CLAIMS

What is claimed is:

1. A filter module comprising:

reception filters connected between an antenna terminal and a reception terminal, the reception filters filtering a receive signal from the antenna terminal and outputting the filtered receive signal to the reception terminal; and

a module substrate, wherein

a first reception filter that is at least one reception filter of the reception filters is embedded in the module substrate, and

a second reception filter that is at least another one reception filter is mounted on a surface of the module substrate so as to overlap the first reception filter.

2. The filter module according to claim 1, wherein

the reception filters have reception bands different from each other,

the filter module further comprises a passive circuit that is coupled to the first and second reception filters, that is coupled between the first and second reception filters and the reception terminal, and that makes a reception band of one of the first and second reception filters suppressed when passing signals in a reception band of another of the first and second reception filters, and

the reception terminals of the first and second reception filters are unified through the passive circuit to form a unified reception terminal.

3. The filter module according to claim 2, wherein

the passive circuit includes an inductor coupled between a node and a ground, the node being between the first and second reception filters and the unified reception terminal, and

the inductor is located on the surface of the module substrate on which the second reception filter is mounted.

4. The filter module according to claim 1, wherein

the reception filters are differential filters, each including two reception terminals.

5. The filter module according to claim 1, wherein

the reception filters are acoustic wave filters.

6. A duplexer module comprising:

duplexers, each including a reception filter connected between an antenna terminal and a reception terminal and a transmission filter connected between the antenna terminal and a transmission terminal, the reception filter filtering a receive signal from the antenna terminal and outputting the filtered receive signal to the reception terminal, the transmission filter filtering a transmit signal from the transmission terminal and outputting the filtered transmit signal to the antenna terminal; and

a module substrate, wherein

a first duplexer that is at least one duplexer of the duplexers and that includes the reception filter and the transmission filter is embedded in the module substrate, and

a second duplexer that is at least another one duplexer and that includes the reception filter and the transmission filter is mounted on a surface of the module substrate so as to overlap the first duplexer.

7. The duplexer module according to claim 6, wherein

the duplexers have reception bands different from each other and transmission bands different from each other,

the duplexer module further comprises a passive circuit that is coupled to the reception filters of the first and second duplexers, that is coupled between the reception filters of the first and second duplexers and the reception terminal, and that makes a reception band of one of the first and second duplexers suppressed when passing signals in a reception band of another of the first and second duplexers, and

the reception terminals of the first and second duplexers are unified through the passive circuit to form a unified reception terminal.

8. The duplexer module according to claim 7, wherein

the passive circuit includes an inductor connected between a node and a ground, the node being between the first and second duplexers and the unified reception terminal, and

the inductor is located on the surface of the module substrate on which the second duplexer is mounted.

9. The duplexer module according to claim 6, wherein

each of the duplexers includes a first foot pad coupled to the antenna terminal and a second foot pad coupled to the transmission terminal,

the first foot pad and the second foot pad are located at sides opposing each other, and

the first foot pad of the first duplexer is located at a side opposite to a side at which the first foot pad of the second duplexer is located with respect to a center line of an area in which the first duplexer and the second duplexer overlap each other.

10. The duplexer module according to claim 6, wherein

a frequency interval between a transmission band and a reception band of the first duplexer is wider than a frequency interval between a transmission band and a reception band of the second duplexer.

11. The duplexer module according to claim 6, wherein

the reception filters of the duplexers are differential filters, each including two reception terminals.

12. The duplexer module according to claim 6, wherein

the reception filters and the transmission filters of the duplexers are acoustic wave filters.

CLAIMS

What is claimed is:

1. A filter module comprising:

reception filters connected between an antenna terminal and a reception terminal; and

a module substrate, wherein

a first reception filter that is at least one reception filter of the reception filters is embedded in the module substrate, and

a second reception filter that is at least another one reception filter is mounted on a surface of the module substrate so as to overlap the first reception filter.

2. The filter module according to claim 1, wherein

the reception filters have reception bands different from each other,

the filter module further comprises a passive circuit that is coupled to the first and second reception filters, and makes a reception band of one of the first and second reception filters suppressed when passing signals in a reception band of another of the first and second reception filters, and

the reception terminals of the first and second reception filters are unified through the passive circuit to form a unified reception terminal.

3. The filter module according to claim 2, wherein

the passive circuit includes an inductor coupled between a node and a ground, the node

being between the first and second reception filters and the unified reception terminal, and

the inductor is located on the surface of the module substrate.

4. The filter module according to any one of claims 1 through 3, wherein

the reception filters are differential filters, each including two reception terminals.

5. The filter module according to any one of claims 1 through 4, wherein

the reception filters are acoustic wave filters.

6. A duplexer module comprising:

duplexers, each including a reception filter connected between an antenna terminal and a reception terminal and a transmission filter connected between the antenna terminal and a transmission terminal; and

a module substrate, wherein

a first duplexer that is at least one duplexer of the duplexers is embedded in the module substrate, and

a second duplexer that is at least another one duplexer is mounted on a surface of the module substrate so as to overlap the first duplexer.

7. The duplexer module according to claim 6, wherein

the duplexers have reception bands different from each other and transmission bands different from each other,

the duplexer module further comprises a passive circuit that is coupled to the reception

filters of the first and second duplexers, and makes a reception band of one of the first and second duplexers suppressed when passing signals in a reception band of another of the first and second duplexers, and

the reception terminals of the first and second duplexers are unified through the passive circuit to form a unified reception terminal.

8. The duplexer module according to claim 7, wherein

the passive circuit includes an inductor connected between a node and a ground, the node being between the first and second duplexers and the unified reception terminal, and

the inductor is located on a surface of the module substrate.

9. The duplexer module according to any one of claims 6 through 8, wherein

each of the duplexers includes a first foot pad coupled to the antenna terminal and a second foot pad coupled to the transmission terminal,

the first foot pad and the second foot pad are located at sides opposing each other, and

the first foot pad of the first duplexer is located at a side opposite to a side at which the first foot pad of the second duplexer is located with respect to a center line of an area in which the first duplexer and the second duplexer overlap each other.

10. The duplexer module according to any one of claims 6 through 9, wherein

a frequency interval between a transmission band and a reception band of the first duplexer is wider than a frequency interval between a transmission band and a reception band of the second duplexer.

11. The duplexer module according to any one of claims 6 through 10, wherein the reception filters of the duplexers are differential filters, each including two reception terminals.

12. The duplexer module according to any one of claims 6 through 11, wherein the reception filters and the transmission filters of the duplexers are acoustic wave filters.