LimeSDR-XTRX_v1.0

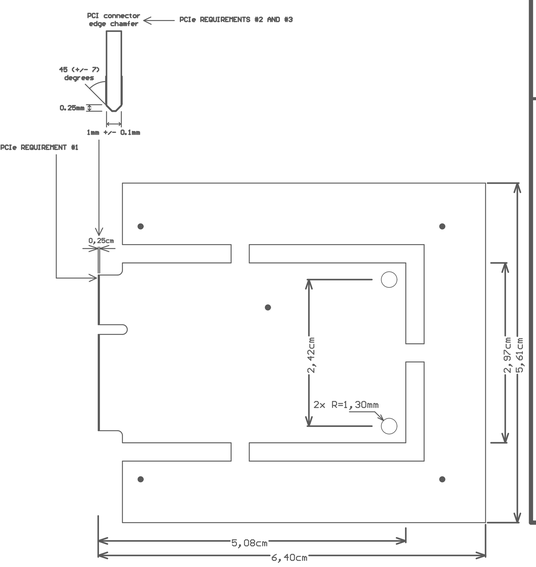
CONTROLLED IMPEDANCE

GENERAL PARAMETERS

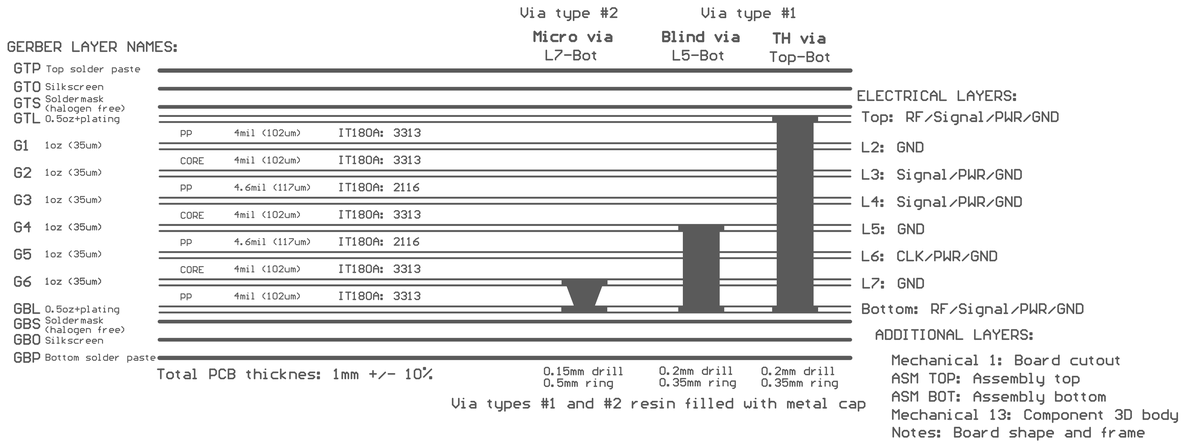
Parameter	Layer/Layers	Value
Copper foil thickness	Top	17.5um
Dielectric thickness between layers	Top-L2	102um (4 mils)
Dielectric permittivity between layers (Er)		4.2
Copper foil thickness	Bottom	17.5um
Dielectric thickness between layers	Bottom-L7	102um (4 mils)
Dielectric permittivity between layers (Er)		4.2

