

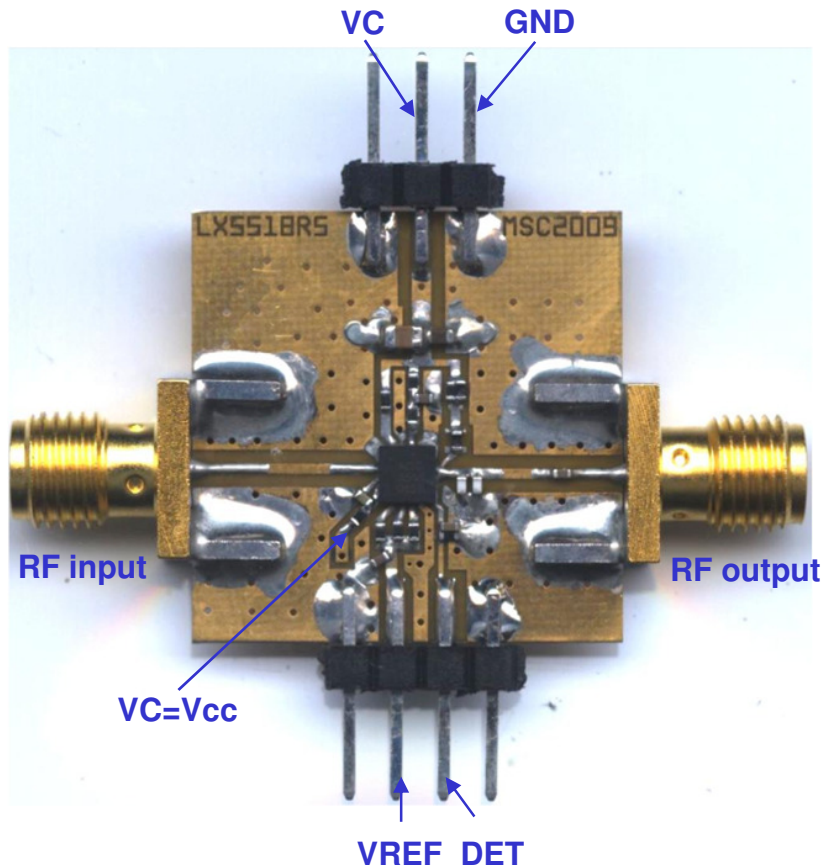


# 2.4-2.5 GHz InGaP HBT Power Amplifier: LX5518 3-stage High Power and Gain PA for 802.11b/g/n Applications

12/18/2012

Fixture#  
18086

## Preliminary Evaluation Board (See BOM details on later pages)



### Key Features

- 2.4 –2.5 GHz Operation
- Single Positive Supply Voltage  $V_c = 5V$ 
  - Quiescent Current  $I_{cq} \sim 224mA$
  - OFDM Power Gain  $\sim 32 dB$
  - EVM  $\sim 1.8 \%$  for  $P_{out} = +26dBm$
  - EVM  $\sim 3 \%$  for  $P_{out} = +27dBm$
  - 2<sup>nd</sup> side lobe  $\sim 50 dBc$  for  $+31 dBm$  1 Mbps DSSS
- Simple Output Matching

**Important Notice:** Performance data are subject to change due to further board-level tuning. Please contact Microsemi for improved performance for other operation conditions.

