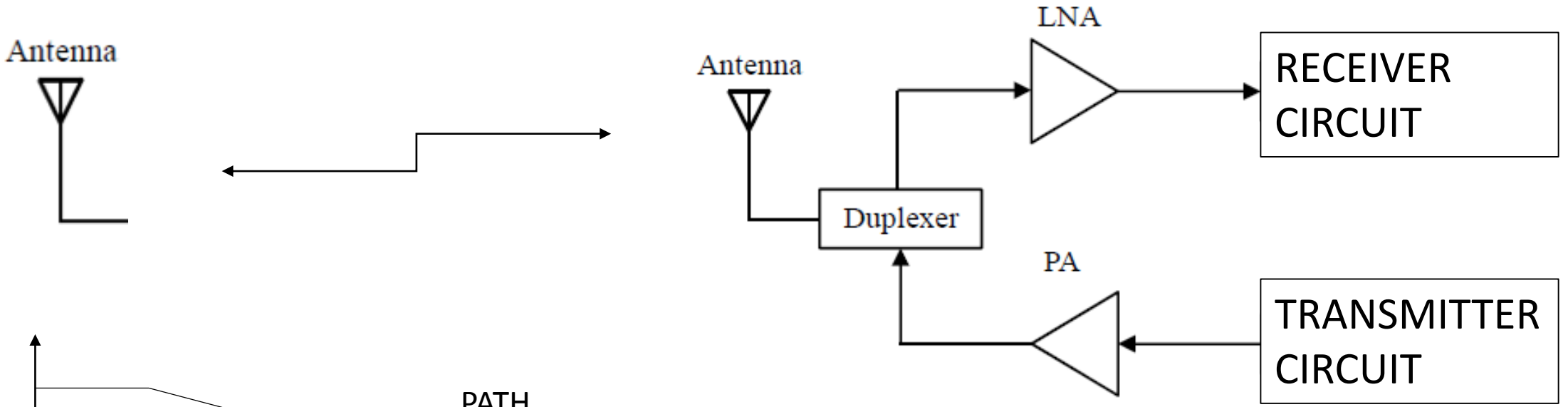
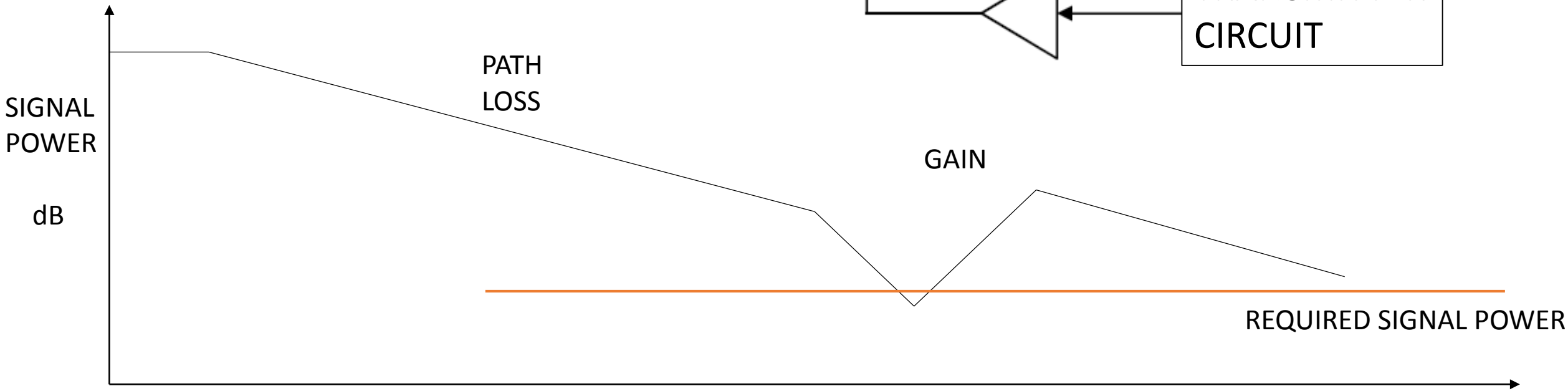
LOW NOISE AMPLIFIER AND POWER AMPLIFIER SPECIFICATIONS

IMPORTANCE OF AMPLIFIERS

- Wireless Transmission suffers from the path loss (loss due to wireless medium) and also leads to failure in signal reception.
- To increase the signal power in wireless channel and to make the receiver to receive the signal with required signal power, Amplifiers are required in wireless transceivers.
- Power Amplifiers are used to increase the power of transmission signal and helps to increase the possibility to the reception.
- LNA (Low Noise Amplifier) are used in reception which is increasing the received signal power with minimum noise. That’s why this amplifier is called Low Noise Amplifier.

