# Task 1

## Stripline

* To achieve low impedance, I’ve chosen the high-permittivity substrate TMM 10 of low thickness:  
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  .  
  Using TXLine, I’ve obtained the width . Such a line should be well adjusted to the SMA connector 32K145-400L5 of pin diameter .  
  To check with the demand on single-mode propagation, the conditions hold.
* Chosen substrate: TMM 10  
  ,  
  .  
  In TXLine, I’ve obtained which complies with the SMA connector 32K243-40ML5 of pin diameter   
  To check with the demand on single-mode propagation, the conditions hold.
* Chosen substrate: RO4350  
  ,,  
  .  
  In TXLine, I’ve obtained which complies with the SMA connector 32K243-40ML5 of pin diameter   
  To check with the demand on single-mode propagation, the conditions hold.
* Chosen substrate: RT/duroid 5880  
  ,,  
  .  
  In TXLine, I’ve obtained which hopefully complies with the SMA connector 32K243-40ML5 of pin diameter   
  To check with the demand on single-mode propagation, the conditions hold.
* For such a high impedance, I haven’t found a solution which would be close to the proposed design consideration. The characteristic impedance of the transmission line is proportional to the substrate thickness and disproportional to the relative permittivity of the substrate and the width of the strip. Even when I’d chosen the boundary values (), the characteristic impedance got up to around which is barely over a half of the desired value. It is worth noting that already these insufficient boundary values were unsatisfactory because of high-mode propagation warnings in TXLine.

## CPW

* Chosen substrate: TMM 10  
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  .  
  Using TXLine, I’ve obtained the width of the strip and the gap . Such a line should be well adjusted to the SMA connector 32K243- 40ML5 of pin diameter (tapered) since .  
  To check with the demand on single-mode propagation, the condition holds.
* Chosen substrate: TMM 10  
  ,  
  .  
  Using TXLine, I’ve obtained the width of the strip and the gap . Such a line should be well adjusted to the SMA connector 32K243- 40ML5 of pin diameter (tapered) since .  
  To check with the demand on single-mode propagation, the condition holds.
* Chosen substrate: TMM 10  
  ,  
  .  
  Using TXLine, I’ve obtained the width of the strip and the gap . Such a line should be well adjusted to the SMA connector 32K243- 40ML5 of pin diameter (tapered) since .  
  To check with the demand on single-mode propagation, the condition holds.
* Chosen substrate: TMM 6  
  ,  
  .  
  Using TXLine, I’ve obtained the width of the strip and the gap . Such a line should be well adjusted to the SMA connector 32K145-400L5 of pin diameter since .  
  To check with the demand on single-mode propagation, the condition holds.
* Chosen substrate: RT/duroid 5880  
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  .  
  Using TXLine, I’ve obtained the width of the strip and the gap . Such a line will be well adjusted to neither of the SMA connectors 32K145-400L5 nor 32K243- 40ML5 because . If we were to adjust the width of the strip to the connector’s pin, the matching condition would be even farther off.  
  Since we demand a substrate of very low permittivity, wavelength is large and thus doesn’t limit our consideration in terms of higher-mode propagation.

## CPWG

* Chosen substrate: TMM 10  
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  Using TXLine, I’ve obtained the width of the strip and the gap . Such a line should be well adjusted to the SMA connector 32K243- 40ML5 of pin diameter (tapered) since .  
  To check with the demand on single-mode propagation, the condition holds.
* Chosen substrate: TMM 10  
  ,  
  .  
  Using TXLine, I’ve obtained the width of the strip and the gap . Such a line should be well adjusted to the SMA connector 32K243- 40ML5 of pin diameter (tapered) since .  
  To check with the demand on single-mode propagation, the condition holds.
* Chosen substrate: TMM 6  
  ,  
  .  
  Using TXLine, I’ve obtained the width of the strip and the gap . Such a line is well adjusted to the SMA connector 32K145-400L5 of pin diameter since .  
  To check with the demand on single-mode propagation, the condition holds.
* Chosen substrate: RO4350  
  ,  
  .  
  Using TXLine, I’ve obtained the width of the strip and the gap . Such a line should be well adjusted to the SMA connector 32K145-400L5 of pin diameter (slightly tapered) since .  
  To check with the demand on single-mode propagation, the condition holds.
* Chosen substrate: RT/duroid 5880  
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  .  
  Again, for such high impedance, I couldn’t find a proper solution. I’ve found out that the width of the strip changes the impedance drastically in CPWG but to achieve , I had to surpass the manufacturing limits:

# Task 2

## Diagram Description automatically generated with low confidenceSchematic

Chart

Description automatically generated

## Graph