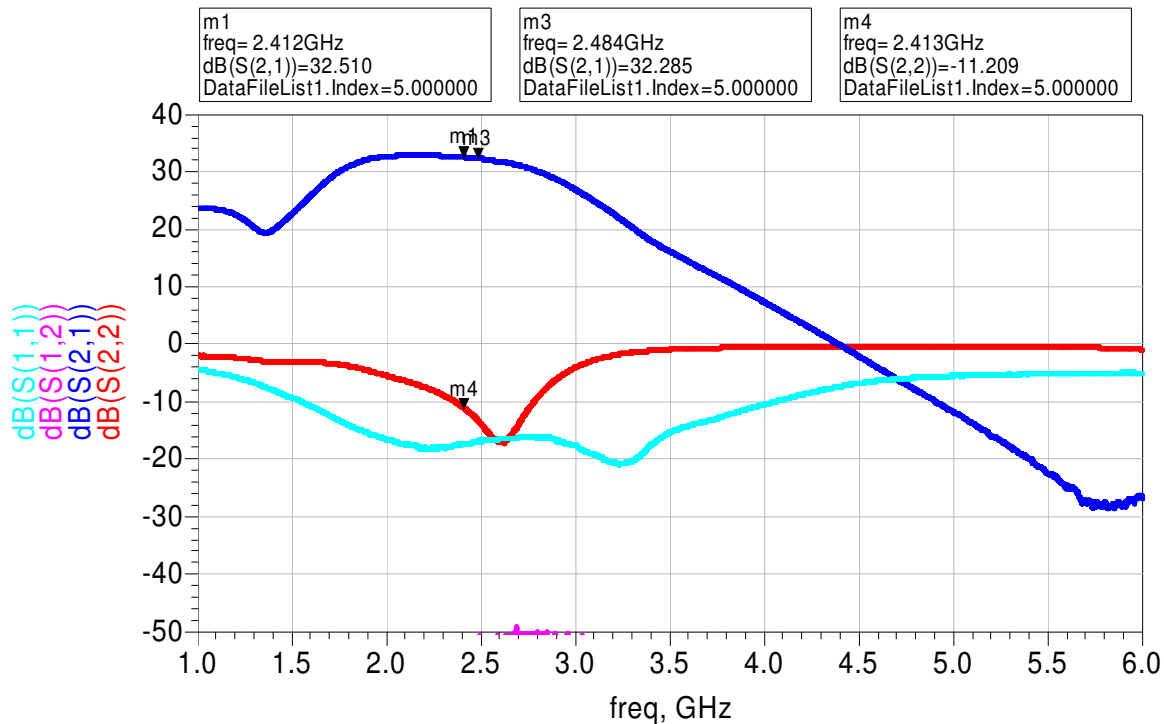


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## Measured S-Parameters ( $V_c=V_{cc}=5V$ , $V_{ref}=2.95V$ , and $I_{cq}=224mA$ )



Notes:

-S-parameters were measured using TRL calibration to remove connector and feeding microstrip line losses



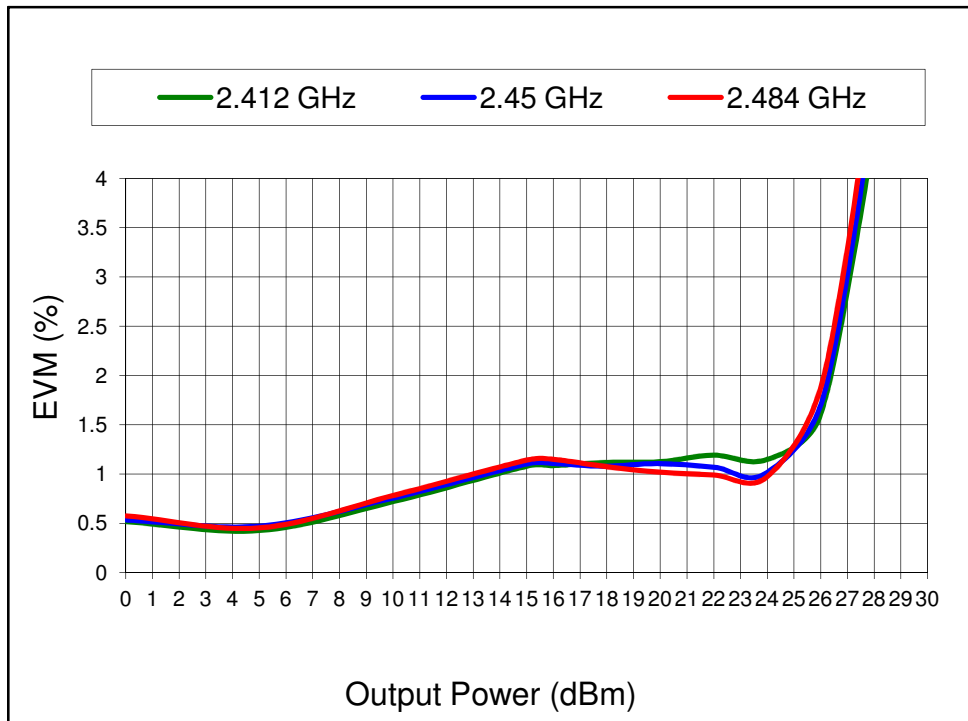
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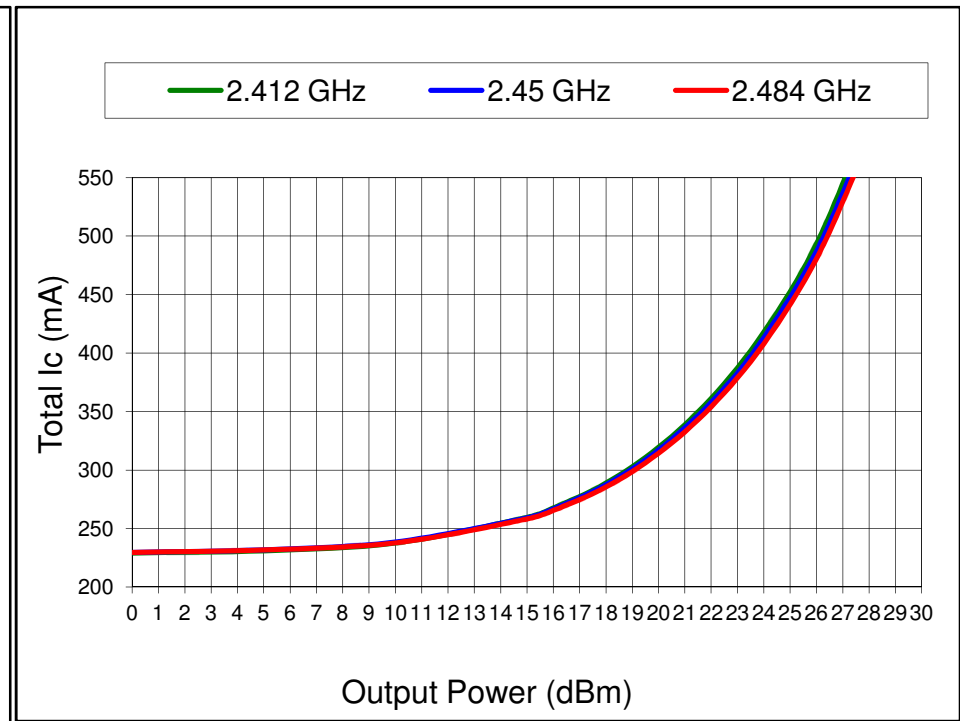
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## Measured EVM & Current vs. Pout (Vc=Vcc=5V, Vref=2.95V, and Icq=224mA)

