AR171117

BLA9H0912L(S)-1200P, 960 to 1215MHz

v1.0 — 17 August 2017

AMPLEON

Application Report

Document information	
Status	Company public
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Abstract	Measurement results of a Class-AB design for the 960 to 1215MHz band with the BLA9H0912L(S)-1200P

1. Revision History

Table 1: Report revisions

Revision	Date	Description	Author
1.0	201708144	Initial document	Hans Mollee

2. Contents

3. List of figures

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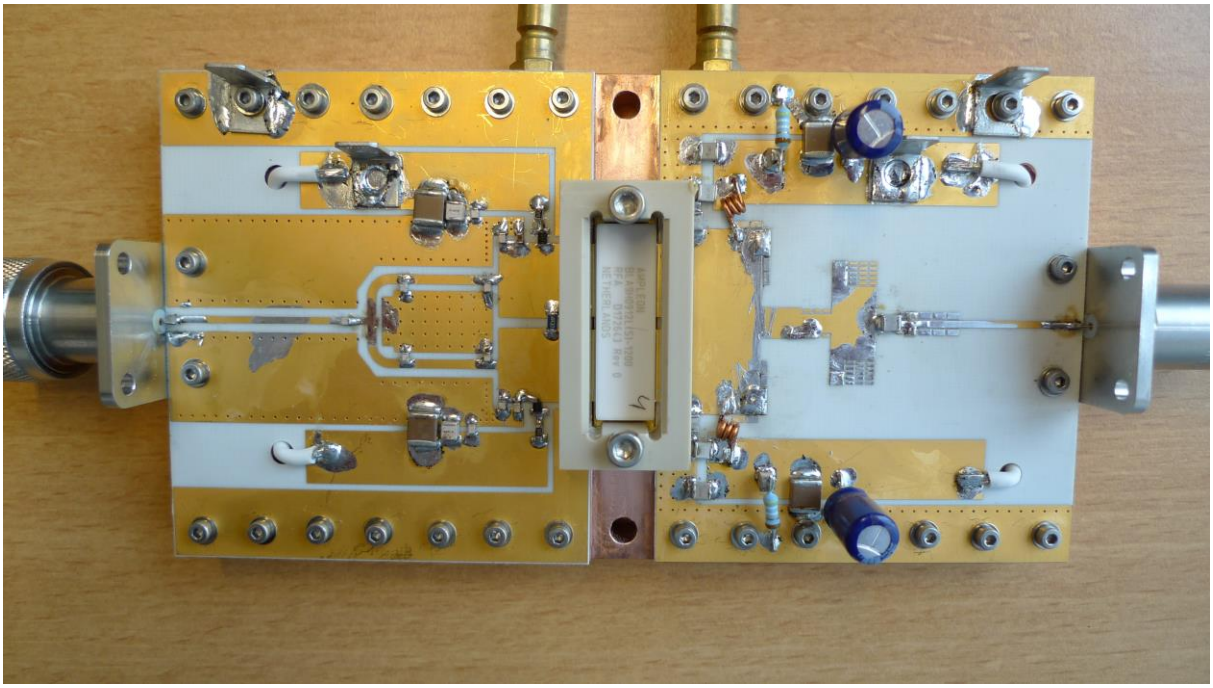
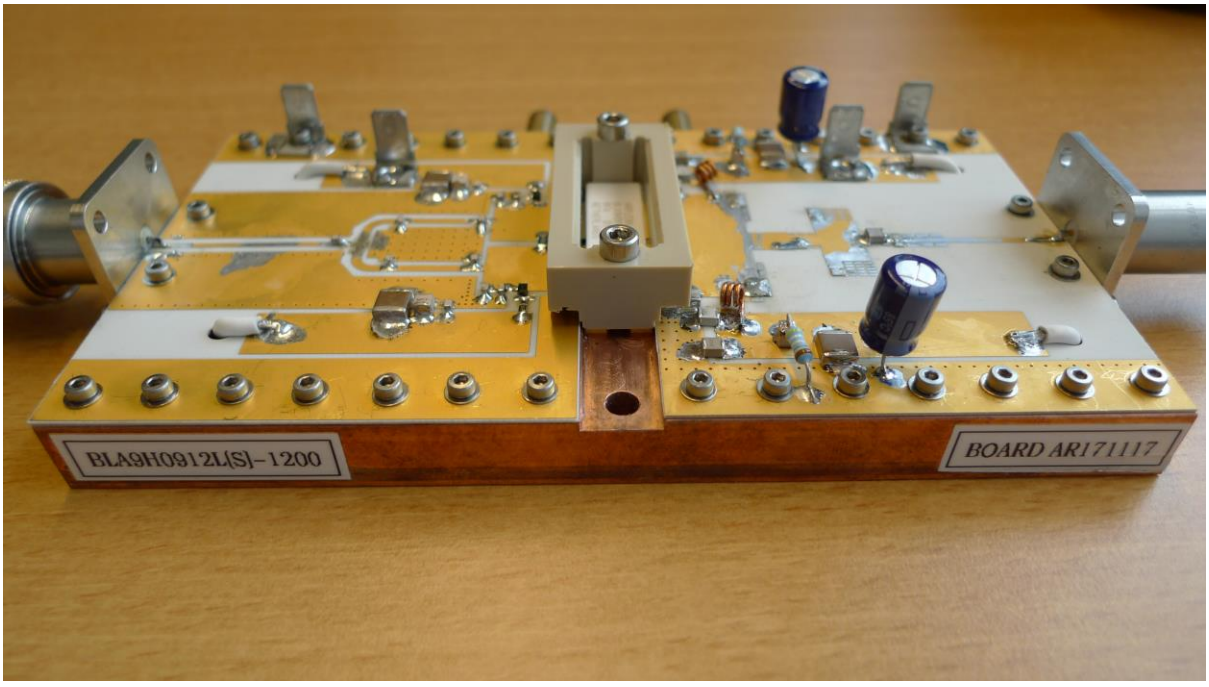
5. General description

