

AR204002

ART1K6, 2-30MHz

V1.0---15 Jan. 2020

AMPLEON

Application
Measurement
Report

Document information

Status Public

Author(s) Rock Qiu, rock.qiu@ampleon.com

Abstract Measurement results of linear demo with ART1K6, this circuit works at 2-30MHz.

Revision History

Table 1: *Report revisions*

Revision	Date	Description	Author
1.0	20200115	Initial document	Rock Qiu

Contents

1. Revision History	2
2. Contents	3
3. List of figures	3
4. List of tables	3
5. General description	4
6. Biasing	5
7. Performance Indication	5
8. Performance Details	6
8.1 Return loss.....	6
8.2 Test data.....	7
9. Hardware	10
9.1 Board Image	10
9.2 Copper Layout and components mapping	12
9.3 Bill of materials.....	12
9.4 Board material.....	12
9.5 Device markings.....	12
10. Legal information	14
10.1 Definitions	14
10.2 Disclaimers	14
10.3 Trademarks.....	14
10.4 Contact information	14

List of figures

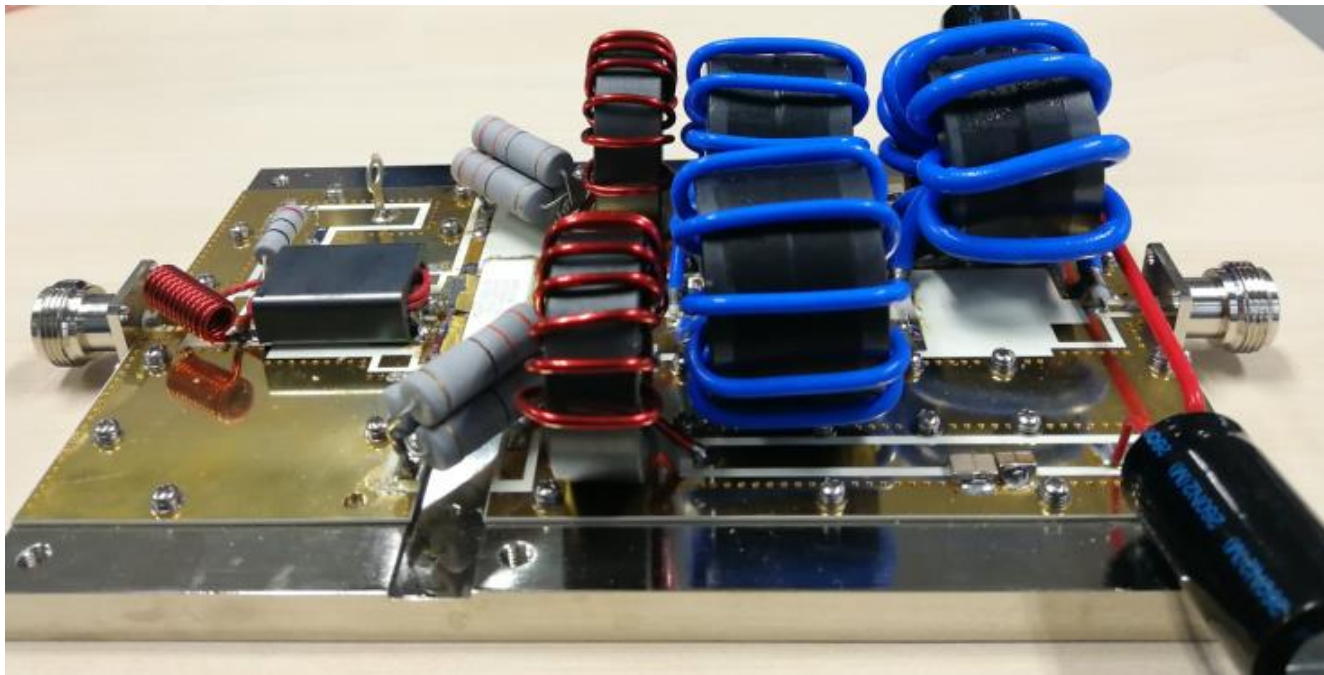
Figure 1	gain	5
Figure 2	return loss	6
Figure 3	IMD3 test.....	7
Figure 4	2-tone efficiency test.....	8
Figure 5	demo picture	11

List of tables

Table 1:.....	Report revisions	2
Table 2:.....	Performance Indication	5
Table 3:.....	Bill of Materials	6
Table 4:.....	Board specifications	9
Table 5:.....	Device specifics.....	9

General description

This report presents the measurement results of the CW demo AR204002. The device is ART1K6 LDMOS in a push-pull package. The presented demo is tuned for the frequency of 2-30MHz.