EVM



Ic total



Notes:

- EVM for OFDM signal of 64QAM/54Mbps. See the end page for EVM test set details.
- EVM is actual measured data without de-embedding. Source EVM is ~0.5% from Agilent E4438C VSG.
- Ic is average total current with duty-cycle~99%. Ic is lower at reduced duty cycle.

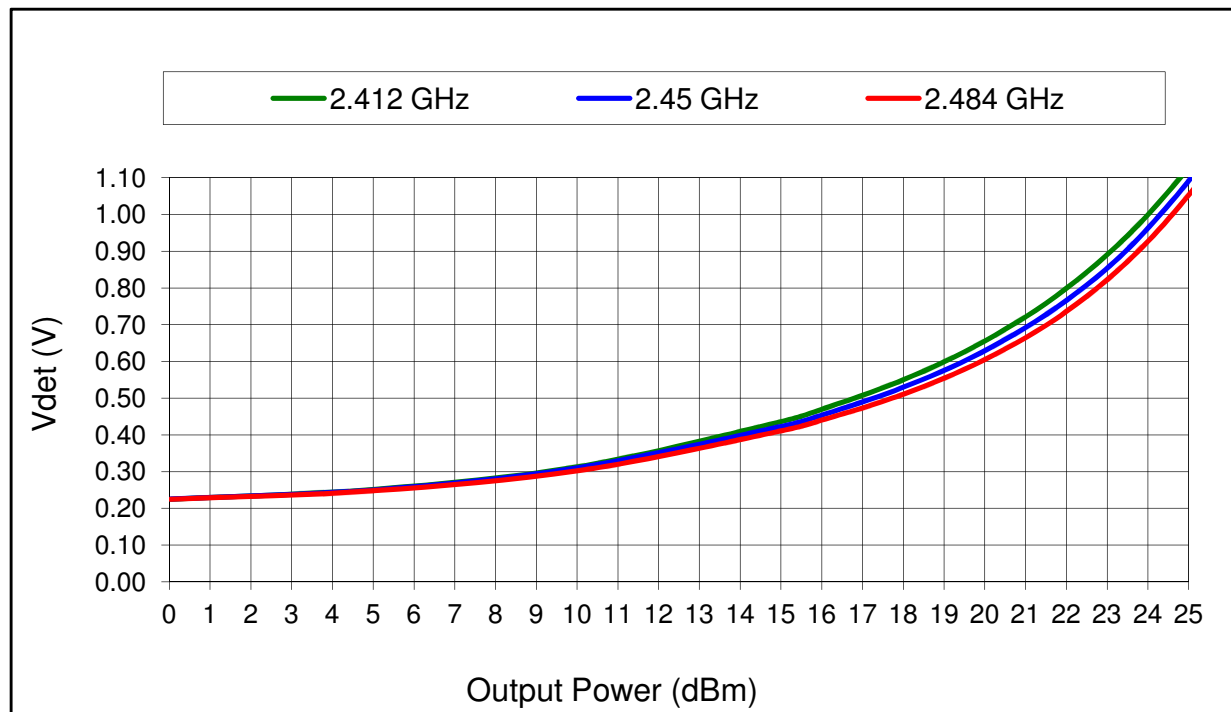


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**Measured Detector Output vs. Pout**  