This report presents the measurement results of the Class-AB demo AR171117. The device used is a BLA9H0912L(S)-1200P, 9th generation LDMOS in a push-pull package, the BLA9H0912L(S)-1200P. The presented demo is designed for the frequency band 960 to 1215MHz





The PCB has been designed on Rodgers RO4003, h=0.508mm, ε_R=3.55, 35um double sided copper. Supply voltage (drain-source) is 50V. Gate bias voltage is connected to the Vg terminals on the input board. To set the drain quiescent current, slowly increase V_{GS} until the I_{DQ} will be 75 mA, starting at about 2V.

When switching of the RF-pulse a spike may appear on the drain supply due to the inductance and the fall time of the pulse. When using signal with a rapid fall time this spike may become (too) large.

By placing two 10µF SMD capacitors (C8 and C12) on the drain supply. These spikes will be reduced to virtually zero.

Performance Details

The pulse format used is a 50 µs pulse with a duty cycle of 5%. The power sweep was performed up to 2 dB gain compression. The device used is from the first batch made and needs further optimization.

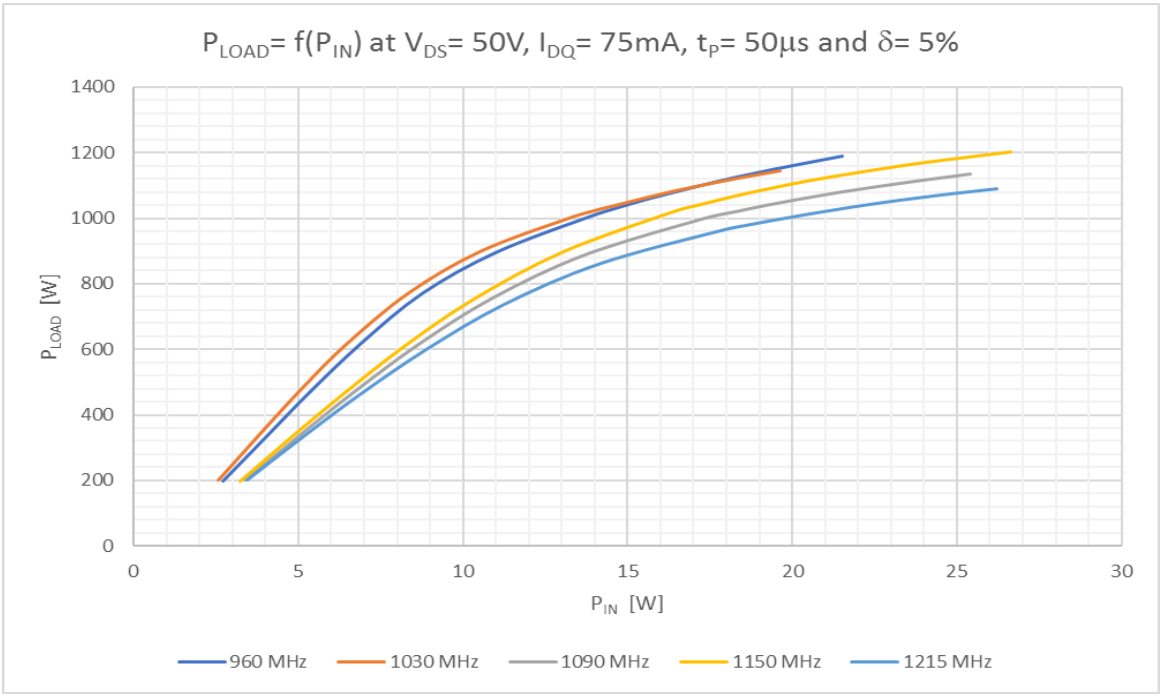


Figure 1 P_{LOAD} vs P_{IN}

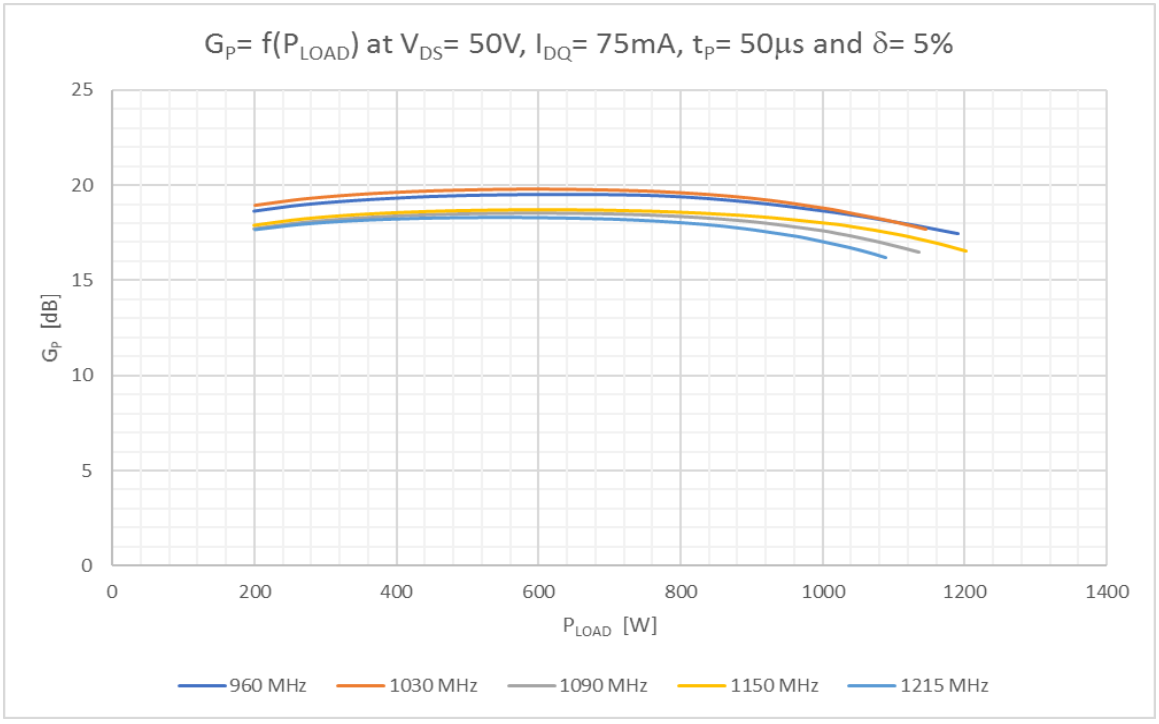


Figure 2 Gain vs P_{LOAD}

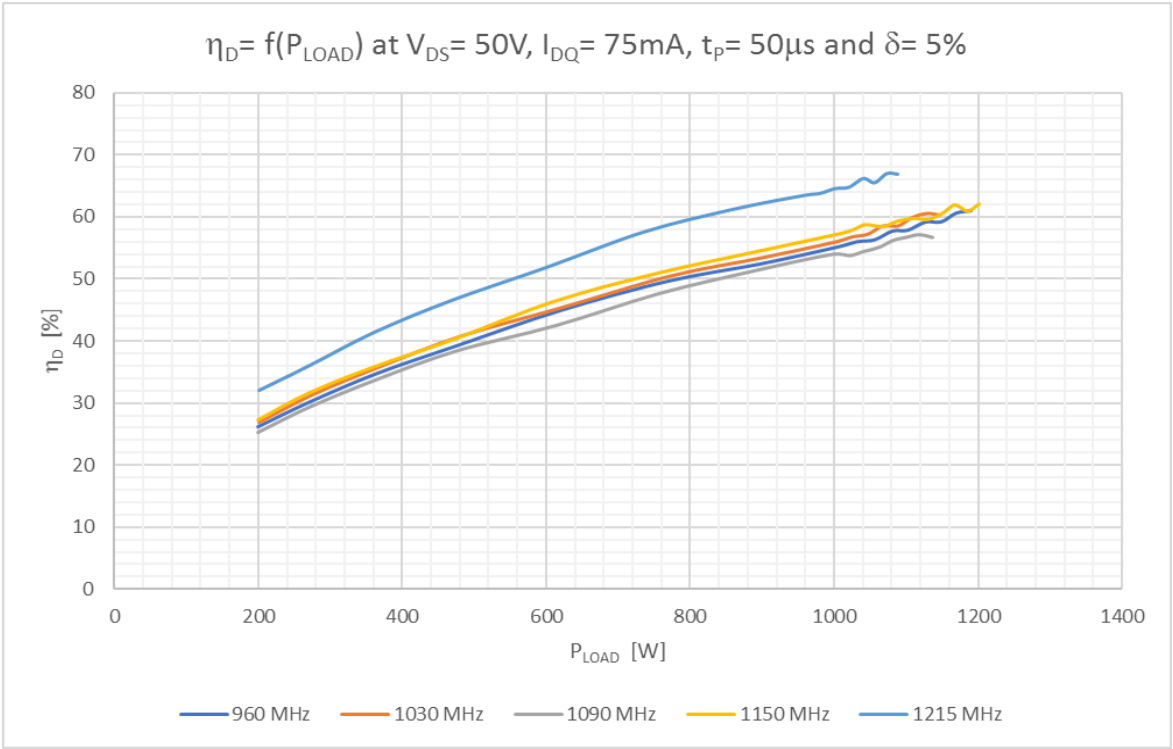


Figure 3 Drain efficiency vs P_{LOAD}

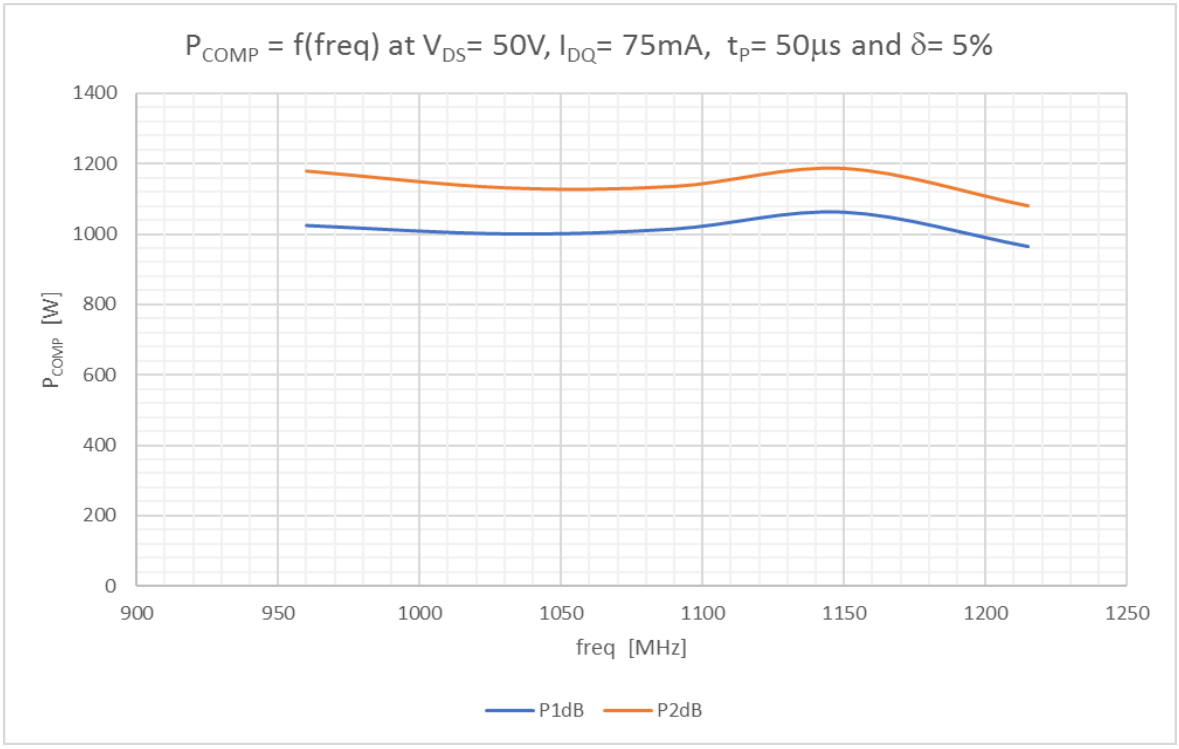


Figure 4 Compressed Power