CALCULATIONS

RF (Top)	Target impedance	Single-ended	50R
	Additional comments	Top layer, no side GND plane	
	Top layer copper foil thickness	17.5um	
	Track width	0.18mm	
	Distance to reference plane	>3h	
	Dielectric thickness between layers	Top-L2	102um (4 mils)
	Dielectric permittivity between layers (Er)		4.2
	Approximate microstrip line impedance	50 Ohms (+/- 10% tolerance)	
RF (Top)	Target impedance	Differential	100R
	Additional comments	Top layer, no side GND plane	
	Top layer copper foil thickness	17.5um	
	Track width	0.1 mm (3.93 mils)	
	Track spacing	0.1 mm (3.93 mils)	
	Distance to reference plane	>3h	
	Dielectric thickness between layers	Top-L2	102um (4 mils)
	Dielectric permittivity between layers (Er)		4.2
	Approximate microstrip line impedance	100 Ohms (+/- 10% tolerance)	
RF (Bottom)	Target impedance	Single-ended	50R
	Additional comments	Bottom layer, no side GND plane	
	Top layer copper foil thickness	17.5 um	
	Track width	0.18mm	
	Distance to reference plane	>3h	
	Dielectric thickness between layers	Bottom-L7	102um (4 mils)
	Dielectric permittivity between layers (Er)		4.2
	Approximate microstrip line impedance	49.99 Ohms (+/- 10% tolerance)	
PCIe (Top and Bottom)	Target impedance	Differential	85R
	Additional comments	Top/Bottom layers, no side GND	
	Top layer copper foil thickness	17.5 um	
	Track width	0.14 mm (5.5 mils)	
	Track spacing	0.1 mm (3.93 mils)	
	Distance to reference plane	>3h	
	Dielectric thickness between layers	Top-L2 Bottom-L7	173um (6.8 mils)
	Dielectric permittivity between layers (Er)		4.2
	Approximate microstrip line impedance	85 Ohms (+/- 10% tolerance)	



STACKUP AND LAYER DESCRIPTION



VERY IMPORTANT NOTES

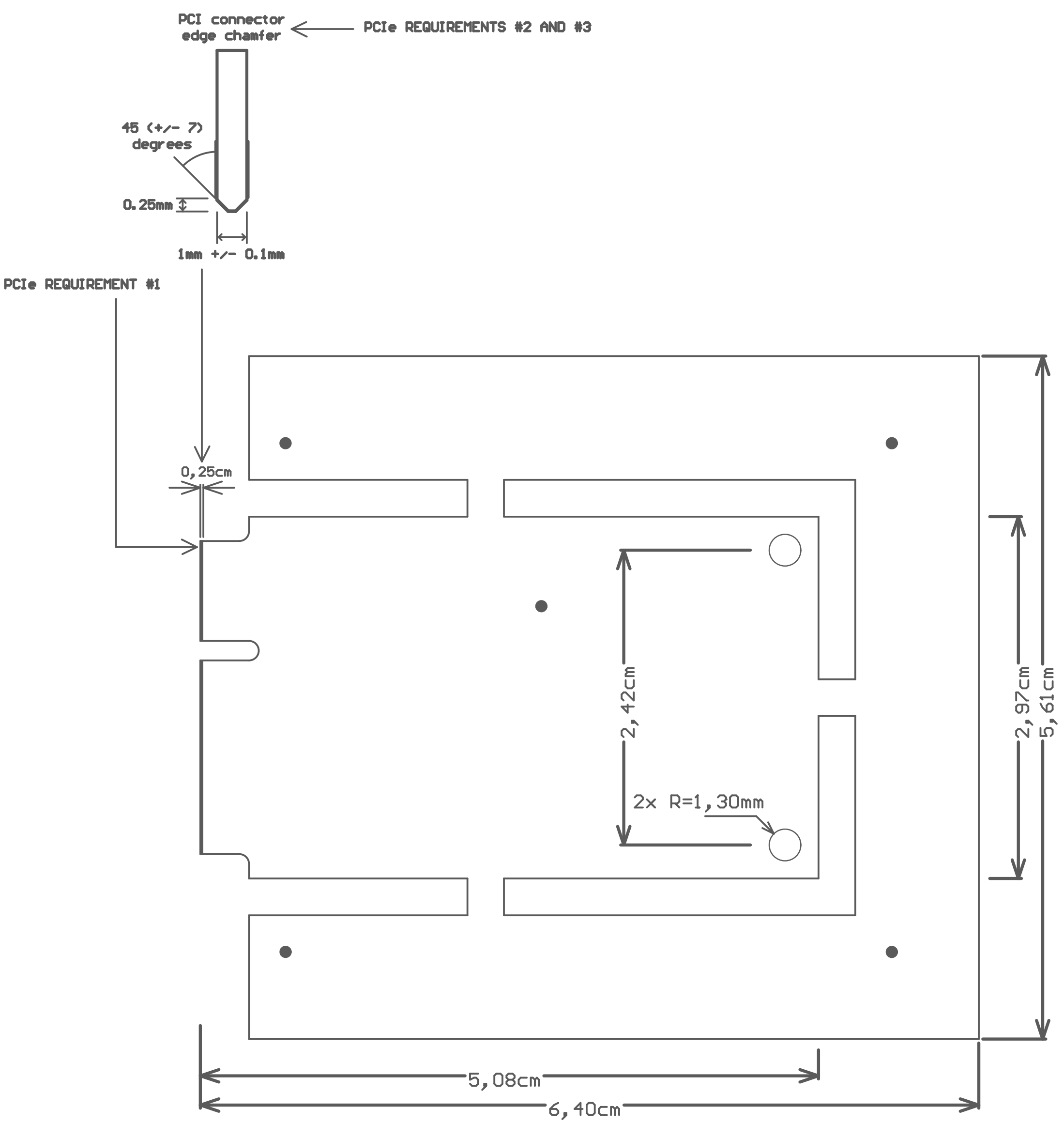
GENERAL PCB SPECS		
Minimum copper to copper spacing	0.1mm (3.9mil)	
Minimum track width	0.1mm (3.9mil)	
PCB thickness	1mm +/-10%	
PCB material	IT-180A preferred or equivalent RF-rated material (up to 3 GHz or higher)	
Copper weight	External layer	0.5 oz+plating
	Internal layer	1 oz
Solder mask	DARK BLUE	
	Both sides	
	Halogen free	
	Glossy finish (NOT matte)	
Silkscreen	White epoxy ink	
	Both sides	
	Halogen free	
	No silkscreen on pads	
Hole types on the PCB and information	Plated ☒	Non-plated ☒
	● Hole diameters are final manufactured diameters INCLUDING HOLE METALIZATION.	
Route process	V-score ☐	Tab route ☒
	V-score and tab route ☐	
Panel	Yes ☐	No ☒
Surface finish (both sides)	HASL lead free ☐	
	HASL with lead ☐	
	Immersion gold 0.05-0.10um of gold over 2.50-5.00um of nickel ☒	
	OSP ☐	
	Hard gold PCIe fingers ☒	