( $V_c=V_{cc}=5V$ ,  $V_{ref}=2.95V$ , and  $I_{cq}=224mA$ )



Notes:

-OFDM signal of 64QAM/54Mbps and duty cycle~99%. Detector voltage level varies with duty cycle.



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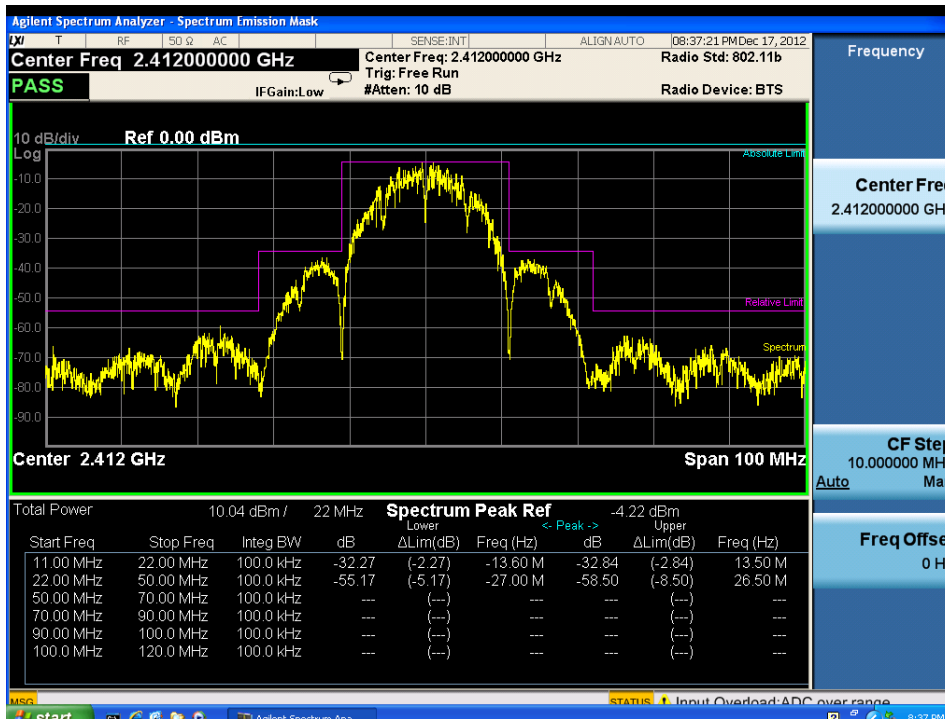
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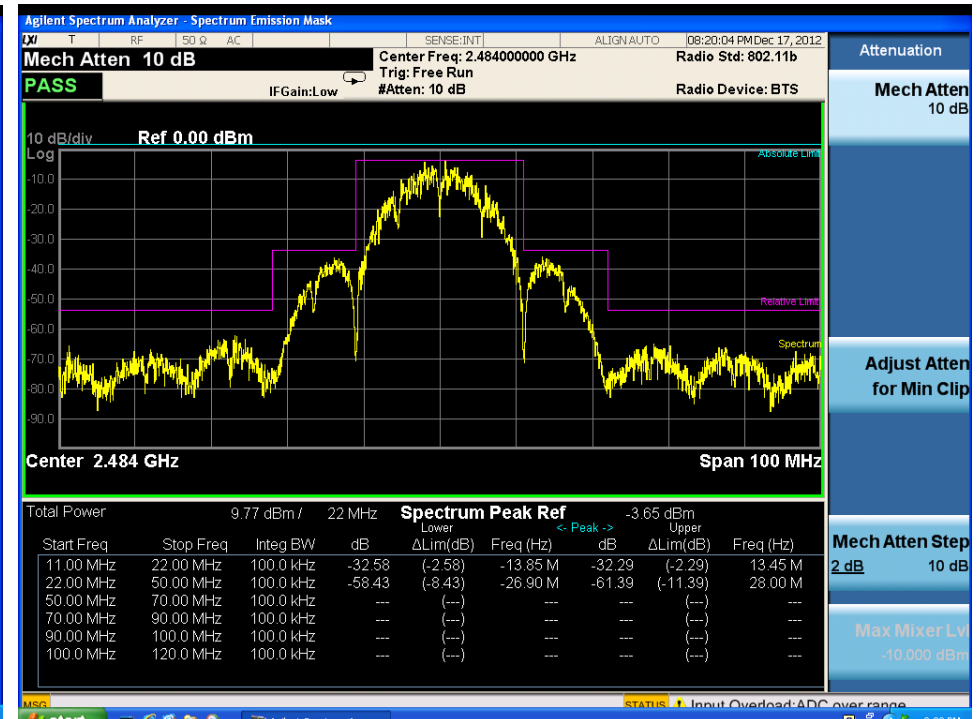
Measured 1 Mbps DSSS Data (**Pout=+31dBm**)  
(**Vc=Vcc=5V**, Vref=2.95V, and Icq=230mA)

