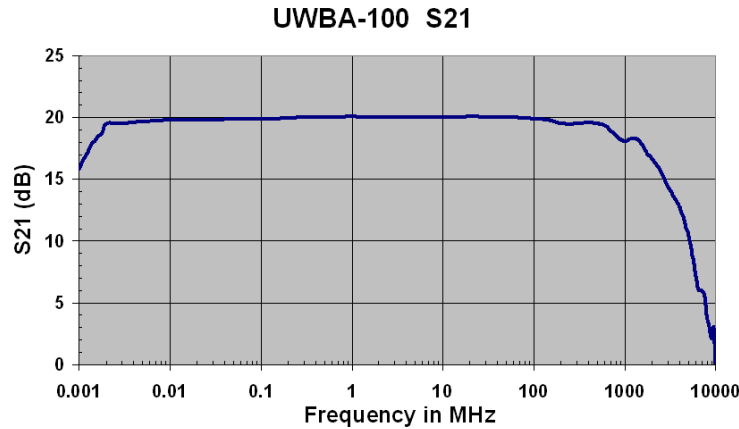
The KH6HTV VIDEO Model UWBA-100 is an Ultra-Wide-Band Amplifier with a flat frequency response extending from the low frequency, audio kHz range up to microwaves (GHz). It is intended for use as an instrumentation amplifier with instruments such as spectrum analyzers and oscilloscopes, but also can be used for amateur radio and commercial telecommunications applications. This amplifier features 20 dB gain, +20 dBm output, -3 dB BW of 2 GHz and useable gain to 5 GHz. The -3 dB low frequency cutoff is a very low, 1.2 kHz. However, if the buyer requires a higher cutoff frequency, it can be supplied at no extra cost, upon request. The amplifier is available for sale, either as an assembled pc board - or - in an all metal enclosure.

**Typical Key Performance Parameters**

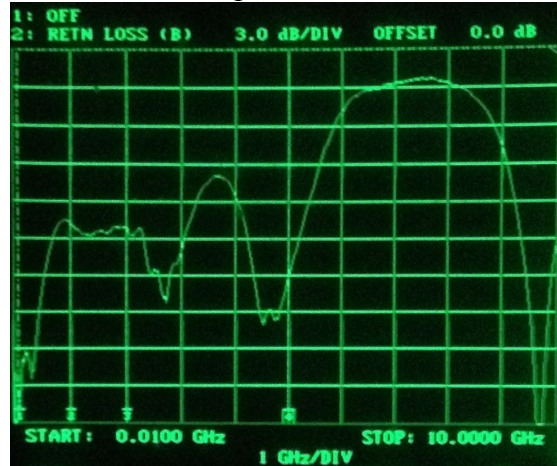
Frequency	430 MHz	1.25 GHz	2.4 GHz	3.5 GHz	5.8 GHz
S21 Gain	20 dB	18 dB	16 dB	13 dB	9 dB
Pout(-1dB)	+20 dBm	+20 dBm	+19 dBm	+17 dBm	+9 dBm

Parameter		Parameter	
Bandwidth (-3 dB)	2 GHz	Low Freq. (-3 dB)	1.2 kHz
S11	see plot	S22	see plot
S21	see plot	Noise Figure	4.5 dB
DC supply Voltage	12V, 11-15 V range	DC current	80 mA
RF connectors	SMA	DC connector	solder feed-thru cap
Dimensions (pc)	2.2" x 0.9"	Dimesions (box)	1.5"x3.6"x1.25"

## UWBA-100 AMPLIFIER -- S PARAMETERS



S21 Gain vs. Frequency 10 MHz to 10 GHz, 1 GHz/div. Vertical scale is 3 dB/div. Dashed line at bottom is 0 dB. Useful Gain up to 5 GHz

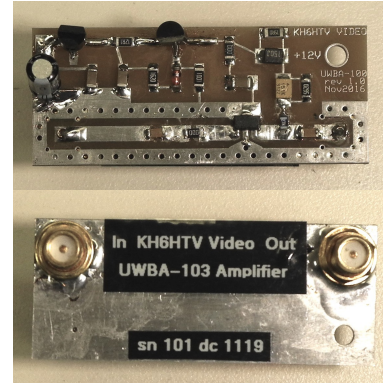


S11 Input (left) & S22 Output (right) Return Loss vs. Frequency 10 MHz to 10 GHz 1 GHz/div. Vertical scale is 3 dB/div. Dashed line at top is 0 dB