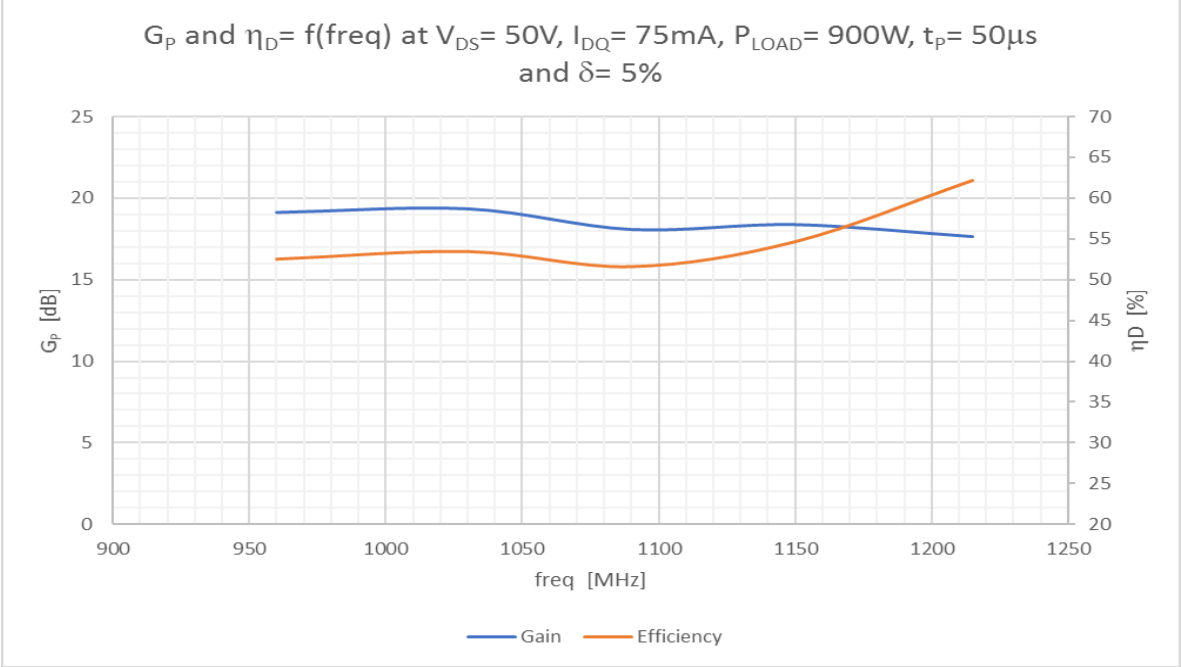


Figure 5 Gain and efficiency performance at 900 W

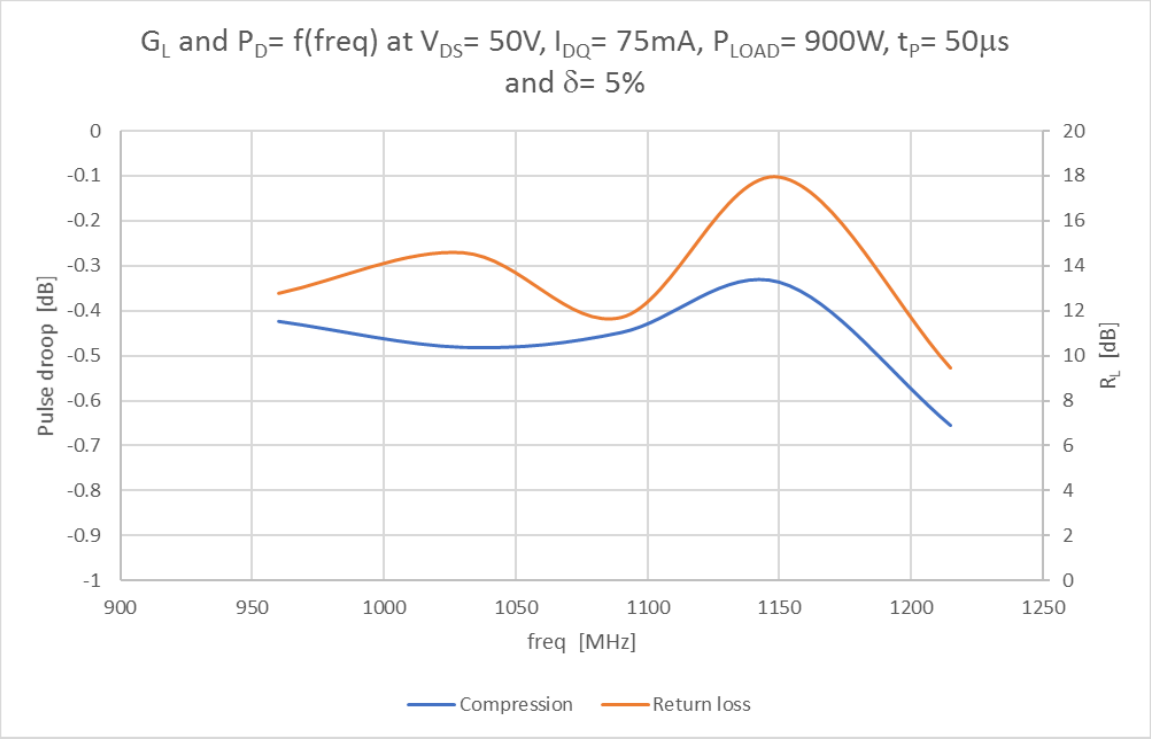


Figure 6 Pulse droop and return loss at 900 W

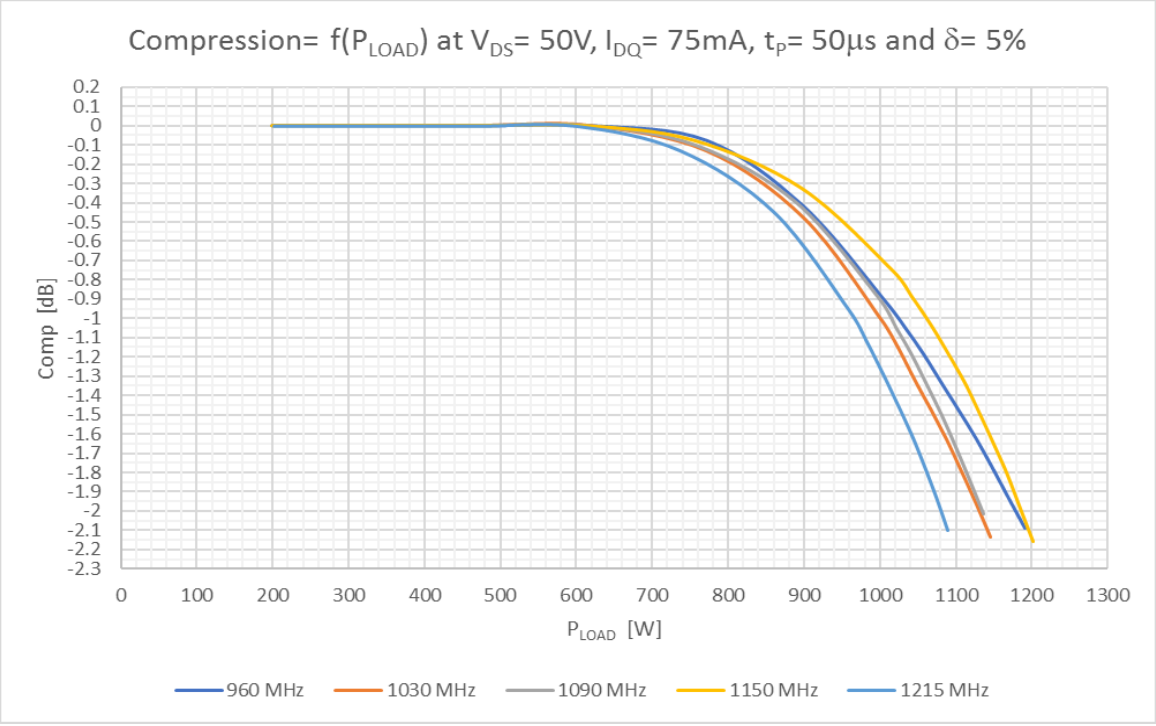
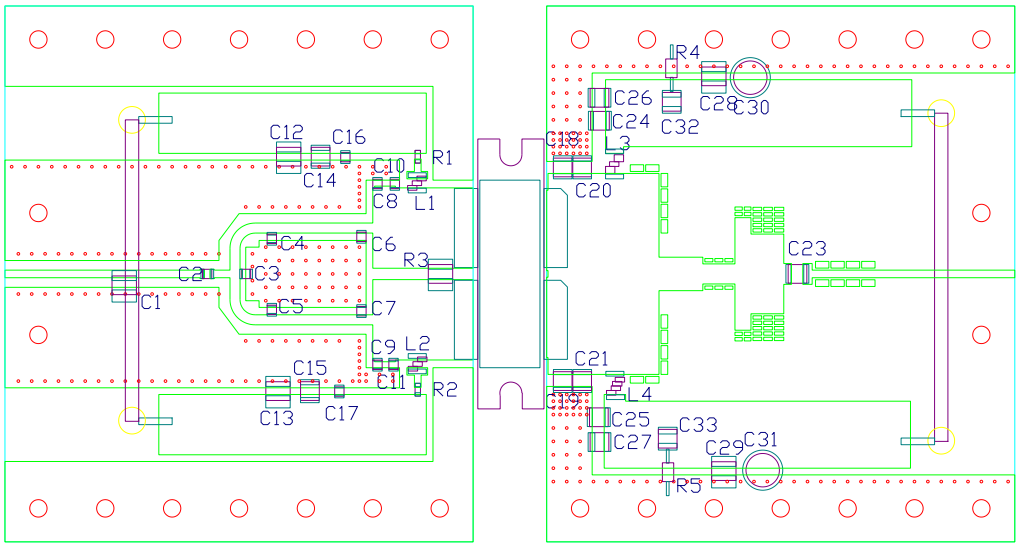


Figure 7 Compression level

5.1 Hardware



Components list application circuit.		
C1	-	ATC100B
C16, C17	100 pF	ATC100A
C3	1.3 pF	ATC100A
C4, C5, C6, C7	1.2 pF	ATC100A
C8, C9	7.5 pF	ATC100A
C10, C11	2.0 pF	ATC100A