TRANSCEIVER FRONT END



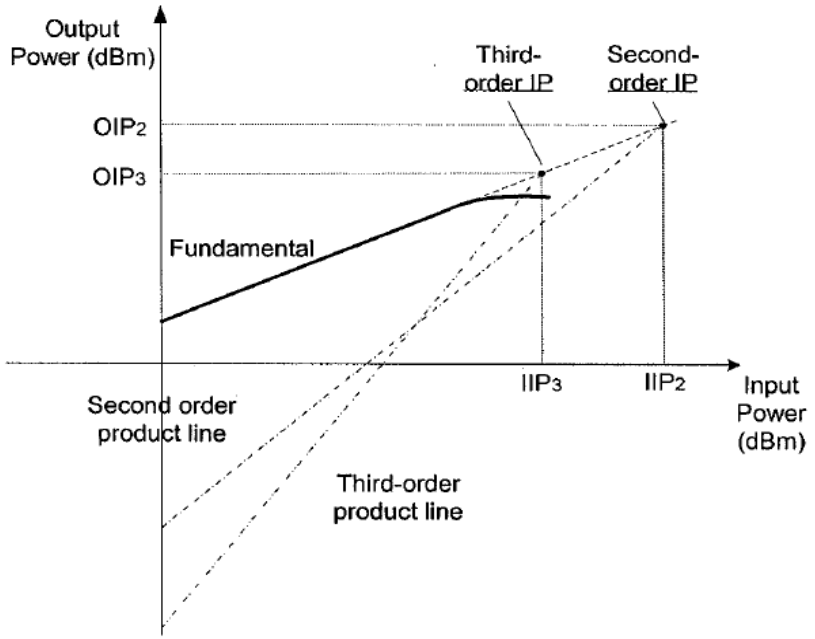


HOW AMPLIFIERS HELPS ?

- Previously shown figure, explains that the Maximum power loss occurred in free space, commonly known as Free Space Loss.
- Some times the received signal power getting lower than the receiver sensitivity.
- Amplifiers provide some gain to the signal and helps to increase the signal power for receiver requirement.
- LNA (Low Noise Amplifier) is focused to maintain the required SNR level at the receiver end.

RECEIVER SECTION

PROPERTIES	PARAMETERS CAN AFFECT THE PROPERTIES
LINEARITY	IIP3
SENSITIVITY	NOISE FIGURE
SELECTIVITY	FILTER CHARACTERISTICS



LNA PARAMETERS

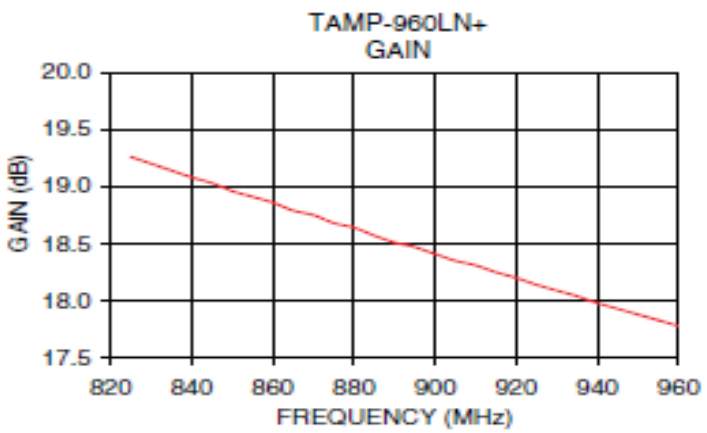
- OPERATING FREQUENCY BAND
- GAIN
- NOISE FIGURE
- OUTPUT POWER 1 dB COMPRESSION POINT
- OUTPUT THIRD ORDER INTERCEPT POINT (OIP3)
- INPUT AND OUTPUT VSWR