**Model UWBA-101  
ULTRA - WIDE - BAND  
23 dB, Low-Noise  
AMPLIFIER**



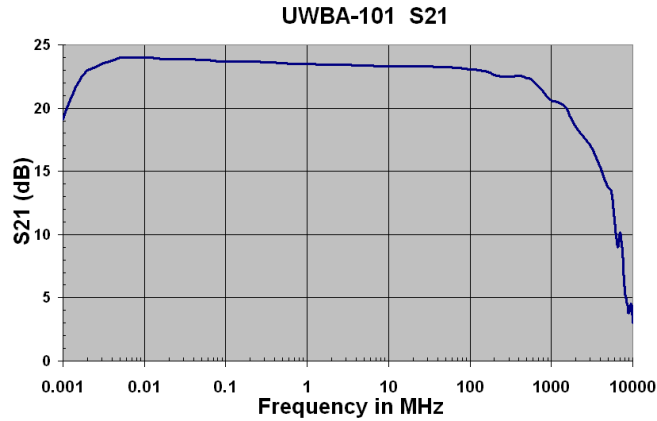
The KH6HTV VIDEO Model UWBA-101 is an Ultra-Wide-Band Amplifier with a low 2.3 dB Noise Figure. It has a flat frequency response extending from the low frequency, audio kHz range up to microwaves (GHz). It is intended for use as an instrumentation amplifier with instruments such as spectrum analyzers and oscilloscopes, but also can be used for amateur radio and commercial telecommunications applications. This amplifier features 23 dB gain, +12 dBm output, -3 dB BW of 1.5 GHz and useable gain to 7 GHz. The -3 dB low frequency cutoff is a very low, 1.2 kHz. However, if the buyer requires a higher cutoff frequency, it can be supplied at no extra cost, upon request. The amplifier is available for sale, either as an assembled pc board - or - in an all metal enclosure.

**Typical Key Performance Parameters**

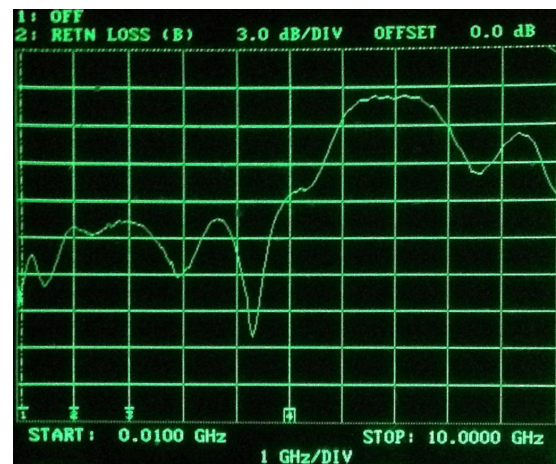
Frequency	430 MHz	1.25 GHz	2.4 GHz	3.5 GHz	5.8 GHz
S21 Gain	22 dB	20 dB	18 dB	16 dB	12 dB
Pout(-1dB)	+12 dBm	+12 dBm	+12 dBm	+11 dBm	+11 dBm
Noise Figure	2.9 dB	2.5 dB	2.4 dB	2.6 dB	3.0 dB

Parameter		Parameter	
Bandwidth (-3 dB)	1.5 GHz	Low Freq. (-3 dB)	1.2 kHz
S11	see plot	S22	see plot
S21	see plot	Noise Figure	see above
DC supply Voltage	12V, 11-15 V range	DC current	45 mA
RF connectors	SMA	DC connector	solder feed-thru cap
Dimensions (pc)	2.2" x 0.9"	Dimesions (box)	1.5"x3.6"x1.25"

## UWBA-101 AMPLIFIER -- S PARAMETERS



S21 Gain vs. Frequency 10 MHz to 10 GHz, 1 GHz/div. Vertical scale is 3 dB/div. Dashed line at bottom is 0 dB. Useful Gain up to 7 GHz

