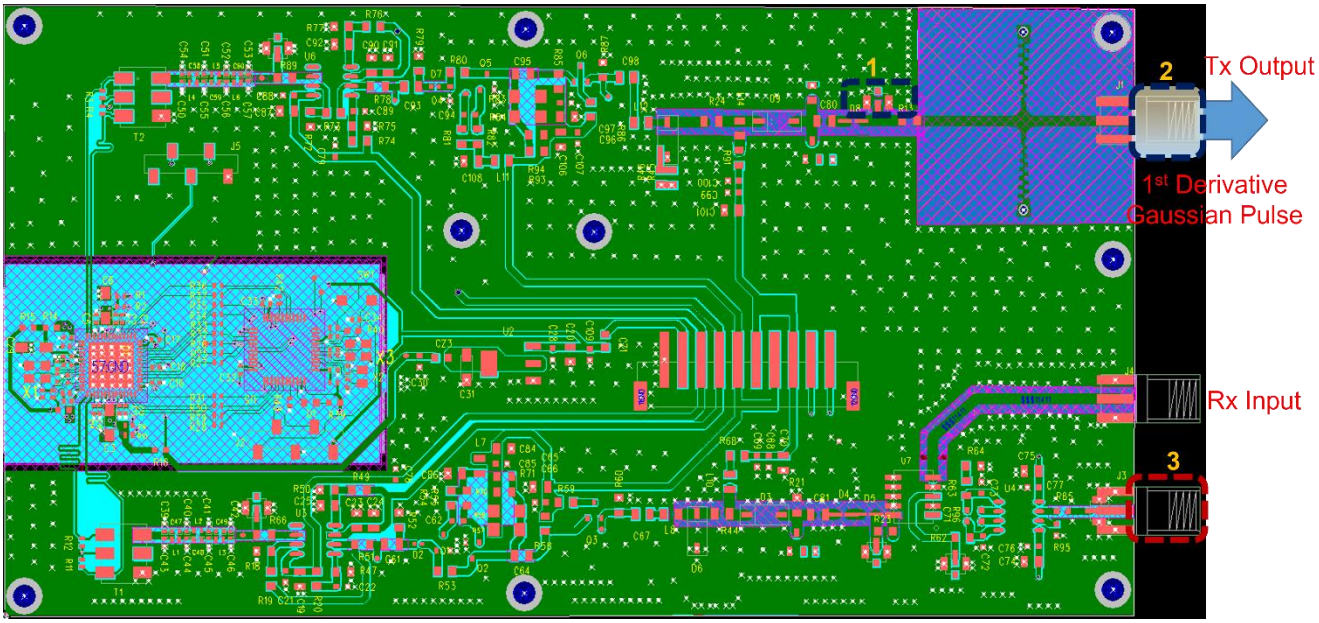
Testing Procedure for Transceiver PCB Boards

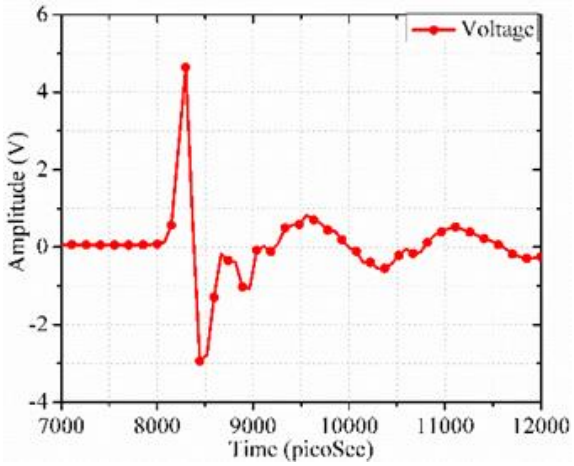
Transmitter Board Testing:

The transmitting board is expected to generate 1st Derivative Gaussian Pulse of the following specifications.