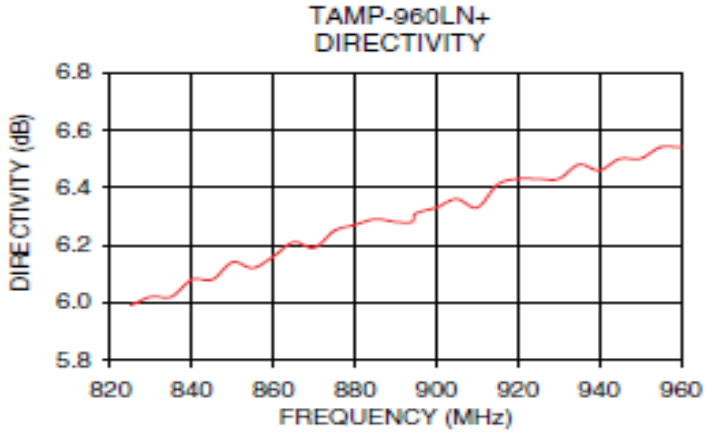
LNA TAMP 960 LN+

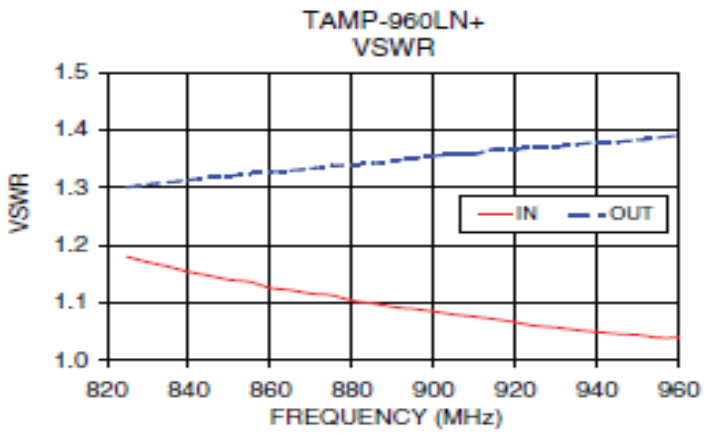
Electrical Specifications at 25°C

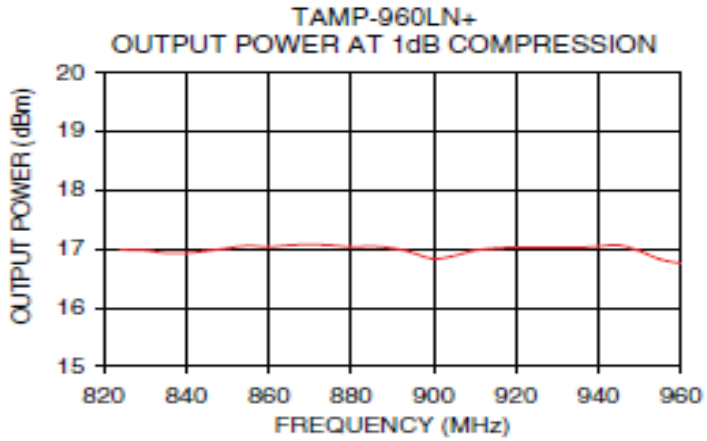
Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		824		960	MHz
Noise Figure	824 - 960 824 - 894 880 - 915 925 - 960		0.55 0.60 0.55 0.55	0.80 0.80 0.70 0.70	dB
Gain	824 - 960 824 - 894 880 - 915 925 - 960	16.5 16.5 16.5 16.5	18.0 18.0 18.0 17.5		dB
Gain Flatness	824 - 960 824 - 894 880 - 915 925 - 960		± 0.6 ± 0.4 ± 0.2 ± 0.2	± 1.2 ± 0.8 ± 0.4 ± 0.4	dB
Output Power at 1dB compression	824 - 960 824 - 894 880 - 915 925 - 960	15.5 15.5 15.5 15.5	16.5 16.5 16.5 16.5		dBm
Output third order intercept point (OIP3)	824 - 960 824 - 894 880 - 915 925 - 960		30 30 30 30		dBm
Input VSWR	824 - 960 824 - 894 880 - 915 925 - 960		1.1 1.1 1.1 1.1		:1
Output VSWR	824 - 960 824 - 894 880 - 915 925 - 960		1.4 1.3 1.4 1.5		:1
DC Supply Voltage			5.0		V
DC Supply Current			40	45	mA