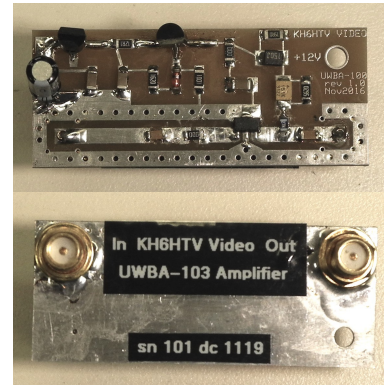


S11 Input (left) & S22 Output (right) Return Loss vs. Frequency 10 MHz to 10 GHz 1 GHz/div. Vertical scale is 3 dB/div. Dashed line at top is 0 dB





**Model UWBA-102  
ULTRA - WIDE - BAND  
11 dB, 5 GHz  
AMPLIFIER**



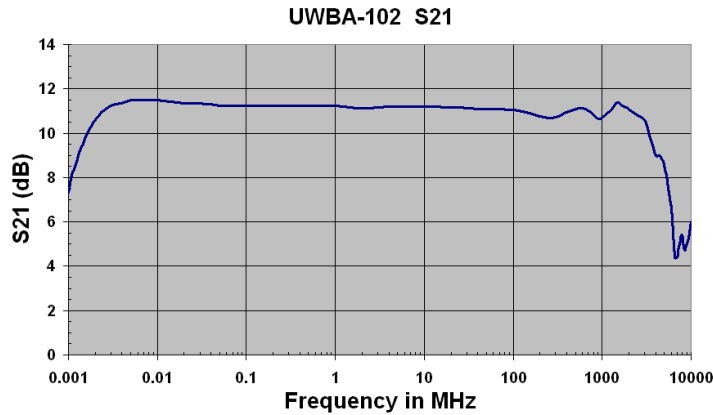
The KH6HTV VIDEO Model UWBA-102 is an Ultra-Wide-Band Amplifier with a flat frequency response extending from the low audio kHz range up to microwaves (GHz). It is intended for use as an instrumentation amplifier with instruments such as spectrum analyzers and oscilloscopes, but also can be used for amateur radio and commercial telecommunications applications. This amplifier features 11 dB gain, +14 dBm output, -3 dB BW of 5 GHz and useable gain to beyond 10 GHz. The -3 dB low frequency cutoff is a very low, 1.2 kHz. However, if the buyer requires a higher cutoff frequency, it can be supplied at no extra cost, upon request. The amplifier is available for sale, either as an assembled pc board - or - in an all metal enclosure.

**Typical Key Performance Parameters**

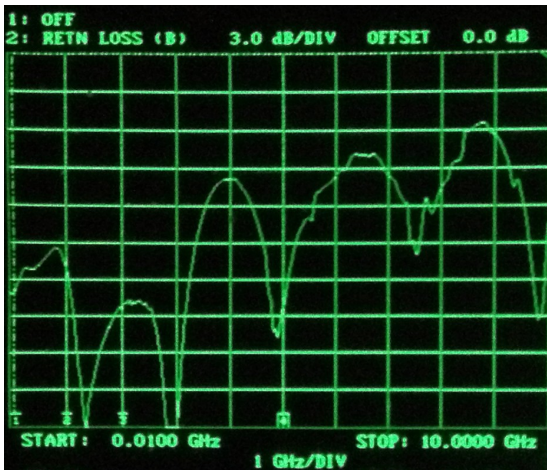
Frequency	430 MHz	1.25 GHz	2.4 GHz	3.5 GHz	5.8 GHz	10 GHz
S21 Gain	11 dB	11 dB	11 dB	10 dB	7 dB	6 dB
Pout(-1dB)	+14 dBm	+13 dBm	+12.5dBm	+13.5dBm	+13 dBm	+11 dBm

Parameter		Parameter	
Bandwidth (-3 dB)	5 GHz	Low Freq. (-3 dB)	1.2 kHz
S11	see plot	S22	see plot
S21	see plot	Noise Figure	5 to 6 dB
DC supply Voltage	12V, 11-15 V range	DC current	60 mA
RF connectors	SMA	DC connector	solder feed-thru cap
Dimensions (pc)	2.2" x 0.9"	Dimesions (box)	1.5"x3.6"x1.25"

## UWBA-102 AMPLIFIER -- S PARAMETERS



S21 Gain vs. Frequency 10 MHz to 10 GHz, 1 GHz/div. Vertical scale is 2 dB/div. Dashed line at bottom is 0 dB. Useful Gain up to beyond 10 GHz

