includes diplexer **120**, the uplink beam **130** is received by base station transceiver **24** after passing through diplexer **120**.

[**0077**] In particular, each processing module **62** may execute one or more beam-selection algorithms to determine a receiving beam selection **126** for each frequency used by smart antenna system **14**. In addition, in a time division multiplexing environment, such as a GSM environment, each processing module **62** may determine a receiving beam selection **126** for each time slot in each frequency.

[**0078**] In one embodiment, each processing module **62** determines a receiving beam selection **126** by determining a fast decision beam selection using a fast decision beam selection module and/or a smart decision beam selection using a smart decision beam selection module. The processing module **62** may determine whether to use the fast decision beam selection or the smart decision beam selection as the receiving beam selection **126** based on one or more parameters, such as whether the processor has prior knowledge of a particular mobile stations **15**.

[**0079**] In some embodiments, the fast decision beam selection module is operable to determine the receiving beam selection **126** in real time. In other words, the fast decision beam selection module is operable to determine a fast decision beam selection based on signals communicated via each uplink beam **130** in a first portion of a particular time slot, and receiving beam switch **127** is operable to switch to the fast beam selection in real time such that signals communicated via the selected uplink beam **130** in a subsequent portion of the same time slot may pass through receiving beam switch **127** to base station transceiver **24**.

[**0080**] In contrast, the smart decision beam selection module may determine the receiving beam selection **126** to be used by receiving beam switch **127** in later time slots or frames. For example, in one embodiment, the smart decision beam selection module determines a smart decision beam selection based on the signals received in the current time slot and one or more previous time slots, but receiving beam switch **127** does not switch to the smart decision beam selection until the following frame. Thus, in this embodiment, receiving beam switch **127** may switch to the uplink beam **130** corresponding with the smart decision beam selection in the frame following the last frame used in determining the smart decision beam selection.

[**0081**] Downlink signals are communicated from base station transceiver **24** to be transmitted to one or more mobile stations **15** via antenna unit **18**. The downlink signals are received by smart antenna apparatus **16** and a downlink beam **132** corresponding with one of the narrow beams **34** is selected for communicating the downlink signals to the mobile stations **15**. In one embodiment in which smart antenna apparatus **16** includes diplexer **120**, the downlink signals pass through diplexer **120** before being assigned to a narrow beam **34**.

[**0082**] A transmitting beam switch **125** is operable to assign the downlink signals to a downlink beam **132** based on a transmitting beam selection **124** determined by processing system **102**. The same or similar inputs and/or parameters used to determine receiving beam selection **126** may be used by processing system **102** to determine transmitting beam selection **124**. The downlink signals are assigned to the downlink beam **132** corresponding to the transmitting beam selection **124** and the downlink beam **132** is communicated to antenna unit **18** and transmitted through the corresponding narrow beam **34**. In one embodiment in which smart antenna apparatus **16** includes diplexer **122**, the downlink beam **132** is received by antenna unit **18** after passing through diplexer **122**.

[**0083**] As with the uplink beam selection, each processing module **62** may execute one or more beam-selection algorithms to output a transmitting beam selection **124** for each frequency used by smart antenna system **14**. In addition, in a time division multiplexing environment, such as a GSM environment, each processing module **62** may determine a transmitting beam selection **124** for each time slot in each frequency. At any particular time, the transmitting beam selection **124** for a particular downlink channel may or may not be the same as the receiving beam selection **126** determined for the corresponding uplink channel. In other words, the narrow beam **34** corresponding with the uplink beam **130** selected for communicating uplink signals from a mobile station **15** to base station transceiver **24** may not always be the same narrow beam **34** selected for communicating downlink signals from base station transceiver **24** to that mobile station **15**. In addition, as with the receiving-beam selection, each processing module **62** may determine a transmitting beam selection **124** by determining a fast decision beam selection using a fast decision beam selection module and/or a smart decision beam selection using a smart decision beam selection module.

[**0084**] As discussed above, the inputs used by processing system **102** in making beam selection determinations may include signaling information received from signaling information monitoring system **106**. In operation, signaling information monitoring system **106** monitors, or receives, signaling information being communicated between base station transceiver **24** and base station controller **26** via interface **36**. Signaling information monitoring system **106** extracts relevant information from the received signaling information and communicates this information to processing system **102** as an input for making beam selections. The systems and methods for monitoring the signaling information are discussed in greater detail below with reference to FIGS. **9** and **10**.

[**0085**] Processing system **102** is synchronized and kept in synchronization with base station transceiver **24** using control signals received from control channel monitoring module **104**. In operation, control channel monitoring module **104** receives, or monitors, control channel signals (including synchronization signals) being communicated from base station transceiver **24** to antenna unit **18**. Control channel monitoring module **104** filters and converts the control channel signals from a base station transmission frequency to an smart antenna receiving frequency, receives and samples the signals, and communicate the signals to processing system **102**. Processing system **102** uses the signals to synchronize itself with base station transceiver **24** in time and frequency. Processing system **102** may execute one or more synchronization algorithms using the control channel signals as input to synchronize itself with base station transceiver **24**. The system and method of synchronization is discussed in detail below with reference to FIGS. **5** through **8**.