EXHIBIT B

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(54) **RACH-RAMP-UP ACKNOWLEDGEMENT**

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(58) **Field of Classification Search** .... None
See application file for complete search history.

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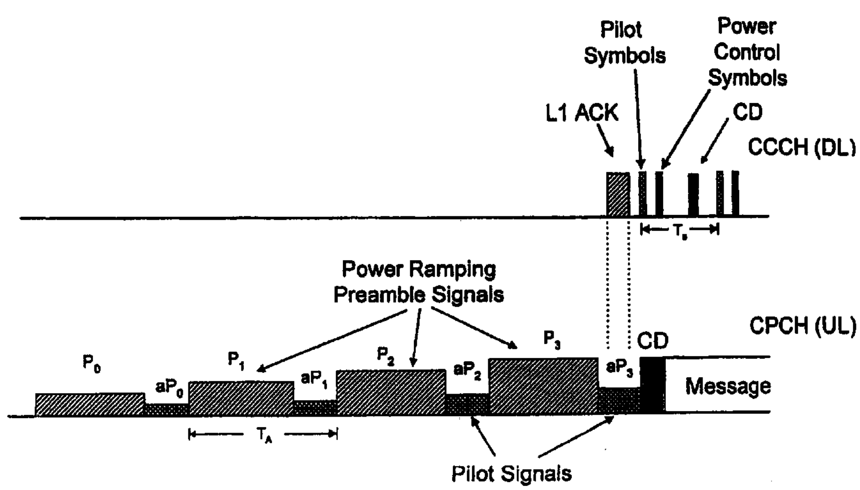
Primary Examiner—Charles Craver

(57) **ABSTRACT**

An improvement to a code-division-multiple-access (CDMA) system employing spread-spectrum modulation, with the CDMA system having a base station (BS) with a BS-spread-spectrum transmitter and a BS-spread-spectrum receiver, and a plurality of remote stations. Each remote station (RS) has an RS-spread-spectrum transmitter and an RS-spread-spectrum receiver. The improvement includes the steps of transmitting from the BS-spread-spectrum transmitter, a broadcast common-synchronization channel. The broadcast common-synchronization channel has a common chip-sequence signal common to the plurality of remote stations, and a frame-timing signal. The improvement includes receiving at a first RS-spread-spectrum receiver the broadcast common-synchronization channel, and determining frame timing from the frame-timing signal, and transmitting from a first RS-spread-spectrum transmitter an access-burst signal. The access-burst signal has a plurality of segments, which have a plurality of power levels. At the BS-spread-spectrum receiver the access-burst signal is received at a detected-power level. In response to receiving the access-burst signal, the BS-spread-spectrum transmitter transmits to the first RS-spread-spectrum receiver an acknowledgment signal. The first RS-spread-spectrum receiver receives the acknowledgment signal, and in response to receiving the acknowledgment signal, the first RS-spread-spectrum transmitter transmits to the BS-spread-spectrum receiver, a spread-spectrum signal having data.



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EX PARTE REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 307

NO AMENDMENTS HAVE BEEN MADE TO THE PATENT

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1**–**12** and **27**–**29** is confirmed.

Claims **13**–**26** are cancelled.

New claims **30**–**60** are added and determinded to be patentable.

30. An improvement to a code-division-multiple-access (CDMA) system employing spread-spectrum modulation, with the CDMA system having a first base station (BS) with a first BS-spread-spectrum transmitter and a first BS-spread-spectrum receiver, a second base station with a second BS-spread-spectrum transmitter and a second BS-spread-spectrum receiver, and a plurality of remote stations, with each remote station (RS) having an RS-spread-spectrum transmitter and an RS-spread-spectrum receiver, the method comprising the steps of:

transmitting from said first BS-spread-spectrum transmitter located at said first base station, a first broadcast common-synchronization channel having a first common chip-sequence signal common to the plurality of remote stations, the first broadcast common-synchronization channel having a first frame-timing signal;

transmitting from said second BS-spread-spectrum transmitter located at said second base station, a second broadcast common-synchronization channel having a second common chip-sequence signal common to the plurality of remote stations, the second broadcast common-synchronization channel having a second frame-timing signals;

