MAT-TUNER®

RF Isolation Measurement for mAT-4117

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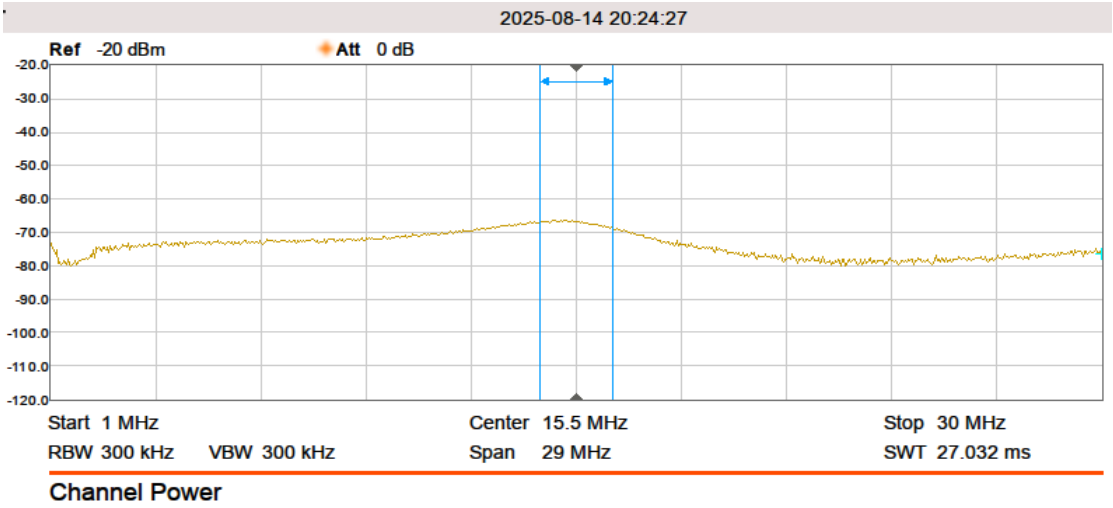
The mAT-4117 is a newly designed Bias-Tee. Its function is to inject a DC power supply into an RF channel or to separate a DC power supply from an RF channel. It employs a two-stage filter to achieve very high RF isolation. This document records the test results for RF signal isolation. The testing consists of two parts. The first part uses a Vector Network Analyzer (VNA) to measure the RF isolation curve between the RF channel and the DC channel. The second part involves injecting a high-power RF signal into the RF channel and then detecting the RF signal strength in the DC channel. Both methods were employed to measure the RF isolation of the mAT-4117.

Part 1: Measurement of RF Isolation Curve

Inject a 0 dBm RF carrier signal (frequency range: 1–30 MHz) into the RF channel, then measure the RF carrier signal strength at the DC power port.



The figure above displays the measured RF signal strength at the DC power port across the 1 to 30 MHz frequency range. As shown in the curve, the peak signal level reaches -67 dBm at approximately 15 MHz, while the minimum level is -80 dBm. This demonstrates highly favorable performance.