Biassing

The biassing is as follows:

$$\begin{aligned}V_{DS} &= 50V \\ I_{dq} &= 2200mA\end{aligned}$$

Performance Indication

Table 2: *Performance indication*

Parameter	Condition	Unit	CW
V_{DD}		V	50
S11 at input		dB	-10
Gain		dB	27

Performance Details

7.1 Gain of ART1K6 (50V Idq=2200mA)

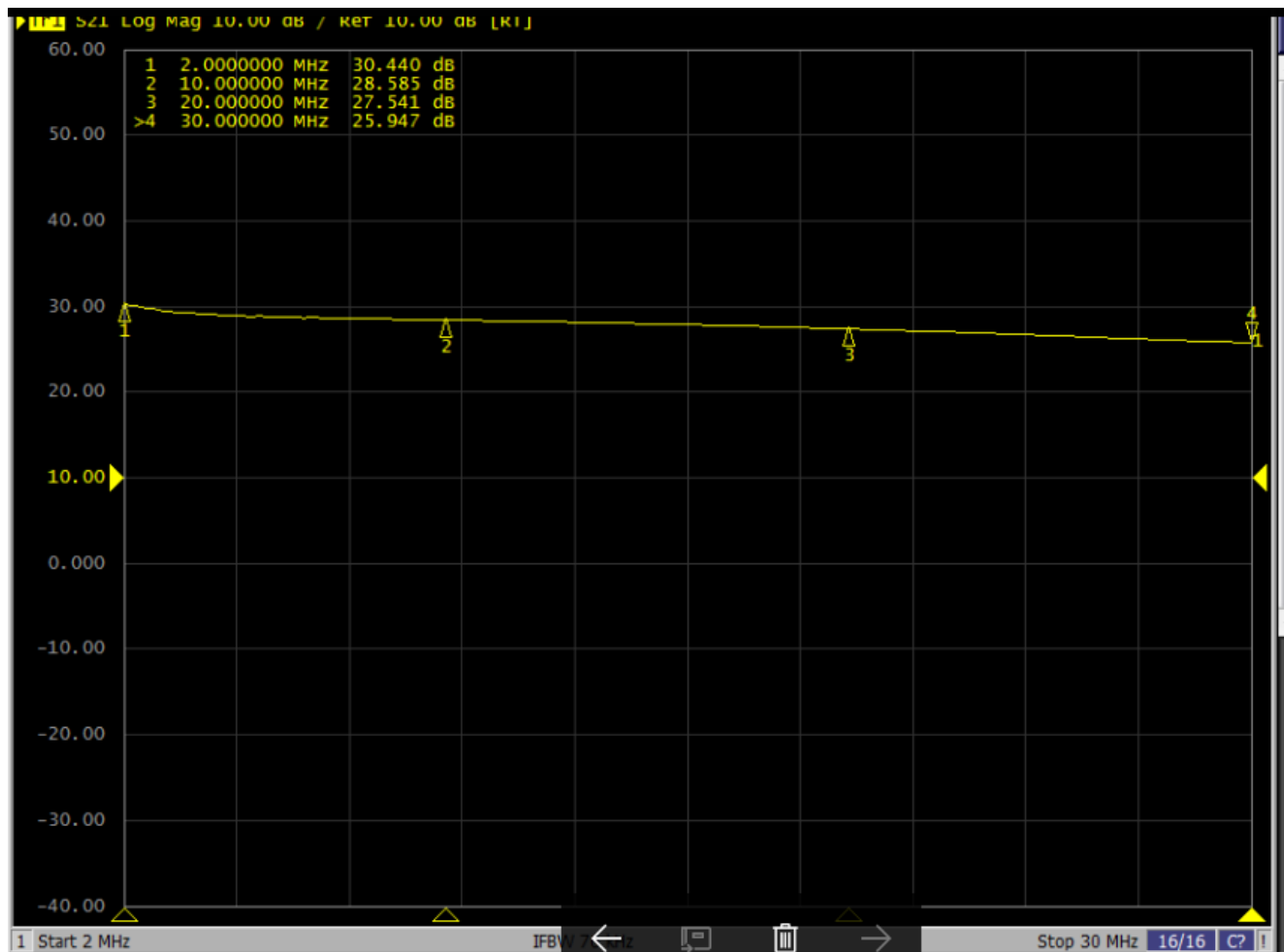


Figure 1 gain of ART1K6