receiving at a first RS-spread-spectrum receiver the first broadcast common-synchronization channel, and determining a first frame timing at said first RS-spread-spectrum receiver from the first frame-timing signal;

receiving at the first RS-spread-spectrum receiver the second broadcast common-synchronization channel, and determining a second frame timing at said first RS-spread-spectrum receiver from the second frame-timing signal;

determining, based on any of power levels and probabilities of error, at said first RS-spread-spectrum receiver, from the first broadcast common-synchronization channel and from the second broadcast common-synchronization channel, to transmit to said first base station;

transmitting from a first RS-spread-spectrum transmitter to said first base station, a first access-burst signal;

receiving at said first BS-spread-spectrum receiver the first access-burst signal at a first detected-power level;

transmitting from said first BS-spread-spectrum transmitter to said first RS-spread-spectrum receiver, responsive to the first access-burst signal, a first layer one acknowledgment signal;

receiving at said first RS-spread-spectrum receiver the first layer one acknowledgment signal; and

transmitting from said first RS-spread-spectrum transmitter, responsive to the first layer one acknowledgment signal, to said first BS-spread-spectrum receiver, a first spread-spectrum signal having data.

31. The improvement as set forth in claim 30, further including the step of transmitting from said first RS-spread-spectrum transmitter, any of data and control information, to said first BS-spread-spectrum receiver.

32. The improvement as set forth in claim 30, with the step of transmitting from the first RS-spread-spectrum transmitter the first access-burst signal, including the step of transmitting the first access-burst signal with a first plurality of segments having a first plurality of power levels increasing sequentially, respectively.

33. The improvement as set forth in claim 30, further including the steps of: determining, based on any of power levels and probabilities of error, at said first RS-spread-spectrum receiver, from the first broadcast common-synchronization channel and from the second broadcast common-synchronization channel, to transmit to said second base station;

transmitting from the first RS-spread-spectrum transmitter to said second base station, a second access-burst signal;

receiving at said second BS-spread-spectrum receiver the second access-burst signal at a second detected-power level;

transmitting from said second BS-spread-spectrum transmitter to said first RS-spread-spectrum receiver, responsive to the second access-burst signal, a second layer one acknowledgment signal;

receiving at said first RS-spread-spectrum receiver the second layer one acknowledgment signal; and

transmitting from said first RS-spread-spectrum transmitter, responsive to the second layer one acknowledgment signal, to said second BS-spread-spectrum receiver, a second spread-spectrum signal having data.

34. The improvement as set forth in claim 33, further including the step of transmitting from said second RS-spread-spectrum transmitter, any of data and control information, to second said BS-spread-spectrum receiver.

35. The improvement as set forth in claim 33, with the step of transmitting from the first RS-spread-spectrum transmitter the second access-burst signal, including the step of transmitting the second access-burst signal with a second plurality of segments having a second plurality of power levels increasing sequentially, respectively.

36. An improvement to a code-division-multiple-access (CDMA) system employing spread-spectrum modulation, with the CDMA system having a first base station (BS), a second base station, and a plurality of remote stations, with each remote station (RS) having an RS-spread-spectrum transmitter and an RS-spread-spectrum receiver, the improvement comprising:

a first BS-spread-spectrum transmitter located at said first base station, for transmitting a first broadcast common-synchronization channel having a first common chip-sequence signal common to the plurality of remote stations, the first broadcast common-synchronization channel having a first frame-timing signal;

a second BS-spread-spectrum transmitter located at said second base station, for transmitting a second broadcast common-synchronization channel having a second common chip-sequence signal common to the plurality of remote stations, the second broadcast common-synchronization channel having a second frame-timing signal;

a first RS-spread-spectrum receiver, located at a first remote station of the plurality of remote stations, for receiving the first broadcast common-synchronization channel, and determining first frame timing at said first RS-spread-spectrum receiver from the first frame-timing signal;

said first RS-spread-spectrum receiver for receiving the second broadcast common-synchronization channel, and determining a second frame timing at said first RS-spread-spectrum receiver from the second frame-timing signal;

means, based on any of power levels and probabilities of error, located at said first RS-spread-spectrum receiver, for determining from the first broadcast common-synchronization channel and from the second broadcast common-synchronization channel, to transmit to said first base station;