2.412 GHz

2.484 GHz



Ic= 869mA



Ic= 821mA



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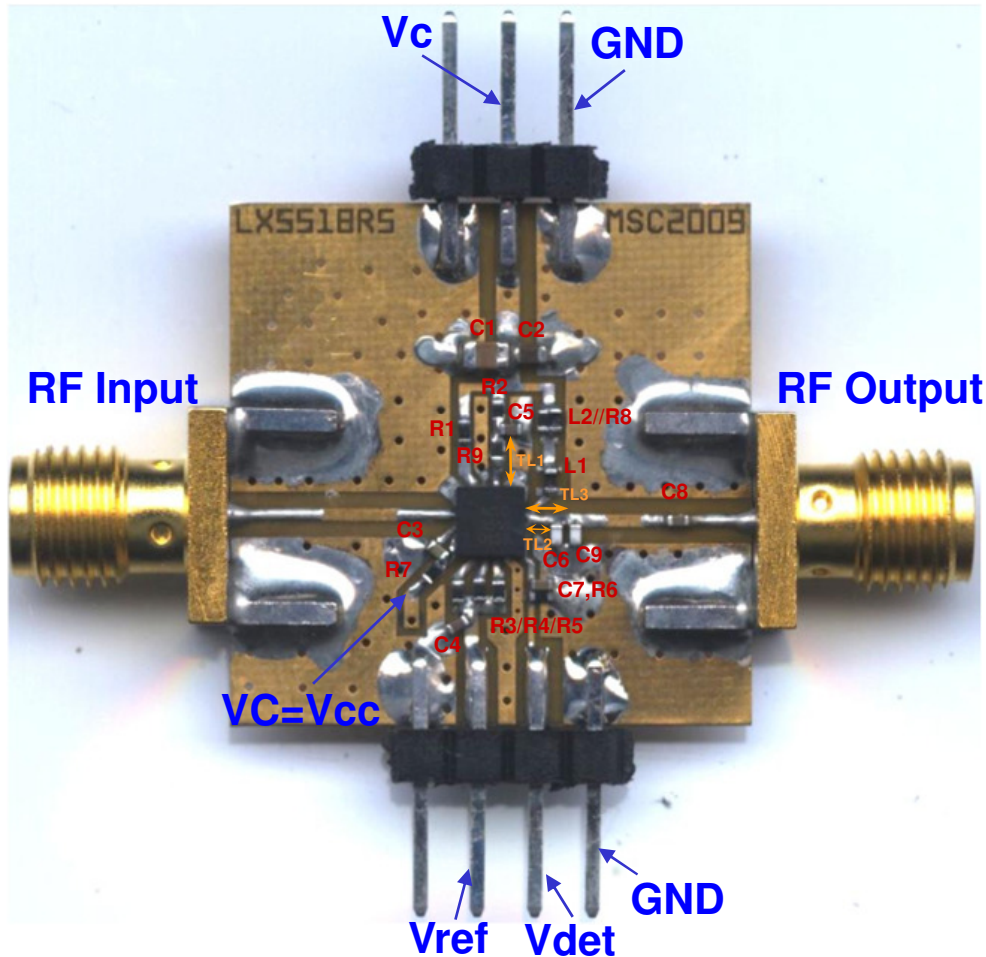
# 2.4-2.5 GHz InGaP HBT Power Amplifier:

LX5518 3-stage High Power and Gain PA for 802.11b/g/n Applications

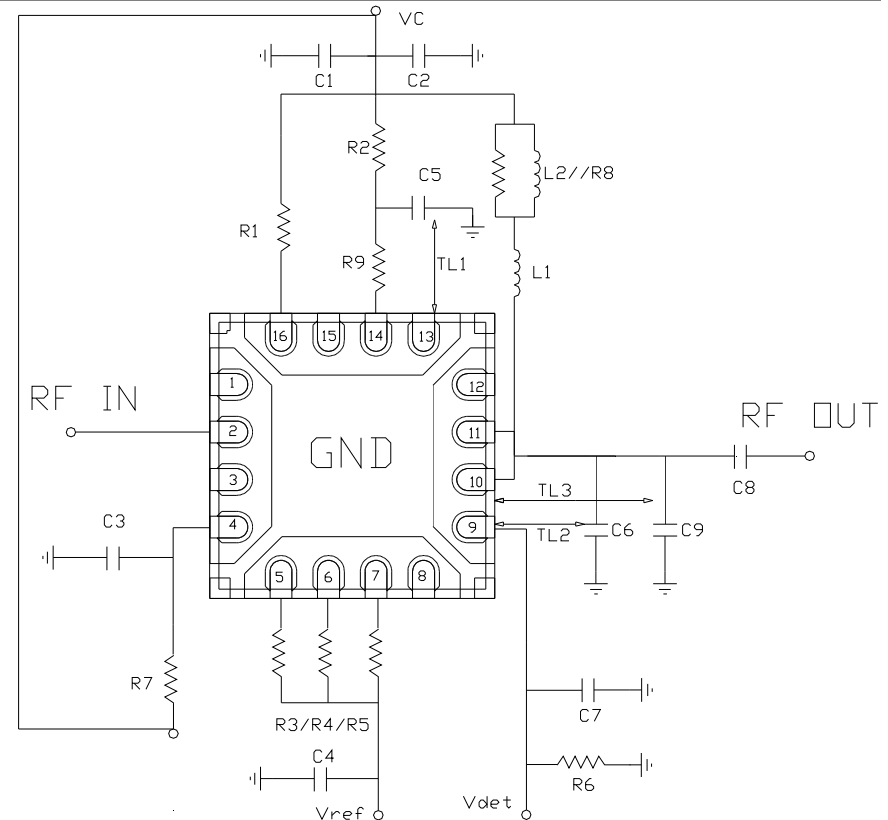
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Vc=Vcc=5V, Vref=2.95V Schematic and BOM