7.2 Return loss of ART1K6 (50V Idq=2200mA)

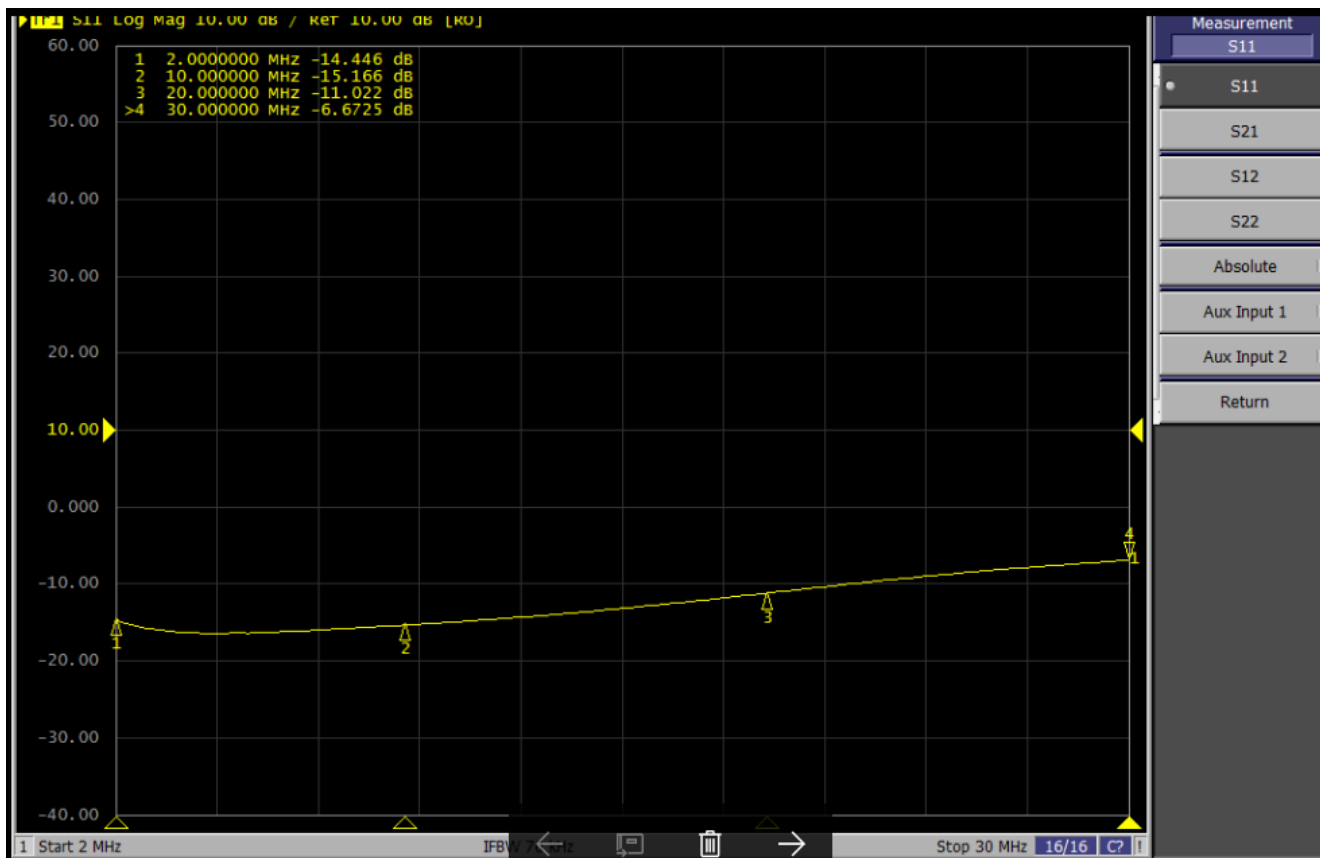


Figure 2 return loss of ART1K6

7.3 IMD3 test (50V Idq=2200mA 10KHz 2-tone)

