WHAT IS CLAIMED IS:

1. A filter assembly comprising:

a first acoustic wave filter having a passband and being coupled to a common node; and

a second acoustic wave filter coupled to the common node, the second acoustic wave filter including acoustic wave resonators of a first type and a series acoustic wave resonator of a second type coupled between the acoustic wave resonators of the first type and the common node, the series acoustic wave resonator of the second type having a higher quality factor in the passband of the first acoustic wave filter than the acoustic wave resonators of the first type, and the acoustic wave resonators of the first type of the second acoustic wave filter constitute at least 70% of resonators of the second acoustic wave filter.

2. The filter assembly of claim 1 wherein the acoustic wave resonators of the first type are surface acoustic wave resonators and the series acoustic wave resonator of the second type is a bulk acoustic wave resonator.

3. A filter assembly comprising:

a first acoustic wave filter having a passband and being coupled to a common node; and

a second acoustic wave filter coupled to the common node, the second acoustic wave filter including acoustic wave resonators of a first type and a series acoustic wave resonator of a second type coupled between the acoustic wave resonators of the first type and the common node, the series acoustic wave resonator of the second type having a higher quality factor in the passband of the first acoustic wave filter than the acoustic wave resonators of the first type, the acoustic wave resonators of the first type being non-temperature compensated surface acoustic wave resonators and the series acoustic wave resonator of the second type being a temperature compensated surface acoustic wave resonator.

4. The filter assembly of claim 1 wherein at least two of the acoustic wave resonators of the first type are in series with the series acoustic wave resonator of the second type.

5. The filter assembly of claim 1 further comprising a third acoustic wave filter coupled to the common node and a fourth acoustic wave filter coupled to the common node.

6. A filter assembly comprising:

a first acoustic wave filter having a first passband and being coupled to a common node;

a second acoustic wave filter coupled to the common node, the second acoustic wave filter including acoustic wave resonators of a first type and a series acoustic wave resonator of a second type coupled between the acoustic wave resonators of the first type and the common node;

a third acoustic wave filter having a third passband and being coupled to the common node; and

a fourth acoustic wave filter having a fourth passband and being coupled to the common node,

the series acoustic wave resonator of the second type having a higher quality factor in the first, third, and fourth passbands than the acoustic wave resonators of the first type.

7. A filter assembly comprising:

a first acoustic wave filter having a passband and being coupled to a common node; and

a second acoustic wave filter coupled to the common node, the second acoustic wave filter including acoustic wave resonators of a first type and a series

acoustic wave resonator of a second type coupled between the acoustic wave resonators of the first type and the common node, the series acoustic wave resonator of the second type having a higher quality factor in the passband of the first acoustic wave filter than the acoustic wave resonators of the first type, the filter assembly including a first die that includes the acoustic wave resonators of the first type and a second die that includes the series acoustic wave resonator of the second type.

8. A multiplexer with acoustic wave filters, the multiplexer comprising:

a first acoustic wave filter coupled to a common node, the first acoustic wave filter including acoustic wave resonators of a first type and a series acoustic wave resonator of a second type coupled between the acoustic wave resonators of the first type and the common node, the acoustic wave resonators of the first type being non-temperature compensated surface acoustic wave resonators and the series acoustic wave resonator of the second type being a temperature compensated surface acoustic wave resonator; and

three other acoustic wave filters coupled to the common node and each having a respective pass band, the series acoustic wave resonator of the second type having a higher quality factor in each of the respective passbands of the three other acoustic wave filters than the acoustic wave resonators of the first type.

9. The multiplexer of claim 8 wherein at least one of the three other acoustic wave filters includes second acoustic wave resonators of the first type and a second series acoustic wave resonator of the second type coupled between the second acoustic wave resonators of the first type and the common node.

10. The multiplexer of claim 8 further comprising an additional acoustic wave filter coupled to the common node.

11. A method of processing a carrier aggregation signal, the method comprising:

filtering the carrier aggregation signal with a first acoustic wave filter that is coupled to an antenna port and has a first passband, the carrier aggregation signal including a first radio frequency carrier in the first passband and a second radio frequency carrier in a second passband; and

filtering the carrier aggregation signal with a second acoustic wave filter that is coupled to the antenna port and has the second passband, the second acoustic wave filter including acoustic wave resonators of a first type and a series acoustic wave resonator of a second type coupled between the acoustic wave resonators of the first type and the antenna port, the series acoustic wave resonator of the second type having a lower loading loss than the acoustic wave resonators of the first type, and the acoustic wave resonators of the first type being on a different die than the series acoustic wave resonator of the second type.

12. The method of claim 11 further comprising receiving the carrier aggregation signal from an antenna coupled to the antenna port.

13. The method of claim 11 further comprising transmitting the carrier aggregation signal through an antenna coupled to the antenna port.

14. The method of claim 11 further comprising coupling the first acoustic wave filter and the second acoustic wave filter to the common node by way of a multi-throw switch.

15. The method of claim 11 wherein the acoustic wave resonators of the first type are surface acoustic wave resonators and the series acoustic wave resonator of the second type is a bulk acoustic wave resonator.

16. A method of processing a carrier aggregation signal, the method comprising:

filtering the carrier aggregation signal with a first acoustic wave filter that is coupled to an antenna port and has a first passband, the carrier aggregation signal including a first radio frequency carrier in the first passband and a second radio frequency carrier in a second passband; and

filtering the carrier aggregation signal with a second acoustic wave filter that is coupled to the antenna port and has the second passband, the second acoustic wave filter including acoustic wave resonators of a first type and a series acoustic wave resonator of a second type coupled between the acoustic wave resonators of the first type and the antenna port, the series acoustic wave resonator of the second type having a lower loading loss than the acoustic wave resonators of the first type, the acoustic wave resonators of the first type being non-temperature compensated surface acoustic wave resonators and the series acoustic wave resonator of the second type being a temperature compensated surface acoustic wave resonator.

17. The filter assembly of claim 1 wherein the first acoustic wave filter includes additional acoustic wave resonators of the first type and an additional series acoustic wave resonator of the second type coupled between the additional acoustic wave resonators of the first type and the common node.

18. The filter assembly of claim 3 wherein the acoustic wave resonators of the first type of the second acoustic wave filter constitute at least 70% of resonators of the second acoustic wave filter.

19. The filter assembly of claim 3 wherein the second acoustic wave filter includes a shunt acoustic wave resonator of the second type, and the series acoustic wave resonator of the second type coupled between the shunt acoustic wave resonator of the second type and the acoustic wave resonators of the first type.

20. The filter assembly of claim 6 wherein the acoustic wave resonators of the first type are surface acoustic wave resonators and the series acoustic wave resonator of the second type is a bulk acoustic wave resonator.

21. The filter assembly of claim 6 wherein the filter assembly includes a first die that includes the acoustic wave resonators of the first type and a second die that includes the series acoustic wave resonator of the second type.

22. The filter assembly of claim 7 wherein the first acoustic wave filter includes additional acoustic wave resonators of the first type and an additional series acoustic wave resonator of the second type coupled between the additional acoustic wave resonators of the first type and the common node.

23. The filter assembly of claim 7 wherein the acoustic wave resonators of the first type are surface acoustic wave resonators and the series acoustic wave resonator of the second type is a bulk acoustic wave resonator.

24. The filter assembly of claim 7 wherein the acoustic wave resonators of the first type of the second acoustic wave filter constitute at least 70% of resonators of the second acoustic wave filter.