a first RS-spread-spectrum transmitter, located at said first remote station of said plurality of remote stations, for transmitting a first access-burst signal;

said first BS-spread-spectrum receiver for receiving the access-burst signal at a detected-power level;

said first BS-spread-spectrum transmitter for transmitting to said first RS-spread-spectrum receiver, responsive to receiving the first access-burst signal, a first layer one acknowledgment signal;

said first RS-spread-spectrum receiver for receiving the first layer one acknowledgment signal; and

said first RS-spread-spectrum transmitter, responsive to the first layer one acknowledgment signal, for transmitting to said first BS-spread-spectrum receiver, a first spread-spectrum signal having data.

37. The improvement as set forth in claim 36, with said first RS-spread-spectrum transmitter for transmitting any of data and control information, to said BS-spread-spectrum receiver.

38. The improvement as set forth in claim 37, with said first RS-spread-spectrum transmitter for transmitting the first access-burst signal with a first plurality of segments having a first plurality of power levels increasing sequentially, respectively.

39. The improvement as set forth in claim 36, further including: said means for determining, based on any of power levels and probabilities of error, at said first RS-spread-spectrum receiver, from the first broadcast common-synchronization channel and from the second broadcast common-synchronization channel, to transmit to said second base station;

said first RS-spread-spectrum transmitter for transmitting to said second base station, a second access-burst signal;

said second BS-spread-spectrum receiver for receiving the second access-burst signal at a second detected-power level;

said second BS-spread-spectrum transmitter for transmitting to said first RS-spread-spectrum receiver, responsive to the second access-burst signal, a second layer one acknowledgment signal;

said first RS-spread-spectrum receiver for receiving the second layer one acknowledgment signal; and

said first RS-spread-spectrum transmitter, responsive to the second layer one acknowledgment signal, for transmitting to said second BS-spread-spectrum receiver, a second spread-spectrum signal having data.

40. The improvement as set forth in claim 39, with said first RS-spread-spectrum transmitter for transmitting the second access-burst signal with a second plurality of segments having a second plurality of power levels increasing sequentially, respectively.

41. The improvement as set forth in claim 39, with said second RS-spread-spectrum transmitter for transmitting any of data and control information, to said second BS-spread-spectrum receiver.

42. A method of transferring packet data for a mobile station (MS) with an MS receiver and an MS transmitter, comprising:

receiving at the MS receiver a broadcast common channel from a base station;

determining a plurality of parameters required for transmission to the base station;

spreading an access preamble selected from a set of predefined preambles;

transmitting from the MS transmitter the spread access preamble, at a first discrete power level;

if no layer one acknowledgement corresponding to the access preamble is detected, transmitting a spread access preamble from the MS transmitter at a second discrete power level higher than the first discrete power level; and

upon detecting a layer one acknowledgement corresponding to a transmitted access preamble, ceasing preamble transmission and transmitting the packet data from the MS transmitter.

43. The method of claim 42, further comprising one or more additional steps of transmitting a spread access preamble at a successively higher power if no layer one acknowledgement corresponding to any of the preamble transmissions is received, up to a maximum allowed number of preamble transmissions.

44. A code-division-multiple-access (CDMA) wireless handset, comprising:

a CDMA transmitter;

a CDMA receiver; and

a controller coupled to the CDMA receiver for responding to signals received via the CDMA receiver and coupled for controlling the CDMA transmitter, such that in operation the CDMA handset is for performing the following steps:

spreading an access preamble selected from a set of predefined preambles;

transmitting the spread access preamble, at a first discrete power level to a base station;

if no layer one acknowledgement corresponding to the access preamble is detected, transmitting a spread access preamble from the MS transmitter at a second discrete power level higher than the first discrete power level; and

upon detecting a layer one acknowledgement corresponding to a transmitted access preamble, ceasing preamble transmission and transmitting packet data from the MS transmitter.

45. The improvement as set forth in claim 1, further including the step of: selecting one of a plurality of preambles assigned to said first base station; wherein:

the first access-burst signal comprises the selected one of the preambles assigned to said first base station; and

the first layer one acknowledgment signal is a layer one acknowledgement signal corresponding to the selected one of the preambles assigned to said first base station.