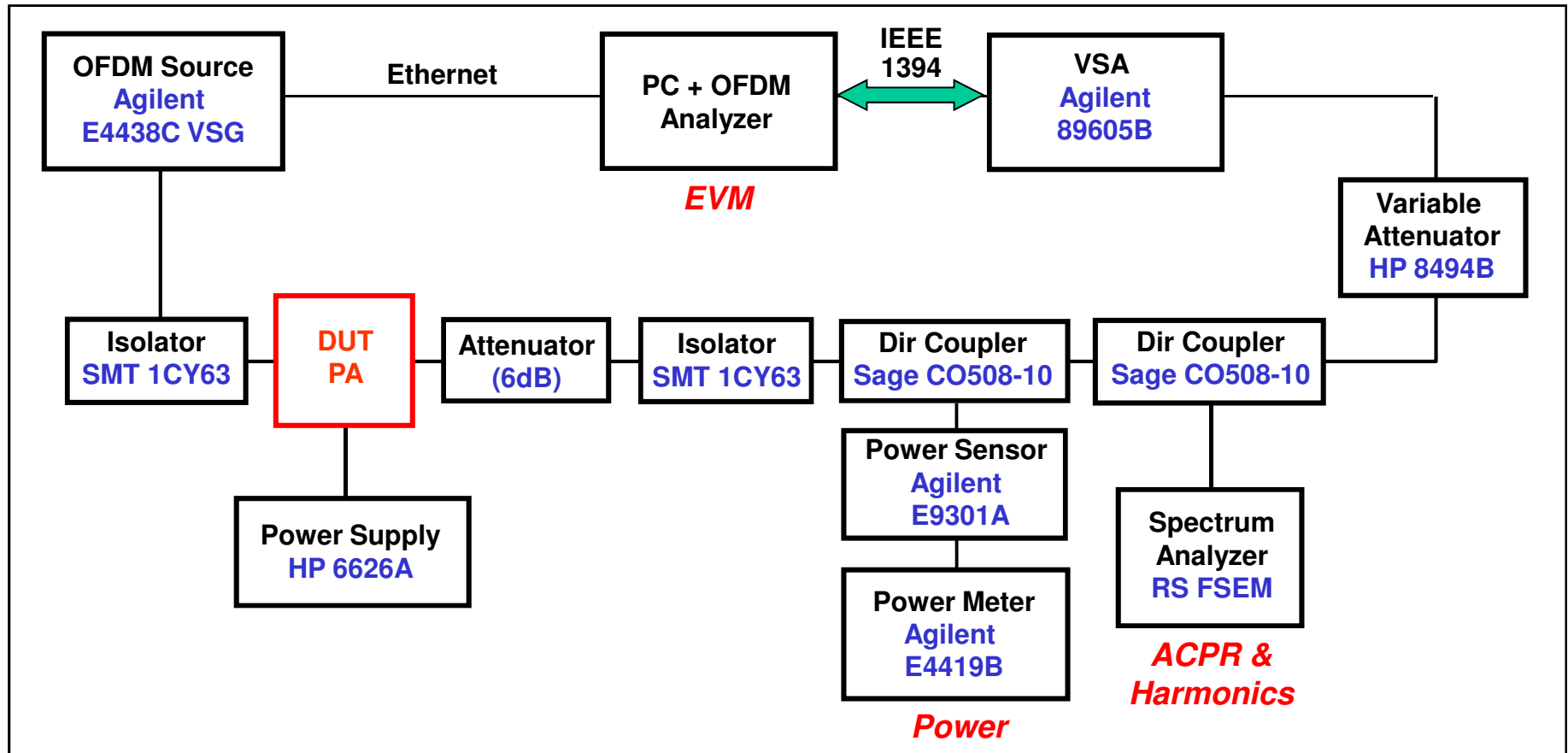


10mil GETEK Substrate ( $\epsilon_r=3.9$ ,  $\tan\delta=0.02$ )



- TL1= 82mil/20mil (L/W)
- TL2= 44 mil/20mil (L/W)
- TL3= 79 mil/20mil (L/W)
- L1= 8.2 nH (0402)
- L2= 8.2 nH (0402)
- R1= 20 Ohm (0402)
- R2=R9= 1 Ohm (0402)
- R3=R4=R5=162 Ohm (0402)
- R6= 50k Ohm (0402)
- R7= 100 Ohm (0402)
- R8= 1 Ohm (0402)
- C1= 10 uF (0805)
- C2= 1 uF (0603)
- C3= 1 uF (0402)
- C4= 100 pF (0402)
- C5= 13 pF (0402)
- C6= 2.2 pF (0402)
- C9= 1.5 pF (0402)
- C7,C8= 10 pF (0402)

# Microsemi 2 GHz HBT Power Amplifier OFDM Power/EVM/ACPR Test Set (Agilent System)



## Nominal Test Conditions:

- OFDM Signal: 64QAM/54Mbps, Packet Length=176 $\mu$ s, Burst Gap=20 $\mu$ s, Duty Cycle~99%
- EVM Test Setting: Short Training Seq for Sync; Phase & Timing (No Amplitude) for Pilot Tracking; Chan Estimation Seq Only
- Power: PAP (Pulse Average Power); ACPR: RBW=100 kHz, VBW=30 kHz, Sweep Time=2 s