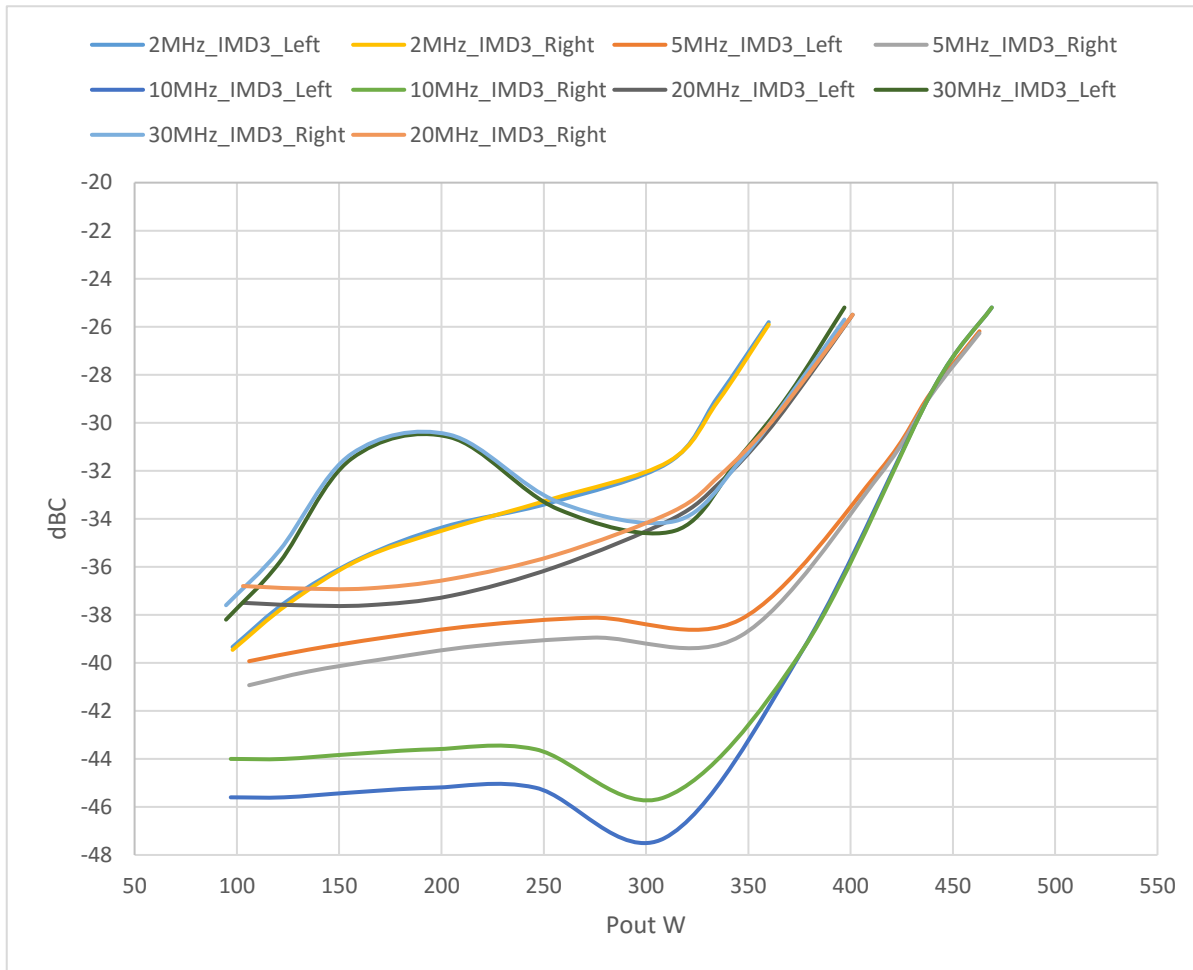


Figure 3 IMD3 of ART1K6

7.4 Efficiency test (50V Idq=2200mA 10KHz 2-tone)

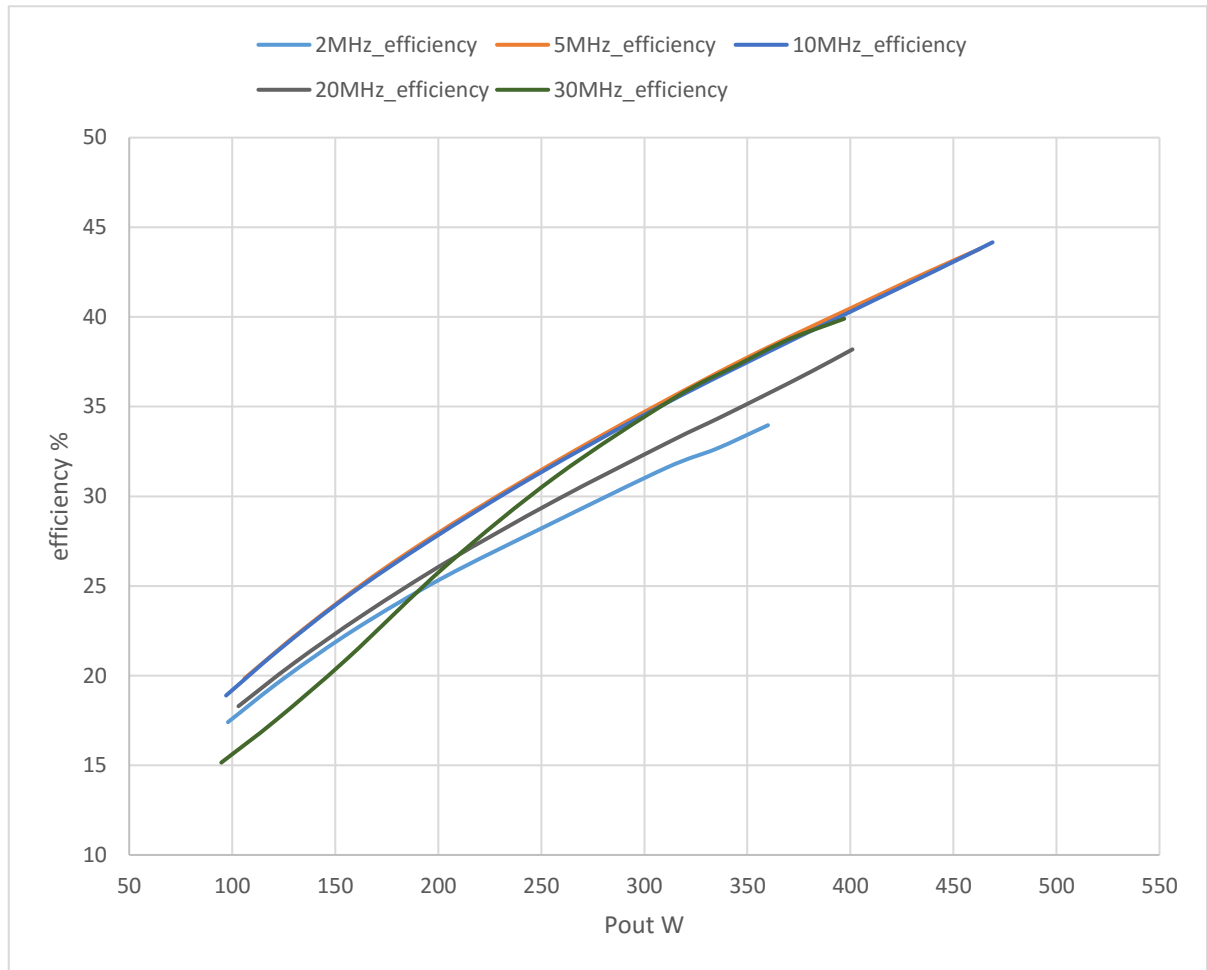
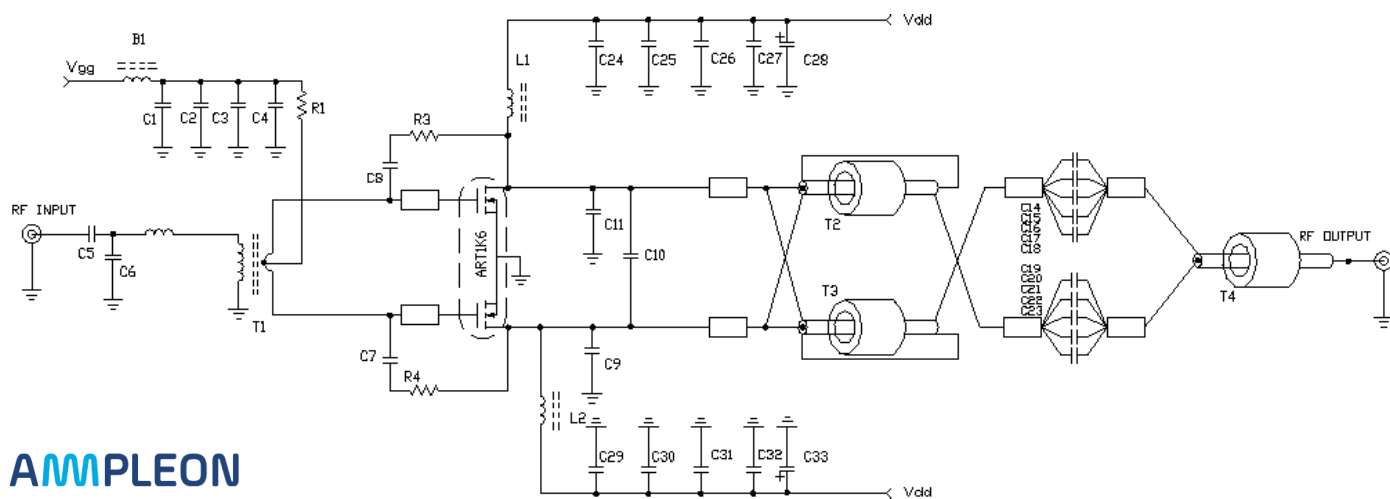