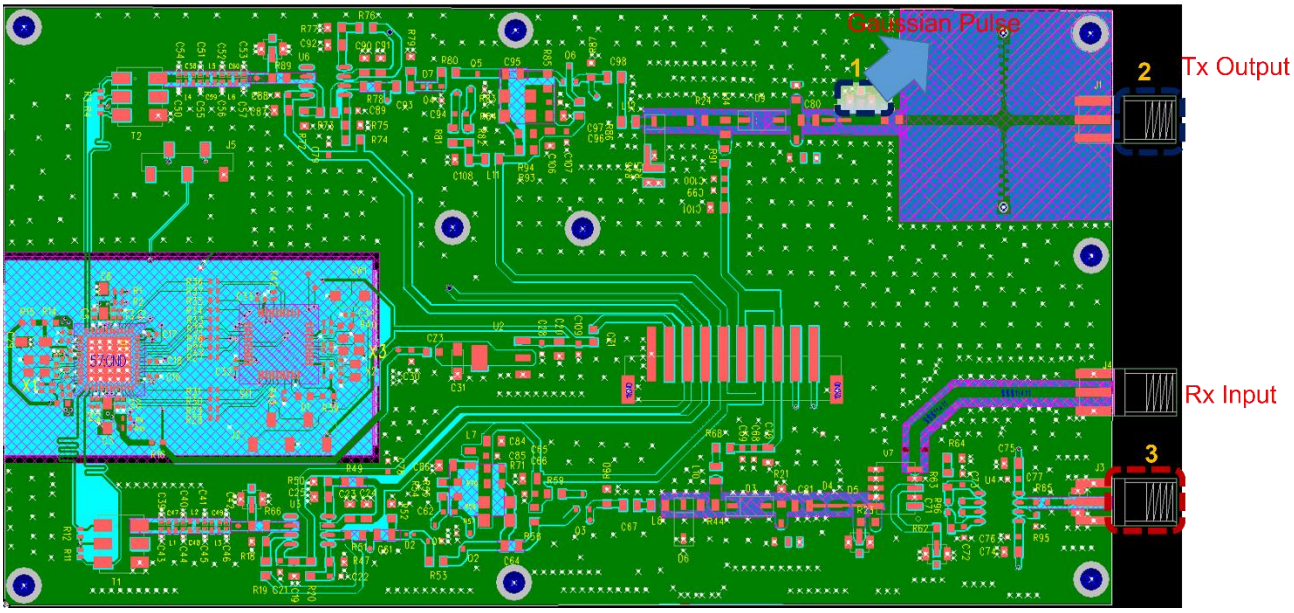


- (Point Number: 2, This point will provide the 1st Derivative Gaussian Pulse)
- (It should be measured with the help of a high frequency sampling oscilloscope)

1. Pulse shape: 1st Derivative Gaussian pulse with an inevitable distortion and ringing. However, ringing should be less than 20%. The following figure shows a typical pulse shape.
2. Pulse amplitude
   Positive Peak: +4.8 V
   Negative Peak: -3.4 V
   However, a deviation of 10% in amplitude is accepted.
3. Pulse width (Full width at half maximum): Identify the voltages at half of the peak values on the pulse and find the time difference between them. The expected pulse width is around 157 ps; however, a 5% deviation is anticipated due to the circuit tolerances.

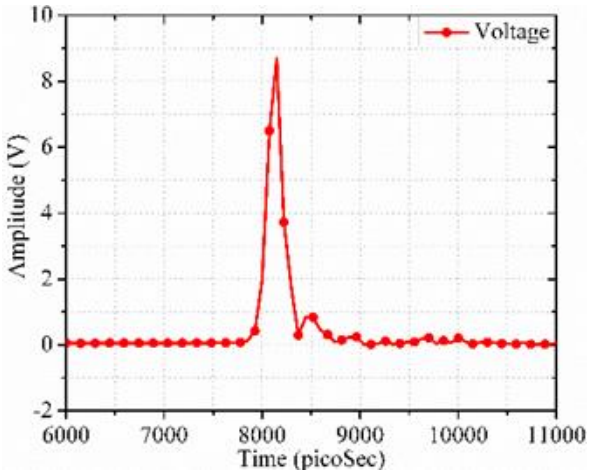


If the above specifications are unsatisfactory, the Gaussian pulse generation should be tested for the following specifications.