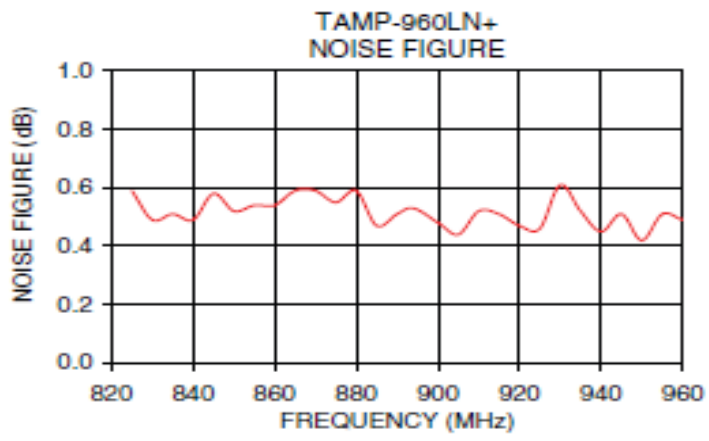
PARAMETERS VS FREQUENCY

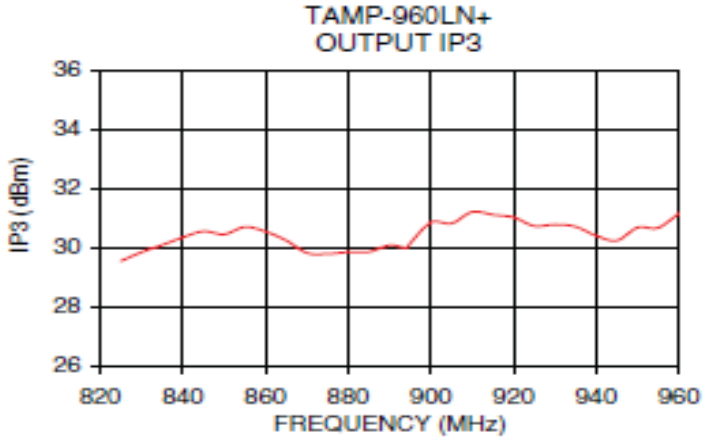




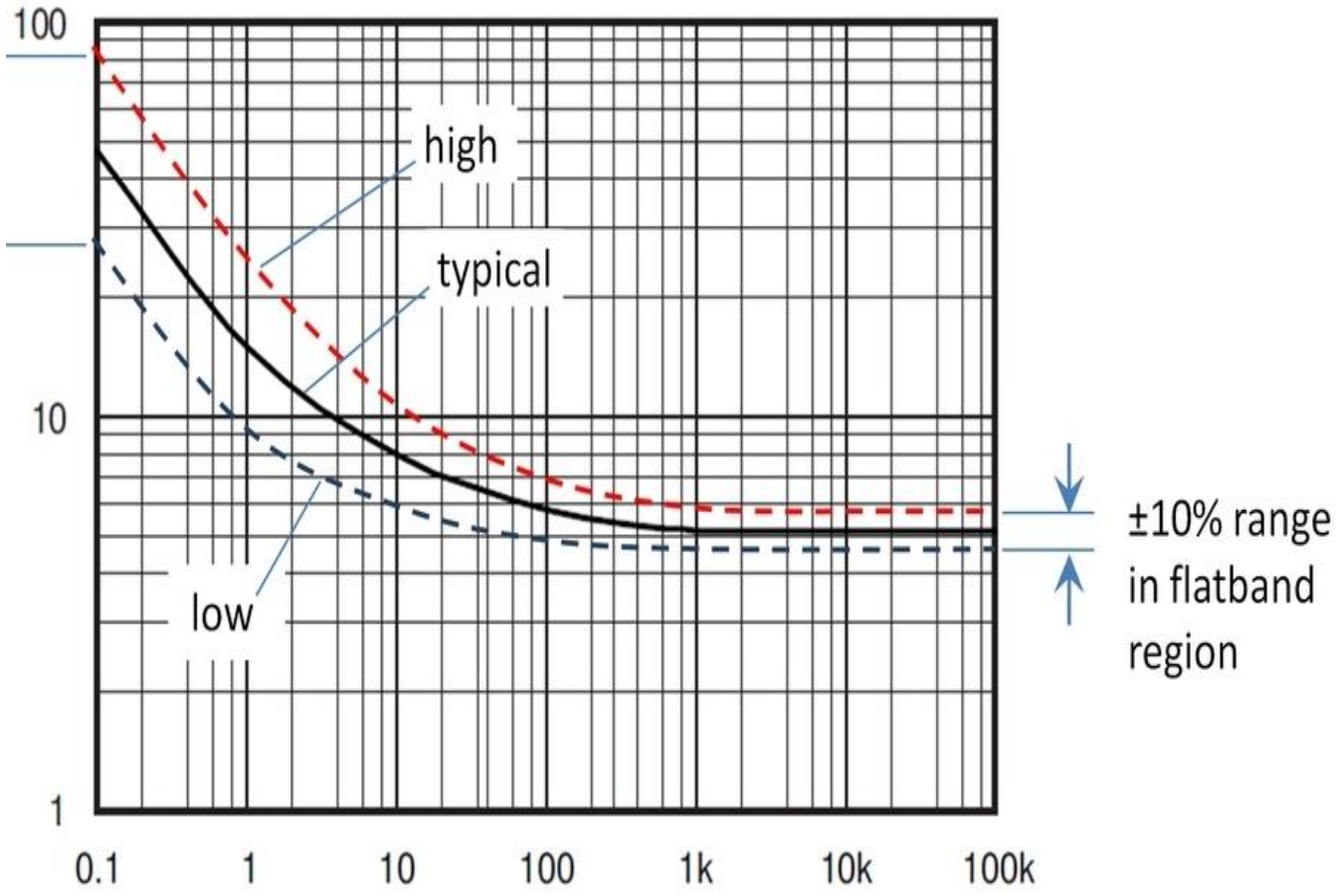








TYPICAL POWER AND FLAT BAND



Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Operating Voltage	5.5 V
Input RF Power (no damage)	+10 dBm
Power Consumption	250 mW

Permanent damage may occur if any of these limits are exceeded.

POWER AMPLIFIER - HELA 10

Electrical Specifications at 25°C

KIT[1] NO.	FREQ. (MHz) f_L-f_U	OHMS	GAIN[2] (dB) Min.	GAIN[2] (dB) Typ.	GAIN[2] (dB) Max.	GAIN[2] (dB) Typ. Flatness	MAXIMUM POWER (dBm) Output (1 dB Compr.) Typ.	MAXIMUM POWER (dBm) Output (1 dB Compr.) Min.	MAXIMUM POWER (dBm) Input[3] (no damage)	DYNAMIC RANGE NF (dB) Typ.	DYNAMIC RANGE IP3 (dBm) Typ.	VSWR[4] (:1) IN Typ.	VSWR[4] (:1) OUT Typ.	DC POWER Volt (V) Nom.	DC POWER Current (mA) Max.	THERMAL RESISTANCE[5] θjc °C/W