Part 2: RF Isolation Measurement Under High-Power Excitation

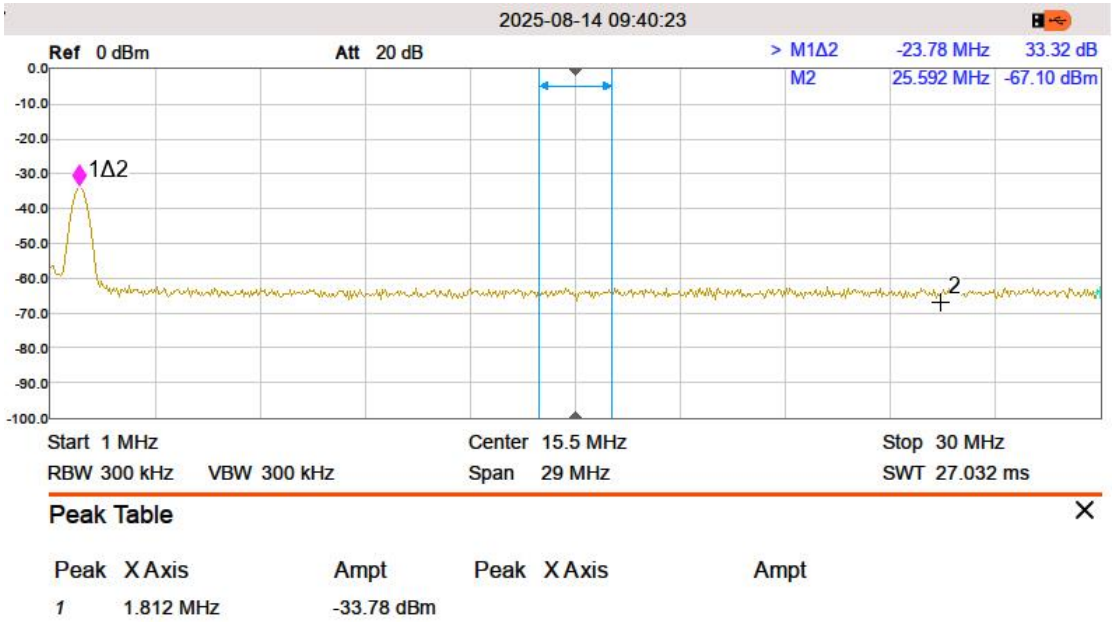
Test Method

RF signal path: High-power RF output from the linear amplifier → Bird power meter → RF channel of mAT-4117 → dummy load.

Measurement path: Low-power RF signal leakage at the DC power channel output of mAT-4117 → 10 dB attenuator → Siglent vector network analyzer (VNA).

The measurement results are as follows:

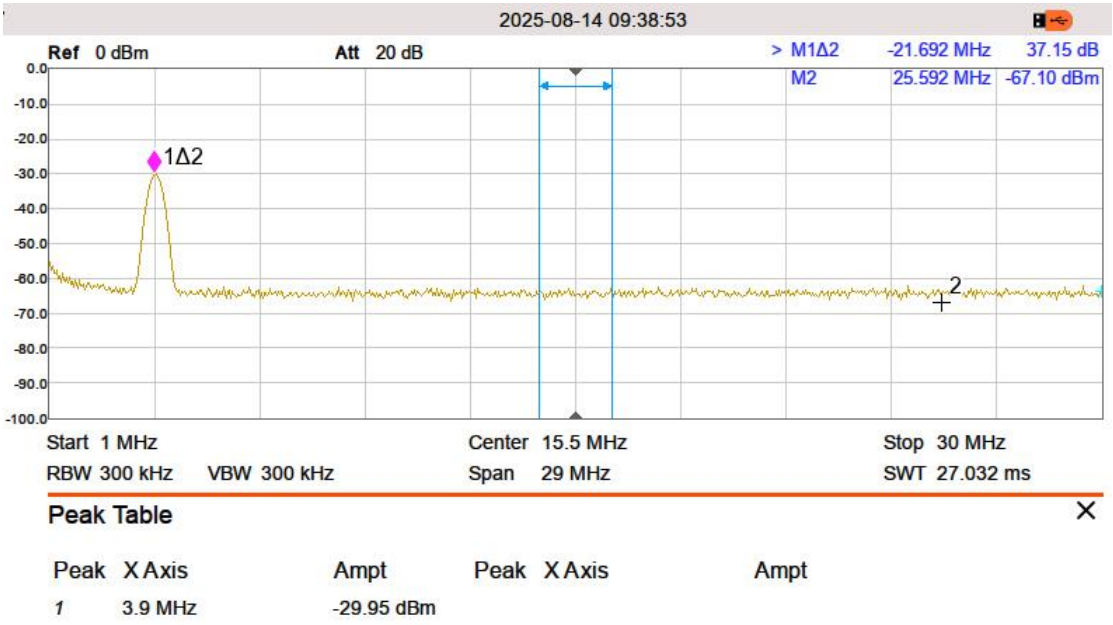
1. Frequency: 1800 KHz, Power: 400 W (57dBm)