- (Point Number: 1, This point will provide the Gaussian Pulse)
- (It should be measured with the help of a high frequency sampling oscilloscope after removing R13)

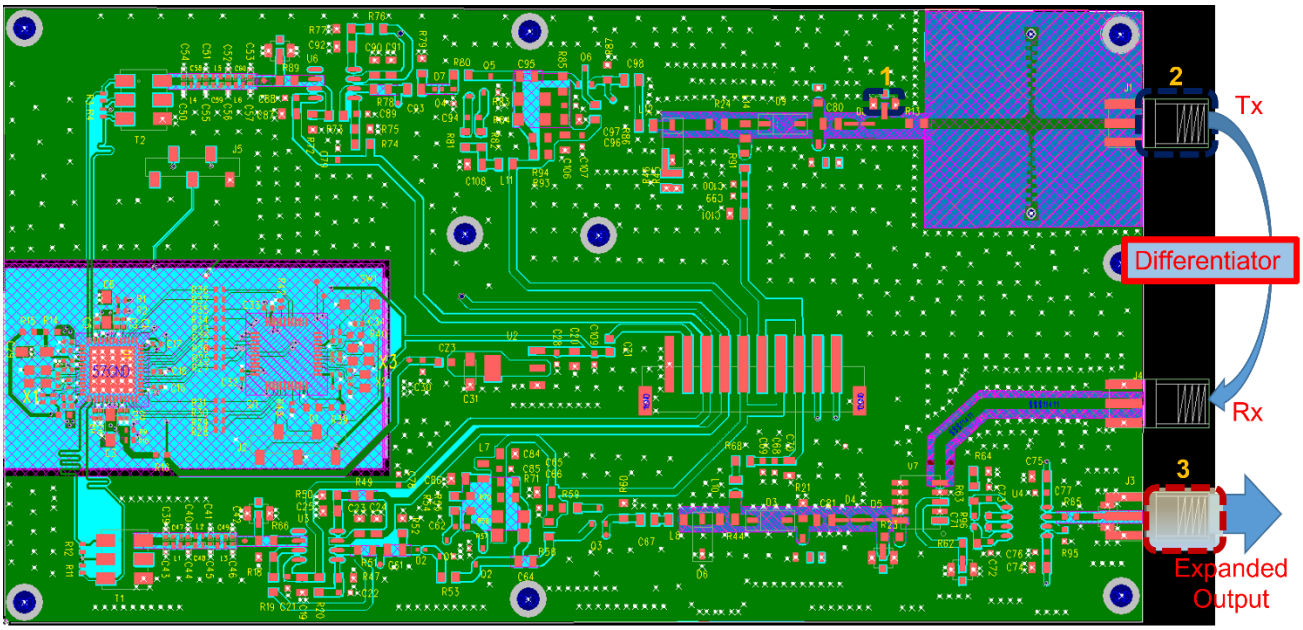
- Pulse shape: Gaussian Pulse
- Peak amplitude: 8.9 V ± 10%
- Pulse width: 160 ps ± 5%
- Ringing: < 10%



Receiver Board Testing:

To test the receiver board without antennas, it is advised that a differentiator is connected to emulate the antenna effect between the output of the transmitter and the receiver's input with an attenuator of -30 dB attenuation. The attenuator is required to protect the Sampling Oscilloscope. The receiver's functionality can be tested at the output stage of the receiver. It can be tested for both cases.

(a) If a differentiator is added, the expected pulse shape is a 2nd derivative Gaussian pulse.
(b) Otherwise, the expected pulse is a 1st derivative Gaussian pulse.



- (Point Number: 3, This point will provide the Expanded Pulse)
- (It should be measured with the help of a low frequency digital oscilloscope after adding R13)

The test performance should satisfy the following specifications.

Expanded pulse shape: 2nd derivative Gaussian pulse for case (a)

1st derivative Gaussian pulse for case (b)

Pulse width: 3 milliseconds