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### 7-1 Filter/Duplexer functions:

#### 7-1-1 Max input power?

- Max input power is largely determined by insertion loss and the volume (mass) of the filter/ duplexer.
- Consult the manufacturer for the specific value for each part number.

#### 7-1-2 What is the function of shielding metal attached to the filter/duplexer?

- To avoid the deterioration of filter properties (attenuations) by the radiation of electromagnetic wave.
- To prevent other components from affecting filter properties.
- To prevent the filter from affecting other components nearby by the radiation of electromagnetic wave.

### 7-2 Measuring filter and duplexer with test fixture.

#### 7-2-1 When the filter/duplexer is measured with a test fixture, the value is different from the values on the manufacturer's inspection report. Why does this happen?

- Check if the “Thru” correctly adjusted.( When the manufacturer supplies a test fixture, the manufacturer usually informs the adjustment value for insertion loss. Since the measured insertion loss includes the loss of the PCB, it is necessary to deduct from the measured value the adjustment value that is the loss from the PCB.
- Check if the filter/duplexer securely grounded. Please check if the shielding metal is correctly grounded.

#### 7-2-2 The filter installed in the system does not perform as good as the agreed specifications. Why does this happen?

- Check whether input and output of the PCB is adjusted to Ohms (check if the strip lines are adjusted to 50 ohms. Eliminate any parallel capacitance between Input and output pads. The parallel capacitance is often observed with in PCBs).
- Make sure there are no couplings between Input and Output traces. Make sure there is enough distance between them.
- Make sure there is no metallic components near the filter/duplexer.
- Make sure the filter/duplexer is not deformed nor damaged.
- Make sure the shielding metal is properly grounded to the earth.

### 7-3 Layout and installation of filters and duplexers:

7-3-1 How apart should the filter be placed from the nearby components? How close could the filter be placed near other chip components or metal casing covering RF circuits?

- If the filter/duplexer has the shielding metal, the shielding metal should not contact other components. Although the filter/duplexer performance is not affected by the metal shield contacting other components, it is recommended that the filter/ duplexer should have a certain distance to other neighboring components. This is to avoid any physical force exerted by other objects nearby which may damage or destroy the filter/duplexer.
- If there is no shielding metal on the filter/duplexer, the opening surface side shall be 2 to 3 mm apart from the nearby components or objects. (The space shall be equivalent to the height of the ceramic body.)
- Other surfaces shall have 1 mm spacing to the nearby components.

7-3-2 Land pattern layout and connection of the input and output lines.

- Prepare the PCB according to manufacturer's recommended land pattern.
- Make sure to ground the shielding metal.
- Keep Input and Output traces as far apart each other as possible.

8-3-3 What kind of PCB is recommended for the installation of the filter/duplexer?

Is there any recommended thickness of the PCB?

- There are no restrictions for the thickness of PCBs as far as the lines adjusted to 50 Ohms can be drawn on the PCB. It is however not recommended to use the PC board that is too thin, as the parallel capacitance often occurs in I/O pad area on very thin PCB.
- The filter /duplexer , in particular those of large size, shall not be installed very near the PCB's fixture or fixture areas (such as bolts to the bases or the chassis), as the deformation of the PCB due to dropping or heat cycles may damage the filter/duplexer.

7-3-4 How shall the filter/duplexer be soldered to PCBs?

- Refer to the manufacturer's recommended land pattern.
- Use reflow oven and follow manufacturer's recommended flow temperature profile.
- It is not recommended to use soldering iron or manual soldering.