of the coupler 215c. The 0-degree output terminal of the coupler 215b is electrically connected to the dipole antenna 211a. The 90-degree output terminal of the coupler 215b is electrically connected to the dipole antenna 211b. The 0-degree output terminal of the coupler 215c is electrically connected to the dipole antenna 211c. The 90-degree output terminal of the coupler 215c is electrically connected to the dipole antenna 211d. With the configuration in Fig. 6, the dipole antennas 211a to 211d are supplied with power with phases of 0 degrees, 90 degrees, 180 degrees, and 270 degrees, respectively. The configuration of the couplers 215a, 215b, and 215c and connection wiring is not limited to the above. The configuration is only required to allow the dipole antennas 211a to 211d to be combined so as to have phase delays of 0 degrees, 90 degrees, 180 degrees, and 270 degrees, respectively. For example, the feeding phases of the dipole antennas 211a to 211d may be controlled by changing the line length between the dipole antenna and the coupler. Alternatively, the feeding phases of the dipole antennas 211a to 211d may be controlled by reversing the polarities of attachment of the dipole antennas (reversing plus and minus). The configuration of the feed elements 21A to 21K may be similar to the configuration illustrated in Fig. 6. With the configuration illustrated in Fig. 6, signals received by the dipole antennas 211a to 211d are transmitted to the divider/combiner 5 via the low noise amplifier 216 and the feed line 3.

[0036]

By providing the low noise amplifier 216 between the coupler 215a and the divider/combiner 5, it is possible to reduce the noise figure for signals received by the dipole antennas 211a to 211d in the signal paths from the dipole antennas 211a to 211d to the divider/combiner 5. Comparing the configuration in Fig. 4 and the configuration in Fig. 5 with the configuration in Fig. 6, the configuration in Fig. 6 can further reduce

supplied with the power from the combining unit.

[0062]

(Supplementary Note 6)

The antenna device according to any one of Supplementary Notes 1 to 5, in which the predetermined interval is less than half a wavelength of the signals.

[0063]

(Supplementary Note 7)

The antenna device according to any one of Supplementary Notes 1 to 6, in which

a plurality of the first antennas are disposed on the antenna pole, and

a plurality of feed lines connecting the plurality of the first antennas and the combining unit are identical in length to each other.

[0064]

(Supplementary Note 8)

The antenna device according to Supplementary Note 2, in which the connection unit connects the dipole antennas adjacent to each other.

[0065]

(Supplementary Note 9)

The antenna device according to any one of Supplementary Notes 3 to 7, in which the first connection unit and the second connection unit connect the dipole antennas adjacent to each other.

[0066]

(Supplementary Note 10)

A method for controlling an antenna device including:

an antenna pole;

a first antenna disposed on the antenna pole; and

(Supplementary Note 16)

The method for controlling the antenna device according to any one of Supplementary Notes 10 to 15, in which

a plurality of the first antennas are disposed on the antenna pole, and

a plurality of feed lines connecting the plurality of the first antennas and the combining unit are identical in length to each other.

[0073]

(Supplementary Note 17)

The method for controlling the antenna device according to Supplementary Note 11, in which the connection unit connects the dipole antennas adjacent to each other.

[0074]

(Supplementary Note 18)

The method for controlling the antenna device according to any one of Supplementary Notes 12 to 16, in which the first connection unit and the second connection unit connect the dipole antennas adjacent to each other.

Reference Signs List

[0075]

1 antenna device

2 multi-path limiting antenna

21 feed element

22 parasitic element

211 dipole antenna

212 installation fixture

213 circuit board

215 coupler

216 low noise amplifier

CLAIMS

[Claim 1]

An antenna device comprising:

an antenna pole;

a first antenna disposed on the antenna pole;

a second antenna disposed on the antenna pole at a predetermined interval from the first antenna;

a combining unit that supplies power to the first antenna and combines signals received by the first antenna; and

an amplification unit that is connected between the first antenna and the combining unit and amplifies the signals.

[Claim 2]

The antenna device according to claim 1, wherein

the first antenna includes:

a plurality of dipole antennas; and

a connection unit that connects a pair of dipole antennas in the plurality of dipole antennas, and

the amplification units are provided between the plurality of dipole antennas and the connection unit.

[Claim 3]

The antenna device according to claim 1, wherein

the first antenna includes:

a plurality of dipole antennas;

a first connection unit that connects a pair of dipole antennas in the plurality of dipole antennas; and

a second connection unit that connects a pair of dipole antennas in the plurality of dipole antennas different from the pair of dipole antennas, and

the amplification units are provided between the first connection

unit and the combining unit and between the second connection unit and the combining unit.

[Claim 4]

The antenna device according to claim 1, wherein

the first antenna includes:

a plurality of dipole antennas;

a first connection unit that connects a pair of dipole antennas in the plurality of dipole antennas;

a second connection unit that connects a pair of dipole antennas in the plurality of dipole antennas different from the pair of dipole antennas; and

a third connection unit that connects the first connection unit and the second connection unit, and

the amplification unit is provided between the third connection unit and the combining unit.

[Claim 5]

The antenna device according to any one of claims 1 to 4, wherein

the second antenna includes a plurality of dipole antennas, and

the plurality of dipole antennas in the second antenna are not supplied with the power from the combining unit.

[Claim 6]

The antenna device according to any one of claims 1 to 4, wherein

a plurality of the first antennas are disposed on the antenna pole, and

a plurality of feed lines connecting the plurality of the first antennas and the combining unit are identical in length to each other.

[Claim 7]

The antenna device according to claim 2, wherein

the connection unit connects the dipole antennas adjacent to each

other.

[Claim 8]

The antenna device according to any claim 3, wherein

the first connection unit and the second connection unit connect the dipole antennas adjacent to each other.

[Claim 9]

A method for controlling an antenna device including:

an antenna pole;

a first antenna disposed on the antenna pole; and

a second antenna disposed on the antenna pole at a predetermined interval from the first antenna,

wherein the control method comprises:

supplying power to the first antenna and combining signals received by the first antenna; and

amplifying the signals.