CLAIM NO. HP-2020-000017

IN THE HIGH COURT OF JUSTICE
BUSINESS AND PROPERTY COURTS OF ENGLAND AND WALES
INTELLECTUAL PROPERTY LIST (ChD)
PATENTS COURT

B E T W E E N:

COMMSCOPE TECHNOLOGIES LLC
(incorporated under the laws of the state of Delaware, USA)

Claimant

- and –

SOLiD Technologies, Inc.
(a UK establishment of SOLiD, Inc., a company incorporated under the laws of South Korea)

Defendant

STATEMENT OF REASONS FOR AMENDMENT OF
EP (UK) 1 570 626 B1

The following are the reasons in support of the application by the Claimant to amend European Patent No EP (UK) 1 570 626 B1 ("**EP 626**").

1. The Claimant will seek to unconditionally amend the claims of EP 626 as shown in Annex A hereto.

2. The amendments to claim 1 are supported by claim 8 of WO 2004/051322 A2, where it states, "*The system of claim 7 wherein the radio frequency signals between the base station and the host unit are carried over an optical link*" and paragraph [0034] where it states "*Alternate embodiments use other quantities of antennas. For example, one embodiment uses three antennas to cover three different sectors of an area."* and

paragraph [0044] where it states "*The digitized received signal is input to a summer (415) to be added to the digitized signals from the preceding remote units in the daisy-chain.*"

3. The amendments to claim 2 are supported by paragraph [0034] of WO 2004/051322 A2, where it states "*Alternate embodiments use other quantities of antennas. For example, one embodiment uses three antennas to cover three different sectors of an area."* and paragraph [0044] where it states "*The digitized received signal is input to a summer (415) to be added to the digitized signals from the preceding remote units in the daisy-chain.*"

4. As set out in paragraphs 2-3, the amendments sought will not have the effect of disclosing any matter which extends beyond that disclosed in the application as filed or of extending the protection conferred by EP 626. The amendments therefore comply with the provisions of the Patents Act 1977 and in particular sections 75 and 76 thereof.

5. There are no reasons why the amendments should not be allowed.

Statement of Truth

The Claimant believes that the facts stated in this Statement of Reasons are true. I am duly authorised by the Claimant to sign this statement. I understand that proceedings for contempt of court may be brought against anyone who makes, or causes to be made, a false statement in a document verified by a statement of truth without an honest belief in its truth.

Signed:  Date: 1 September 2021

Served this 1st day of September 2021 by Powell Gilbert LLP, 85 Fleet Street, London EC4Y 1AE(Ref: CMM13.1/APL/TW)

Solicitors for the Claimant

Annex A

1. A distributed digital antenna system that communicates signals with a base station (110, 200) that is coupled to a data network, the system comprising:

a host unit (101, 201) that converts radio frequency signals from the base station to digital optical signals and that converts digital optical signals from the digital antenna system to radio frequency signals for use by the base station;

an optical medium coupled to the host unit that carries the digital optical signals; and

a plurality of remote units (105, 106, 107, 108, 205, 206, 207, 208) daisy-chained along the optical medium such that each remote unit transmits radio frequency signals over an air interface as an analog representation of the digital optical signals from the base station and receives radio frequency signals over the air interface that are converted by a receiving remote unit to digital optical signals, each of the remote units including a summer that sums the digital optical signals with the received digital optical signals from any preceding remote unit of the daisy-chained remote units to generate a digital summation signal for use by the host unit (101, 201),

wherein the radio frequency signals between the base station and the host unit are carried over an optical link,

and wherein

a. each of the remote units may comprise more than one sectorized antennas;

b. the digital optical signals from the base station are transmitted on the antenna(s) corresponding to the sector(s) for those signals;

c. each of the remote units includes a summer that sums:

   i. the radio frequency signals received on said antenna(s) that are converted by said receiving remote unit to digital optical signals, and
   ii. the received digital optical signals from any preceding remote unit of the daisy-chained remote units.

2. The system of claim 1 wherein the radio frequency signals between the base station and the host unit are carried over an optical link. *[Removed]*

3. The system of claim 1 or claim 2 wherein the optical medium is an optical fiber.

4. The system of claim 3 wherein the optical medium is an optical fiber that carries multiple wavelengths.

5. The system of any preceding claim wherein the optical medium is a first optical fiber that carries a first wavelength from the host unit to the plurality of remote units and a second optical fiber that carries a second wavelength from the plurality of remote units to the host unit.