ADDITIONAL REQUIREMENTS

- All 0.2mm vias including 0.35mm ring and 0.2mm drill via-in-pads (IC1 and IC7) must be resin filled with metal cap.
- IC1 thermal pad vias with 0.4mm ring and 0.2mm drill must be resin filled with metal cap. IC1 thermal pad vias with 0.5mm ring and 0.2mm drill must be left open (NO resin fill with metal cap). 4 vias in total, marked with note.
- Electrical test : 100 % netlist.
- Boards are to be individually bagged.
- PCB vendor to silkscreen UL and RoHS compliance marks, vendor logo and date code on bottom where shown (ignore if none of the info will be placed on PCB)
- Assembly note: Assembly house MUST provide notes in paper with shipped board if there were any changes during assembly and the board is not assembled 100% according to BOM and P&P files.
  Note example:

Part	Initial BOM asm. note	Current PCB status	Comment
R1	FIT	NF	Not mounted due to bad footprint
IC5	FIT	NF	Not mounted due to part shortage

- PCIe REQUIREMENT #1: PCI EXPRESS pads (top and bottom) - 30 micro inches of gold over 50 micro inches nickel plating
- PCIe REQUIREMENT #2: Board edge below PCI pads must be chamfered (as shown). Edges must be free of cutting burrs
- PCIe REQUIREMENT #3: PCIe finger leader lines are acceptable


PCI connector
edge chamfer
PCIe REQUIREMENTS #2 AND #3
45 (+/- 7)
degrees
0.25mm
1mm +/- 0.1mm
PCIe REQUIREMENT #1
0,25cm
2,42cm
2x R=1,30mm
2,97cm
5,61cm
5,08cm
6,40cm