46. The improvement as set forth in claim 7, wherein:

the first access-burst signal comprises a preamble selected from among a plurality of preambles assigned to said first base station; and

the first layer one acknowledgment signal is a layer one acknowledgement signal corresponding to the selected one of the preambles assigned to said first base station.

47. A base-band processor, for use in a code-division-multiple-access (CDMA) wireless base station having a modulator and a demodulator, the base-band processor comprising:

a preamble processor, coupled to the demodulator, for detecting a preamble in a received spread-spectrum signal;

a data processor, coupled to the demodulator, for detecting and processng any data contained in the received spread-spectrum signal;

an encoder, for encoding data; an interleaver, coupled to the encoder, for interleaving encoded data; packet a packet formatter, coupled to the interleaver, for formatting the interleaved data into a packet; and

a controller coupled to the preamble processor and coupled for controlling the modulator, the data processor and the packet formatter, such that in operation the base-band processor is for performing the following steps:

detecting a first one of a sequence of coded preamble signals embedded in a first spread-spectrum signal received at an adequate power level;

upon detection of the first coded preamble signal at the adequate power level, generating a packet comprising an acknowledgement signal, and outputting the packet comprising the acknowledgement signal to the modulator; and

processing a packet, comprising data, from a second received spread-spectrum signal, wherein:

the first coded preamble comprises one preamble from among a plurality of preambles assigned to said base station; and

the first layer one acknowledgment signal is a layer one acknowledgement signal corresponding to the one preamble from among the plurality of preambles assigned to said base station.

48. A base-band processor, for use in a code-division-multiple-access (CDMA) wireless handset having a spread-spectrum modulator and a spread-spectrum demodulator, the base-band processor, comprising:

an acknowledgment detector, coupled to the demodulator, for detecting an acknowledgment in a received spread-spectrum signal;

an encoder, for encoding data;

an interleaver, coupled to the encoder, for interleaving encoded data;

a preamble generator for generating a preamble;

a multiplexer, coupled to the interleaver and to the preamble generator, for multiplexing the interleaved data and the preamble;

a packet formatter, coupled to the multiplexer, for formatting the multiplexed data and preamble into one or more packets; and

a controller coupled to the acknowledgment detector and coupled for controlling the modulator, the preamble generator, the multiplexer and the packet formatter, such that in operation the base-band processor is for performing the following steps:

generating and outputting to the modulator a plurality of packets comprising a sequence of coded preamble signals at sequentially increasing discrete power levels;

detecting an acknowledgement in a received spread-spectrum signal; and

upon detection of the acknowledgement, outputting a packet comprising data to the modulator for transmission over a random access wireles channel, wherein:

each of the coded preamble signals contains a preamble selected from among a plurality of preambles assigned to a base station; and

the detected layer one acknowledgement corresponds to a preamble selected from among the plurality of preambles assigned to said base station contained in one of the coded preamble signals.

49. A method of operation of a code-division-multiple-access (CDMA) system employing spread-spectrum modulation, with the CDMA system having a base station (BS) with a BS-spread-spectrum transmitter and a BS-spread-spectrum receiver, and a plurality of remote stations, with each remote station (RS) having an RS-spread spectrum transmitter and an RS-spread-spectrum receiver, the method comprising the steps of:

transmitting a broadcast common-synchronization channel, from the BS-spread-spectrum transmitter located at the base station to the plurality of remote stations;

receiving at a first RS-spread-spectrum receiver the broadcast common-synchronization channel, and determining a plurality of parameters required for transmission to the base station;

transmitting from a first RS-spread-spectrum transmitter a first preamble at a first discrete power level;

if no acknowledgment corresponding to the previously transmitted preamble is received at the first RS-spread-spectrum receiver by a time following the transmission of the first preamble, transmitting from the first RS-spread-spectrum transmitter a second preamble at a second discrete power level that is higher than the first discrete power level;

receiving the second preamble, at a detected-power level, at the BS-spread-spectrum receiver;

transmitting an acknowledgment of the received preamble from the BS-spread-spectrum transmitter;

receiving the acknowledgment at the first RS-spread-spectrum receiver; and

transmitting a spread-spectrum signal having data from the first RS-spread spectrum transmitter to the BS-spread-spectrum receiver, responsive to the receipt of the acknowledgment, wherein:

each transmitted preamble comprises a preamble selected from among a plurality of preambles assigned to said base station; and

the layer one acknowledgement corresponds to said received preamble.