HELA-10A+	50-1000	75	9.5	12	13	±0.4	30	26	20	3.5	47	1.22	1.22	12	525	6
HELA-10B+	50-1000	50	9.5	12	13	±0.4	30	26	20	3.5	47	1.22	1.22	12	525	6
HELA-10C+	5-450	75	9.3	11.4	12.5	±0.4	30	26	20	3.5	48	1.3	1.22	12	525	6
HELA-10D+	8-300	50	9.3	11	12.5	±0.4	30	26	20	3.5	48	1.2	1.2	12	525	6

1. Kit consists of HELA-10 plus transformers, see table below.
2. Includes transformer losses at input & output.
3. Open load is not recommended, potentially can cause damage. With no load, derate max. input power by 20 dB.
4. For 75 ohm. For 50 ohm, VSWR increases from 1.2:1 at 1 GHz to 2.0:1 at 50MHz.
5. Thermal resistance is from junction to heat slug. (mounting paddle).

LOW NOISE AMPLIFIER AND POWER AMPLIFIER

PARAMETER	SHOULD BE
OPERATING FRQUENCY BAND	HIGH
NOISE FIGURE	LOW
GAIN	HIGH
DYNMIC RANGE • P1 dB • OIP3	HIGH
VSWR	LOW (NEAR TO 1)
THERMAL RESISTANCE	LOW
FLAT NESS	LOW

THANK YOU !!