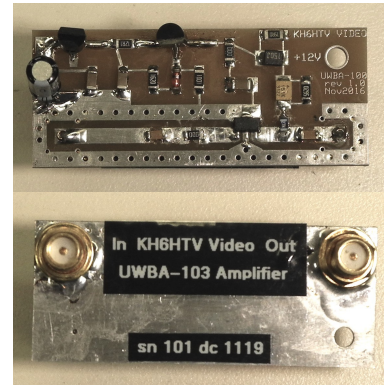


S11 Input (left) & S22 Output (right) Return Loss vs. Frequency 10 MHz to 10 GHz 1 GHz/div. Vertical scale is 3 dB/div. Dashed line at top is 0 dB





**Model UWBA-103  
ULTRA - WIDE - BAND  
20 dB, 3 GHz  
AMPLIFIER**



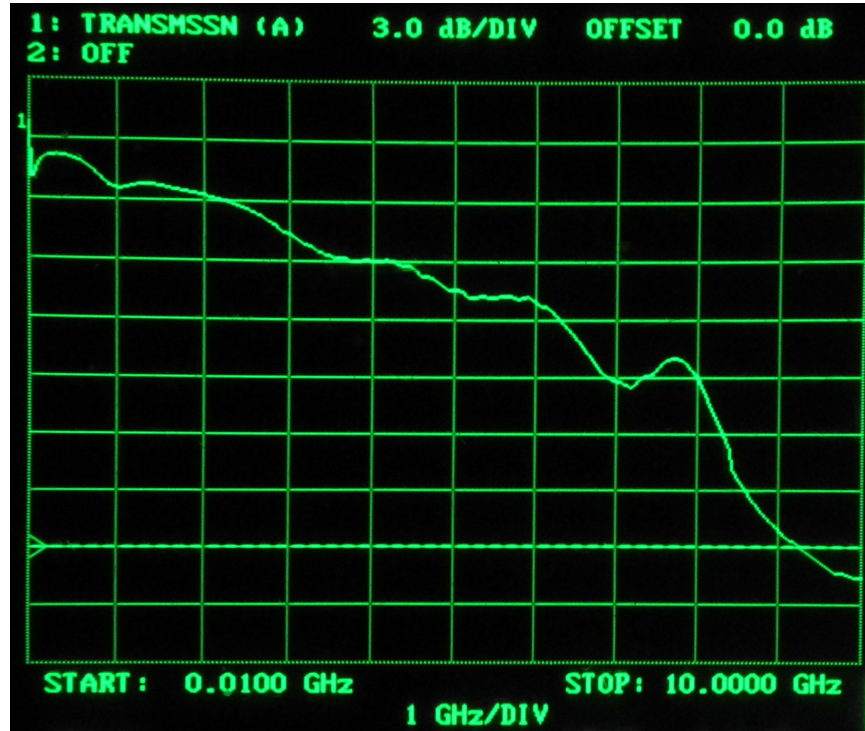
The **NEW** KH6HTV VIDEO Model UWBA-103 is an Ultra-Wide-Band Amplifier with a flat frequency response extending from the low frequency, kHz range up to microwaves (GHz). It is intended for use as an instrumentation amplifier with instruments such as spectrum analyzers and oscilloscopes, but also can be used for amateur radio and commercial telecommunications applications. This amplifier features 20 dB gain, +20 dBm output, -3 dB BW of 3 GHz and useable gain to 8 GHz. The -3 dB low frequency cutoff is a low, 250 kHz. However, if the buyer requires a higher cutoff frequency, it can be supplied at no extra cost, upon request. The amplifier is available for sale, either as an assembled pc board - or - in an all metal enclosure.