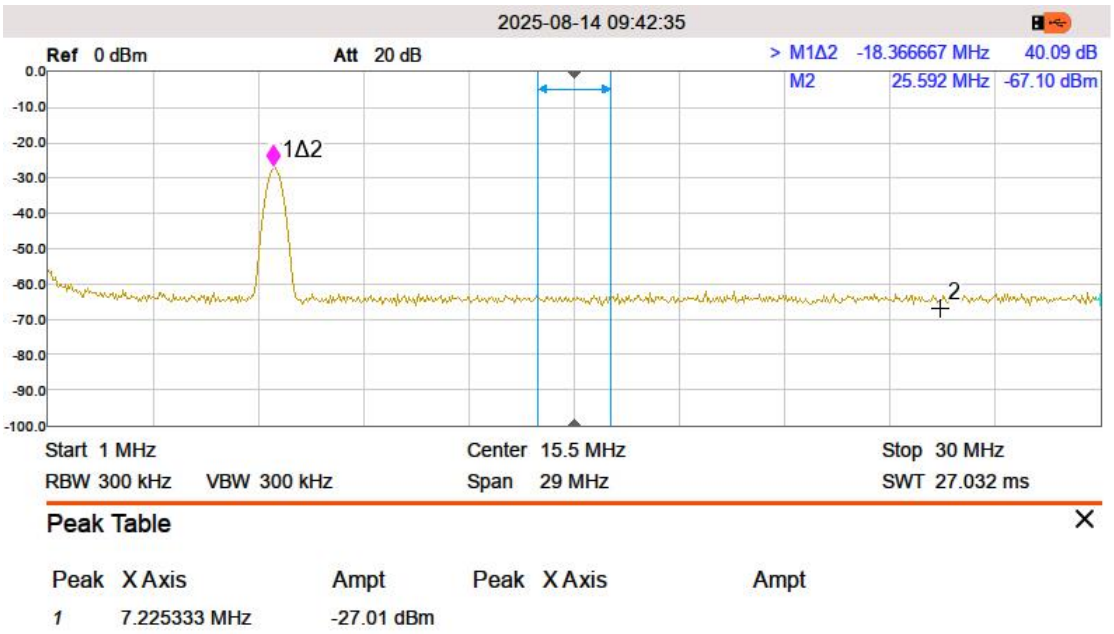
The RF channel input of the mAT-4117 was driven at 57 dBm (400 W), while the measured power at the vector network analyzer (VNA) input registered -33.78 dBm; after compensating for the 10 dB attenuator, the actual leakage power was determined to be -23.78 dBm, resulting in an RF isolation of 80.78 dB for the mAT-4117.

2. Frequency: 3900 KHz, Power: 700 W (58.5 dBm)

At 3900 KHz, the amplifier's RF output was 700 W (approximately 58.5 dBm); the RF signal measured by the vector network analyzer (VNA) registered -29.95 dBm, and after compensating for the 10 dB attenuator, the actual leakage power was -19.95 dBm, yielding an isolation of 78.45 dB for the mAT-4117.



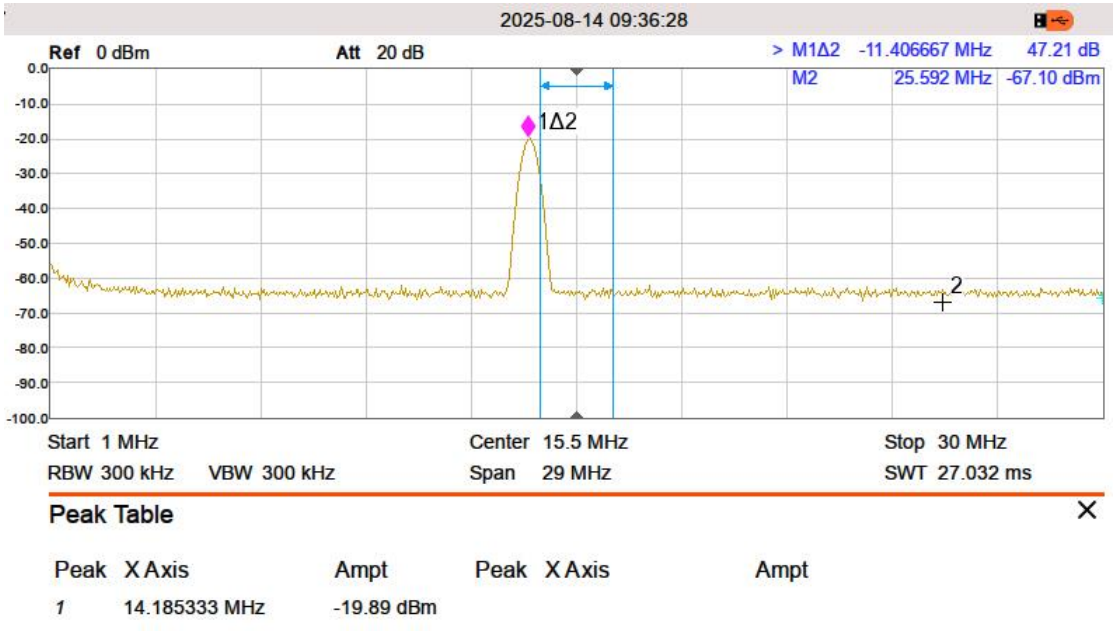
3. Frequency: 7230 KHz, Power: 1000 W (60dBm)