50. A method of communication through a code-division-multiple-access (CDMA) system employing spread-spectrum modulation, with the CDMA system having a base station (BS) with a BS-spread-spectrum transmitter and a BS-spread-spectrum receiver, and a plurality of remote stations, with each remote station (RS) having an RS-spread spectrum transmitter and an RS-spread-spectrum receiver, the method comprising the steps of:

receiving a broadcast common-synchronization channel from the BS-spread-spectrum transmitter located at the

RS-spread-spectrum receiver of one of the remote stations, and determining a plurality of parameters required for transmission to the base station;

transmitting a preamble at a discrete power level from the RS-spread-spectrum transmitter of the one remote station;

listening for an acknowledgment corresponding to the transmitted preamble at the RS-spread-spectrum receiver of the one remote station;

if an acknowledgment is not received, upon expiration of a predetermined interval, following the transmission of the preamble, increasing power level to a new discrete power level, and repeating the transmitting step and continuing the listening step;

upon receiving an acknowledgment at the RS-spread-spectrum receiver of the one remote station, ceasing preamble transmission and transmitting a spread-spectrum signal having data from the RS-spread-spectrum transmitter of the one remote station, for the BS-spread-spectrum receiver, wherein:

each preamble transmission comprises a preamble selected from among a plurality of preambles assigned to said base station; and

the layer one acknowledgement corresponds to a transmitted preamble.

51. The method of claim 27, wherein each spread access preamble comprises a preamble selected from among a plurality of preambles assigned to said base station.

52. The CDMA wireless handset of claim 29, wherein each spread access preamble comprises preamble selected from among a plurality of preambles assigned to said base station.

53. The improvement as set forth in claim 30, further including the step of:

selecting one of a plurality of preambles assigned to said first base station; wherein:

the first access-burst signal comprises the selected one of the preambles assigned to said first base station; and

the first layer one acknowledgment signal is a layer one acknowledgement signal corresponding to the selected one of the preambles assigned to said first base station.

54. The improvement asset forth in claim 36, wherein: the first access-burst signal comprises a preamble selected from among a plurality of preambles assigned to said first base station; and

the first layer one acknowledgment signal is a layer one acknowledgement signal corresponding to the selected one of the preambles assigned to said first base station.

55. A base-band processor, for use in a code-division-multiple-access (CDMA) wireless base station having a modulator and a demodulator, the base-band processor comprising:

a preamble processor, coupled to the demodulator, for detecting a preamble in a received spread-spectrum signal;

a data processor, coupled to the demodulator, for detecting and processing any data contained in the received spread-spectrum signal;

an encoder, for encoding data;

an interleaver, coupled to the encoder, for interleaving encoded data;

a packet formatter, coupled to the interleaver, for formatting the interleaved data into a packet; and

a controller coupled to the preamble processor and coupled for controlling the modulator, the data processor and the packet formatter, such that in operation the base-band processor is for performing the following steps:

detecting a first one of a sequence of coded preamble signals embedded in a first spread-spectrum signal received at an adequate power level;

upon detection of the first coded preamble signal at the adequate power level, generating a packet comprising a layer one acknowledgement signal, and outputting the packet comprising the layer one acknowledgement signal to the modulator; and

processing a packet, comprising data, from a second received spread-spectrum signal, wherein:

the first coded preamble comprises one preamble from among a plurality of preambles assigned to said base station; and

the first layer one acknowledgment signal is a layer one acknowledgement signal corresponding to the one preamble from among the plurality of preambles assigned to said base station.