**Typical Key Performance Parameters**

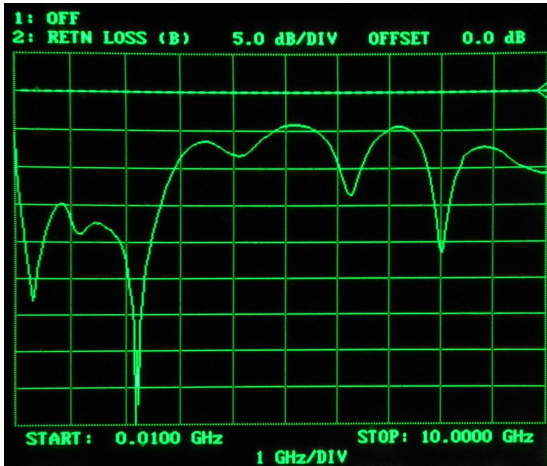
Frequency	430 MHz	1.25 GHz	2.4 GHz	3.5 GHz	5.8 GHz
S21 Gain	20 dB	19 dB	18 dB	16.5 dB	12 dB
Pout(-1dB)	+20 dBm	+19 dBm	+18.5 dBm	+16 dBm	+9 dBm
Pout(sat)	+22 dBm	+20 dBm	+19.5 dBm	+17.5 dBm	+11 dBm

Parameter		Parameter	
Bandwidth (-3 dB)	3 GHz	Low Freq. (-3 dB)	250 kHz
S11	see plot	S22	see plot
S21	see plot	Noise Figure	4 to 4.5 dB
DC supply Voltage	12V, 11-15 V range	DC current	80 mA
RF connectors	SMA	DC connector	solder feed-thru cap
Dimensions (pc)	2.2" x 0.9"	Dimesions (box)	1.5"x3.6"x1.25"

## UWBA-103 AMPLIFIER -- S PARAMETERS



S21 Gain vs. Frequency 10MHz to 10 GHz, 1 GHz/div. Vertical scale is 3 dB/div.  
Dashed line is 0 dB. Useful Gain up to 8 GHz

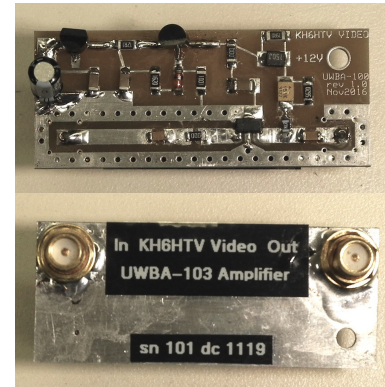


S11 Input (left) & S22 Output (right) Return Loss vs. Frequency 10 MHz to 10 GHz  
1 GHz/div. Vertical scale is 5 dB/div. Dashed line is 0 dB





## Model WB-LNA-X Wide-Band, Low Noise AMPLIFIERS



The KH6HTV VIDEO Models WB-LNA-X are a pair of Wide-Band , Low Noise Amplifiers with useful frequency responses covering the lower microwave frequencies from 420 MHz to 5.8 GHz. They include a sharp cut-off, high-pass filter to attenuate signals below 350 MHz. The amplifiers are available for sale, either as an assembled pc board - or - in an all metal enclosure.

PARAMETER (*)	WB-LNA-1	WB-LNA-2
useful LNA freq. range	420 MHz - 3.5 GHz	900 MHz - 5.8 GHz
Noise Figure	1.8 dB (430 MHz) 1.0 dB (900 MHz) 1.0 dB (1.3 GHz) 1.5 dB (2.4 GHz) 1.7 dB (3.4 GHz)	2.7 dB (900 MHz) 2.5 dB (1.3 GHz) 2.5 dB (2.4 GHz) 3.2 dB (3.4 GHz) 3.0 dB (5.8 GHz)
S21 Gain	18 dB (430 MHz) 16 dB (900 MHz) 15 dB (1.3 GHz) 9 dB (2.4 GHz) 7 dB (3.4 GHz)	21dB (900 MHz) 20 dB (1.3 GHz) 18 dB (2.4 GHz) 16 dB (3.4 GHz) 11 dB (5.8 GHz)
Pout(-1dB)	17 dBm (430 MHz) 18 dBm (900 MHz) 19 dBm (1.3 GHz) 19 dBm (2.4 GHz) 17 dBm (3.5 GHz)	12 dBm (900 MHz) 13 dBm (1.3 GHz) 14 dBm (2.4 GHz) 12 dBm (3.5 GHz) 11 dBm (5.8 GHz)
Low Frequency Cut-Off	350 MHz	350 MHz
DC Current @ 12 Vdc	55 mA	45 mA
DC Supply Voltage	12 Vdc, +11 to +15 V range, internal voltage regulator	
RF & DC Connectors	SMA jacks (female) DC = solder terminal on feed-thru capacitor	
Dimension	2.2"x0.9" (pc board) - or - 1.5"x3.6"x1.25" die-cast enclosure	

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