At 7230 kHz, the amplifier's RF output was 1000 W (60 dBm); the RF signal measured by the vector network analyzer registered -27.01 dBm. After compensating for the 10 dB attenuator, the actual leakage power was -17.01 dBm, yielding an isolation of 77.01 dB for the mAT-4117.

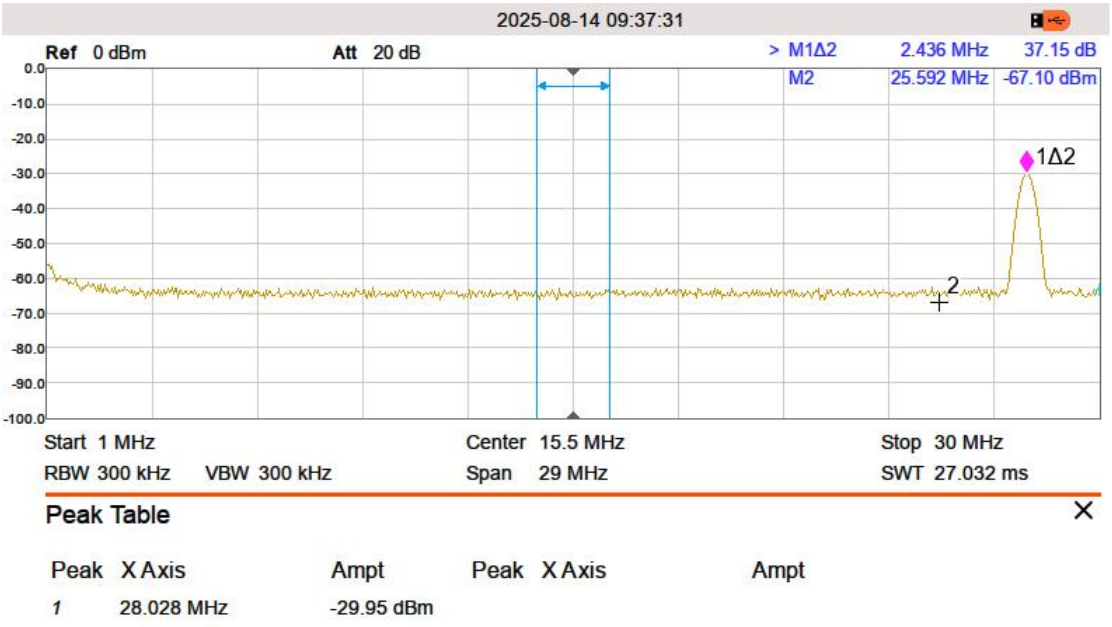
4. Frequency: 14185 KHz, Power: 900 W (59.5dBm)

At 14185 kHz, the amplifier's RF output was 900 W (59.5 dBm); the RF signal measured by the vector network analyzer registered -19.89 dBm. After compensating for the 10 dB attenuator, the actual leakage power was -9.89 dBm, yielding an isolation of 69.4 dB for the mAT-4117.



5. Frequency: 28000 KHz, Power: 650 W (58.1 dBm)

At 28000 kHz, the amplifier's RF output was 650 W (58.1 dBm); the RF signal measured by the vector network analyzer registered -29.95 dBm. After compensating for the 10 dB attenuator, the actual leakage power was -19.95 dBm, yielding an isolation of 78.1 dB for the mAT-4117.



Both measurement methods confirm that the RF isolation of the mAT-4117 exceeds -65 dB, demonstrating highly competitive performance.