

# The Design of Ku-band BPF

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## 1. Triple mode cavity resonator important duty bulk and design of filter

### 1.1 Chebyshev response filter union coefficients

Embodied important duty sleeve and strainer that make use of resentment style cavity resonator in this research and have Chebyshev response combining cavity resonator of two hems that resonate by each triple mode each other. Important duty sleeve and strainer acted important duty to have 100MHz approximately in center frequency 14.5GHz.

### 1.2 Design of triples mode cooperation resonance belonging

Take advantage of triple mode method that this treatise causes three biological resonance in one physical cooperation resonance in-flight and planed important duty sleeve and strainer. Figure 5 expresses structure of 2 bundles 6-pole triple mode filter that do  $TM_{012}$  mode by degeneration relation with  $TE_{112}$  mode.

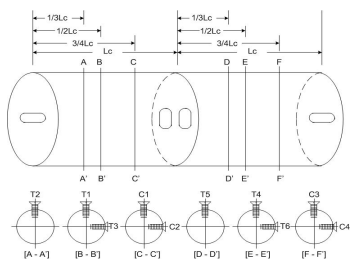


Fig. 1. Structure of 2-stage 6-pole triple-mode filter

$T_1$  and  $T_3$  and  $T_4$  and  $T_6$  are screw to control  $TE_{113}$  mode and screw which  $T_2$  and  $T_5$  combine  $TM_{012}$  mode in figure 5. Also, intercavity slot for union between cavity resonator Chebyshev response embody offset. Figure 1 is design flowchart for 2 bundles 6-pole triple mode cavity resonator important duty sleeve and

strainer.

## 2. Important duty bulk and filter manufacture and sounding

### 2.1 measurements and result ancient temple

Figure 2 measures important duty response of 6-pole filter that have 100MHz approximately span 1GHz in center frequency 14.5GHz. Marker 1 expresses center frequency in figure 15 and marker 2 and marker 3 bulk and important duty approximately 100MHz appear. Marker 4 and marker 5 bulk and important duty approximately 2 times of 100MHz appear.

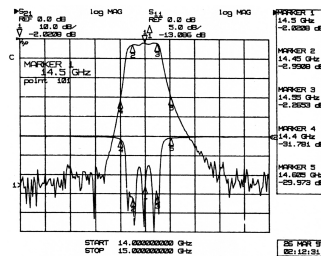


Fig. 2 A bandpass characteristics of filter-span 1GHz

Center frequency of filter acts correctly in 14.5GHz in figure 2 and bulk and important duty approximately in insertion loss average 2.4dB was measured and reflection loss  $S_{11}$  of pass-band filter was 15dB something wrong. Also, appeared by important duty having lowland station attenuation of 30dB at 2 times point approximately and  $S_{11}$  response satisfies the 6th that is laziness or in design's filter degree by 6-pole special quality. The this loss amount can may supplement if conductivity manufactures escarp of cavity resonator and slot and screw using good material. Also, union between cavity resonator can may improve if take advantage of method that point that

much manufacture errors that do that is by small dimension at manufacture of intercavity slot are such though happened manufactures intercavity slot via little more microscopic trimming process or lengthen thickness of slot. Also, flatness special quality was measured more greatly than 0.1dB that is 0.37dB design's ripple value in tub and in bandwidth. This flatness special quality regulation and union screw minor manufacturing use three amulet regulations being possible improve may. Ticket 3 compares measurement data with 2 bundles 6-pole triple mode cavity resonator important duty bulk and design of filter.

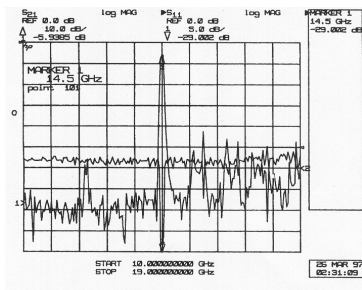


Fig. 3 A bandpass characteristics of filter-Span 96Hz

Figure 3 displays that measure response of filter by 9 GHz span. Diminution appeared more than 67dB in lowland station in picture.

### 3. Conclusion

Using resonance mode that this treatise does three reciprocity handweavings in single cavity resonator 2 bundles 6-pole triple mode important duty sleeve and strainer design manufactured. Triple mode is horizontality of  $TE_{113}$  mode, resonate by  $TM_{012}$  mode in verticality field and degeneration relation and connected in longitudinal form. Intercavity slot that connect triple mode did to combine self-discipline ingredient of only TE mode that do horizontality on slot plane for preferential union to embody Chebyshev filter response. Drive correctly decoration about union coefficient between  $TE_{11p}$  mode hereafter and manufactured slot of offset form seeking TM mode in slot plane and tangential of TE mode for this and longitudinal field's century distribution. Manufactured 2 bundles 6-pole triple mode cooperation resonator

important duty sleeve and strainer in stele watch 14.5 GHz important duty that having 100MHz approximately important duty have diminution of 30dB at 2 times point approximately and satisfied the 6th of design specification . Triple mode cavity resonator filter that present in this treatise can be used widely to filter assembly manufacture etc. in satellite relay appointment channel filter and radio communication system hereafter because there is strong point that can shorten size and weight to work of dividing into three parts when compare with existent duplex mode cavity resonator filter.

### References

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