C18, C19	5.6 pF	ATC800B
C20, C21	6.2 pF	ATC800B
C23	16 pF	ATC800B
C24, C25	62 pF	ATC800B
C26, C27	1 nF	ATC800B
C14, C15, C32, C33	1 nF	ATC100B
C12, C13, C28, C29	10 μF	Murata GRM55DR61H106KA88L
C30, C31	100 μF	63 V, Electrolytic capacitor
R1, R2	5.1 Ω	0603 SMD Resistor
R3	4.3 Ω	0805 SMD Resistor
R4, R5	3.01 Ω	0.6 W – Philips: 2322-156-13018
L1, L2	5.4 nH	Coilcraft 0906-5GLB
L3, L4	11.3 nH	0.8 mm Cu-wire, 3 turns – 2mm diameter

PCB Material: Rogers 4003, thickness 0.508 mm (20 mil) or equivalent, ε_R = 3.55, Cu = 35 micron

5.2 Board material

Table 2: Board specifications

Parameter	Value
Manufacturer	Rogers
Type	RO4003
Thickness	20 mil, 0.508 mm
Layers	2, top/bottom. Bottom all copper

5.3 Device markings

Table 3: Device specifics

Parameter	Value
Manufacturer	Ampleon
Device	BLA9H0912L(S)-1200
Marking	BLA9H0912L(S)-1200, RFA D173643 Rev 0
Comments	Engineering sample

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