attenuator **80** is operable to reduce the amplitude of radio signals by a predetermined amount without introducing distortion to the signals.

[0094] Receiver **58** is operable to receive signals from second filter **56** and is generally operable to receive radio signals within a particular frequency band. In one embodiment, receiver **58** is operable to receive signals within the uplink frequency bandwidth (in other words, the bandwidth of signals transmitted by mobile stations **15**). In some embodiments, receiver **58** is similar or identical to other receivers used by smart antenna apparatus **16** to receive radio signals from mobile stations **15**, such as beam receivers **112**. In a particular embodiment, receiver **58** is one of the beam receivers **112**.

[0095] Sampler **60** is operable to convert signals from analog to digital. Sampler **60** may convert analog signals received by receiver **58** to digital signals such that the signals may be processed by processing module **62**.

[0096] Processing module **62** is operable to process radio signals using one or more synchronization algorithms **82**. In one embodiment, processing module **62** is operable to execute one or more synchronization algorithms **82** using digital signals received from sampler **60** as input to synchronize smart antenna apparatus **16** with base station transceiver **24** in time and frequency. In the embodiment shown in FIG. **3**, synchronization algorithms **82** include a coarse timing synchronization algorithm **86**, a frame synchronization algorithm **88**, a fine timing synchronization algorithm **90**, and a fine frequency synchronization algorithm **92**. Coarse timing synchronization algorithm **86** and frame synchronization algorithm **88** generally perform rough synchronizations, while fine timing synchronization algorithm **90** and fine frequency synchronization algorithm **92** are generally fine tuning algorithms. These particular synchronization algorithms **82** are discussed in greater detail below with reference to FIGS. **4** and **5**. In one embodiment, processing module **62** is operable to execute one or more synchronization algorithms **82** in order to locate the control signals within the control frequency and to use certain control signals, such as time and frequency synchronization signals, to synchronize smart antenna apparatus **16** with base station transceiver **24**.

[0097] Base station transceiver **24** may include one or more radio wire outputs **84** operable to receive one or more radio signal wires **42**. Thus, smart antenna apparatus **16** may be coupled to base station transceiver **24** via one or more radio signal wires **42**.

[0098] FIG. **6** illustrates a method of synchronizing smart antenna apparatus **16** with base station transceiver **24** using radio frequency control signals transmitted by base station transceiver **24**. Generally, base station transceiver **24** transmits radio signals via radio signal wires **42** in a control frequency intended for one or more mobile stations **15**. The control frequency includes a control channel used to communicate control signals including synchronization signals. Smart antenna apparatus **16** splits the path of the radio signals into a first path directed toward antenna unit **18** and a second path directed toward smart antenna receiver **58** and processor **62**. The radio signals are converted from a transmission (or downlink) frequency to a receiving (or uplink) frequency before being received by receiver **58**. Processor **62** executes one or more synchronization algorithms using the radio signals (which include the control signals) as input to synchronize smart antenna system **16** with base station transceiver **24** in time and frequency with a high degree of accuracy. Thus, smart antenna system **16** may be accurately synchronized with base station transceiver **24** using radio signals received from base station transceiver **24** via radio signal wires **42**.

[0099] At step **200**, downlink control frequency signals are communicated from base station transceiver **24** via one or more radio signal wires **42**. The control frequency signals are generally intended to be received by one or more mobile stations **15** via wireless transmission, and may include control signals within a control channel as well as voice signals within one or more traffic channels. The control signals may include synchronization data, such as time synchronization bursts and frequency synchronization bursts, that may be used to synchronize mobile stations **15** with base station transceiver **24** in time and/or frequency.

[0100] The downlink control frequency signals communicated from base station transceiver **24** are received at smart antenna apparatus **16** via the one or more radio signal wires **42** at step **202**. As shown in the embodiment of FIG. **5**, the signals are received by radio wire input **64**. The signals are then communicated through splitter **50** at step **204**. The signals enter splitter **50** via signal path **66** which is divided by splitter **50** into first path **68** and second path **70**. As discussed above, a first path **68** is directed toward antenna unit **18** such that the downlink control frequency signals, including control signals, may be communicated to mobile stations **15**, and a second signal path **70** is directed toward first filter **52** such that the downlink control frequency signals, including control signals, may be communicated to processing module **62**.

[0101] Steps **206** through **212** illustrate the communication of the control frequency signals, in particular the control channel signals, from splitter **50** to mobile stations **15** for synchronizing mobile stations **15** with base station transceiver **24**. At step **206**, the control frequency signals are communicated from splitter **50** to antenna unit **18** via path **68** which may include one or more radio signal wires **40**. The signals are then transmitted by antenna unit **18** at step **208**. At step **210**, the signals are received by one or more mobile stations **15**. Mobile stations **15** use the control signals communicated in the control channel of the downlink control frequency to synchronize themselves with base station transceiver **24** in time and/or frequency at step **212**. Mobile stations **15** may use one or more synchronization algorithms in order to synchronize themselves with base station transceiver **24**.

[0102] Steps **214** through **226** illustrate the communication of the downlink control frequency signals, in particular the control signals, from splitter **50** to processing module **62** for synchronizing smart antenna apparatus **16** with base station transceiver **24**. At step **214**, the signals are communicated from splitter **50** to first filter **52** via path **70**. The signals are filtered by first filter **52** at step **216**. In one embodiment, first filter **52** includes attenuator **72** and band pass filter **74**. In this embodiment, the amplitude of the signals is reduced by attenuator **72**, and frequencies outside the band of frequencies defined by the downlink control frequency are blocked or absorbed by band pass filter **74**.

[0103] At step **218**, the signals are communicated to signal mixer **54** and mixed, or combined, with a conversion signal