6. The system of claim 5 wherein the second wavelength carries a digital signal that represents a summation of signals received by each of the plurality of remote units.

7. The system of any preceding claim wherein the plurality of remote units each comprise:

an antenna that communicates the radio frequency signals over the air interface;

a plurality of optical-to electrical converters (320, 321, 322, 323, 420, 421, 422, 423) that convert the forward link digital optical signals input to the remote unit to forward link digital electrical signals and that convert reverse link digital electrical signals to reverse link digital optical signals for output to host unit;

a digital to analog converter (310, 410) that converts the forward link digital electrical signals to the analog representation;

an analog-to-digital converter (305, 405) that converts the received radio frequency signals to the reverse link digital electrical signals; and

wherein the summer (315,415) sums the reverse link digital electrical signals with reverse link digital signals from previous remote units of the optical medium daisy-chain to generate the digital summation signal.

8. The system of any preceding claim wherein the base station communicates signals from the host unit to a public switched telephone network.

9. A remote unit adapted to a distributed digital antenna system that communicates signals with a base station (100, 200), the remote unit comprising:

An More than one sectorized antennas that communicates radio frequency signals using an air interface standard;

a plurality of optical-to-electrical converters (320, 321, 322, 323, 420, 421, 422, 423) that convert input digital optical signals, from a host unit coupled to the base station and a daisy-chain of previous remote units, to forward link digital electrical signals;

a digital to analog converter (310, 410) that converts the forward link digital electrical signals to analog signals for transmission by the antenna(s) corresponding to the sector(s) for those signals as radio frequency signals;

an analog-to-digital converter (305, 405) that converts radio frequency signals from the antenna(s) to reverse link digital electrical signals; and

a summer (315, 415) that sums the reverse link digital electrical signals for each sector from the analog-to-digital converter to reverse link digital signals for the corresponding sector from the daisy-chain of previous remote units to generate a digital summation signal for each sector.

10. The remote unit of claim 9 and further including: a first optical port that is coupled to either the host unit or a subsequent remote unit of the daisy-chain of remote units; and
a second optical port that is coupled to the daisy-chain of previous remote units.

11. The remote unit of claim 9 or claim 10 wherein a first optical-to-electrical converter of the plurality of optical-to-electrical converters converts an optical summation signal from the daisy-chain of previous remote units to the digital summation signal and a second optical-to-electrical converter converts an optical transmit signal from the host unit to the forward link digital electrical signal for conversion to an analog signal by the digital to analog converter.

12. The remote unit of any one of claims 9 to 11, wherein in the remote unit further comprises a wavelength division multiplexer (430) that demultiplexes an input digital optical signal, comprising a plurality of wavelengths, to the digital optical signals each having a wavelength in the plurality of wavelengths, the wavelength division multiplexer further multiplexes digital optical signals to an output digital optical signal comprising the plurality of wavelengths.

13. A method for communicating over a distributed digital antenna system, the method comprising:

converting a first radio frequency signal from a base station (100, 200) to a digital optical signal;

transmitting the digital optical signal over an optical medium to a plurality of remote units in a daisy-chain configuration along the optical medium;

converting the digital optical signal to a forward link digital electrical signal at each remote unit; and

converting the forward link digital electrical signal to an analog signal for transmission by at least one of the remote units as a second radio frequency signal;

receiving a third radio frequency signal over an air interface;

converting the third radio frequency signal to a received digital electrical signal; and

summing the received digital electrical signal with an input summation signal from previous remote units in the daisy-chain configuration;

converting a result of the summing to a sum digital optical signal;

transmitting the sum digital optical signal over the optical medium; and

converting the sum digital optical signal to a fourth radio frequency signal for use by the base station.

14. The method of claim 13 wherein the digital optical signal comprises a plurality of wavelengths and further including demultiplexing the digital optical signal into a plurality of optical signals each having one wavelength.

15. The method of claim 13 or claim 14 and further including the base station transmitting information in the fourth radio frequency signal to a public switched telephone network.

16. The method of any one of claims 13 to 15 and further including multiplexing single wavelength optical signals from the remote unit into a single optical signal comprising a plurality of wavelengths.