56. A base-band processor, for use in a code-division-multiple-access (CMDA) wireless handset having a spread-spectrum modulator and a spread-spectrum demodulator, the base-band processor, comprising:

an acknowledgment detector, coupled to the demodulator, for detecting a layer one acknowledgment in a received spread-spectrum signal;

an encoder, for encoding data;

an interleaver, coupled to the encoder, for interleaving encoded data;

a preamble generator for generating a preamble;

a multiplexer, coupled to the interleaver and to the preamble generator, for multiplexing the interleaved data and the preamble;

a packet formatter, coupled to the multiplexer, for formatting the multiplexed data and preamble into one or more packets; and

a controller coupled to the acknowledgment detector and coupled for controlling the modulator, the preamble generator, the multiplexer and the packet formatter, such that in operation the base-band processor is for performing the following steps:

generating and outputting to the modulator a plurality of packets comprising a sequence of coded preamble signals at sequentially increasing discrete power levels;

detecting a layer one acknowledgement in a received spread-spectrum signal; and

upon detection of the layer one acknowledgement, outputting a packet comprising data to the modulator for transmission over a random access wireless channel, wherein:

each of the coded preamble signals contains a preamble selected from among a plurality of preambles assigned to a base station; and

the detected layer one acknowledgement corresponds to a preamble selected from among the plurality of preambles assigned to said base station contained in one of the coded preamble signals.

57. A method of operation of a code-division-multiple-access (CDMA) system employing spread-spectrum modulation, with the CDMA system having a base station (BS) with a BS-spread-spectrum transmitter and a BS-spread-spectrum receiver, and a plurality of remote stations, with each remote station (RS) having an RS-spread

spectrum transmitter and an RS-spread-spectrum receiver, the method comprising the steps of:

transmitting a broadcast common-synchronization channel, from the BS-spread-spectrum transmitter located at the base station to the plurality of remote stations;

receiving at a first RS-spread-spectrum receiver the broadcast common-synchronization channel, and determining a plurality of parameters required for transmission to the base station;

transmitting from a first RS-spread-spectrum transmitter a first preamble at a first discrete power level;

if no layer one acknowledgment corresponding to the previously transmitted preamble is received at the first RS-spread-spectrum receiver by a time following the transmission of the first preamble, transmitting from the first RS-spread-spectrum transmitter a second preamble at a second discrete power level that is higher than the first discrete power level;

receiving the second preamble, at a detected-power level, at the BS-spread-spectrum receiver;

transmitting a layer one acknowledgment of the received preamble from the BS-spread-spectrum transmitter;

receiving the layer one acknowledgment at the first RS-spread-spectrum receiver; and

transmitting a spread-spectrum signal having data from the first RS-spread spectrum transmitter to the BS-spread-spectrum receiver, responsive to the receipt of the layer one acknowledgment, wherein:

each transmitted preamble comprises a preamble selected from among a plurality of preambles assigned to said base station; and

the layer one acknowledgement corresponds to said received preamble.

58. A method of communication through a code-division-multiple-access (CDMA) system employing spread-spectrum modulation, with the CDMA system having a base station (BS) with a BS-spread-spectrum transmitter and a BS-spread-spectrum receiver, and a plurality of remote stations, with each remote station (RS) having an RS-spread spectrum transmitter and an RS-spread-spectrum receiver, the method comprising the steps of:

receiving a broadcast common-synchronization channel from the BS-spread-spectrum transmitter located at the RS-spread-spectrum receiver of one of the remote stations, and determining a plurality of parameters required for transmission to the base station;

transmitting a preamble at a discrete power level from the RS-spread-spectrum transmitter of the one remote station;

listening for a layer one acknowledgment corresponding to the transmitted preamble at the RS-spread-spectrum receiver of the one remote station;

if a layer one acknowledgment is not received, upon expiration of a predetermined interval, following the transmission of the preamble, increasing power level to a new discrete power level, and repeating the transmitting step and continuing the listening step; and

upon receiving a layer one acknowledgment at the RS-spread-spectrum receiver of the one remote station, ceasing preamble transmission and transmitting a spread-spectrum signal having data from the RS-spread-spectrum transmitter of the one remote station, for the BS-spread-spectrum receiver, wherein:

each preamble transmission comprises a preamble selected from among a plurality of preambles assigned to said base station; and

the layer one acknowledgement corresponds to a transmitted preamble.

59. The method of claim 42, wherein each spread access preamble comprises a preamble selected from among a plurality of preambles assigned to said base station.

60. The CDMA wireless handset of claim 44, wherein each spread access preamble comprises preamble selected from among a plurality of preambles assigned to said base station.

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