Figure 4 efficiency of ART1K6 2-Tone

8. Hardware

8.1 schematic circuits



8.2 Board Image

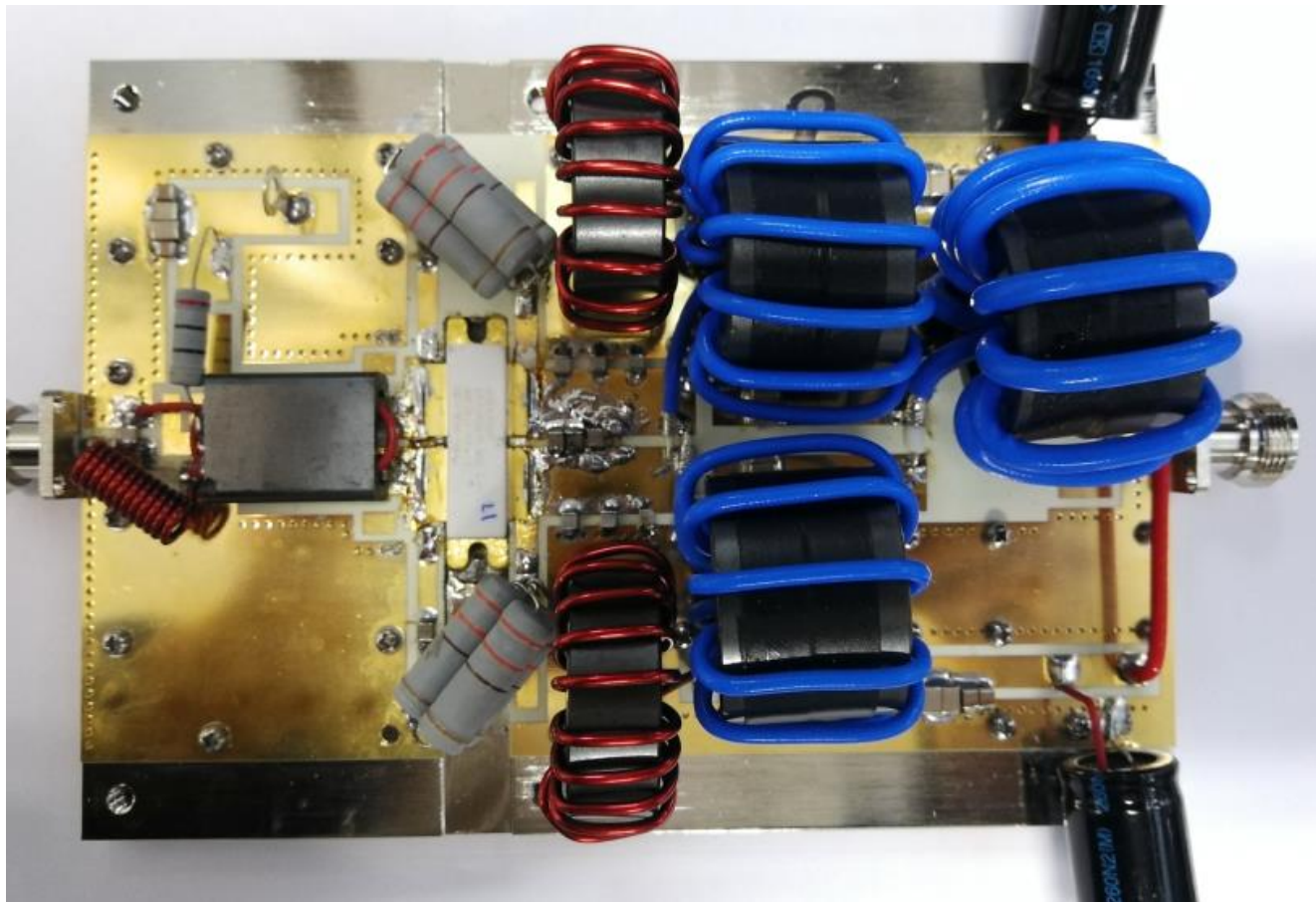


Figure 5 demo picture

8.3 Bill of materials

Table 6. Bill of Materials

Quantity	Description	Part Number	Manufacturer
R1	20ohm 1W Resistor leaded		
R3,R4	3X330ohm 5W Resistor		
C1,C26,C27,C31,C32	10uF	C5750X7R1H106M	TDK
C2,C3,C5,C24,C25,C29,C30,C14-C23	10nF	C3225C0G2E103J	TDK
C4	0.1uF 50V Ceramic Capacitor	CDR33BX104AKYS	Kemet
C28,C33	470 uF 63V Electrolytic Capacitor	MCRH63V477M13X26-RH	MULTICOMP
C6	Non		
C7,C8	1000P	800B	ATC
C9,C11	3X180P	800B	ATC
C10	3X220P	800B	ATC
L1,L2	Handwound 10 turn 18AWG on ferrite rod	FT-140-43	Handwound
T1	4:1 Impedance Ratio 43 material	BN-43-3312	Handwound
T2	Handwound 8 turn 25ohm cable on ferrite rod	FT-140-43	Handwound
T3	Handwound 8 turn 25ohm cable on ferrite rod	FT-140-43	Handwound
T4	Handwound 8 turn 50ohm cable on ferrite rod	FT-140-43	Handwound
PCB	RO4350B 30mil		Rogers

8.3 Board material

Table 7. Board specifications

Parameter	Value
Manufacturer	Rogers
Type	RO4350B
Thickness	30mil, 0.762mm
Layers	2, top/bottom. Bottom all copper

8.4 Device markings

Table 8. Device specifics

Parameter	Value
Manufacturer	Ampleon
Device	ART1K6

Legal information

9.1 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Ampleon does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

9.2 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Ampleon does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Ampleon takes no responsibility for the content in this document if provided by an information source outside of Ampleon.

In no event shall Ampleon be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Ampleon's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of Ampleon.

Right to make changes — Ampleon reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Ampleon products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Ampleon product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Ampleon and its

suppliers accepts no liability for inclusion and/or use of Ampleon products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. Ampleon makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using Ampleon products, and Ampleon accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Ampleon product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Ampleon does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Ampleon products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Ampleon does not accept any liability in this respect.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

9.3 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

Any reference or use of any 'NXP' trademark in this document or in or on the surface of Ampleon products does not result in any claim, liability or entitlement vis-à-vis the owner of this trademark. Ampleon is no longer part of the NXP group of companies and any reference to or use of the 'NXP' trademarks will be replaced by reference to or use of Ampleon's own trademarks.

9.4 Contact information

For more information, please visit: <http://www.ampleon.com>

For sales office addresses, please visit: <http://www.ampleon.com/sales>