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**Petitioner  
Ericsson Inc. and  
Telefonaktiebolaget LM Ericsson**

U.S. Patent No. 7,787,431

IPR2014-01195

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# Overview of '431 patent

Directed to three aspects

## (1) Variable-bandwidth OFDM

“The variable channel bandwidth is realized by adjusting the number of usable subcarriers, whose spacing is set constant.”

(‘431 patent, 4:41-42, cited in Petition for IPR,

## (2) Core-band

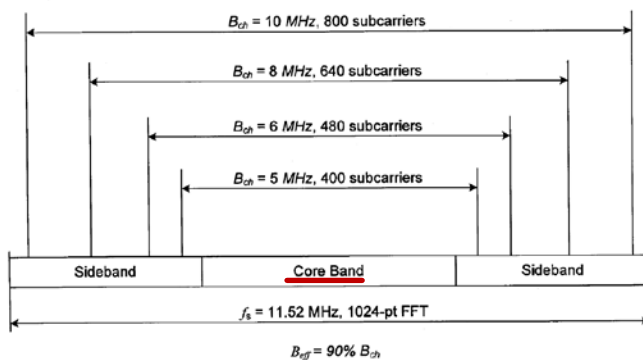


FIG. 6

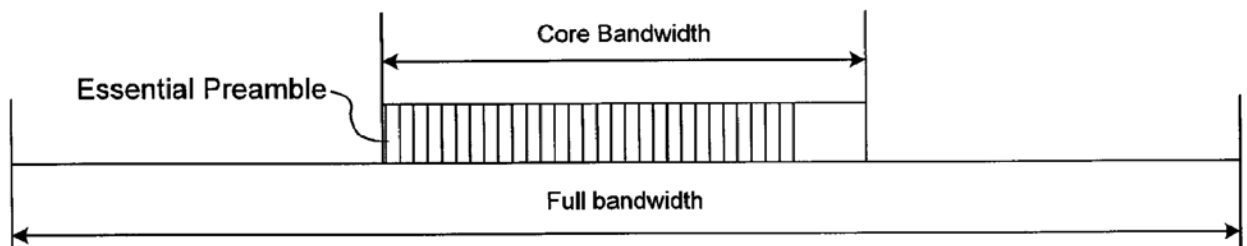
“Radio control and operation signaling is realized through the use of a core-band (CB).”

(‘431 patent, 4:64-67, cited in Petition for IPR,

# Overview of '431 patent

Directed to three aspects (cont.)

## (3) Primary preamble properties



(a) The essential preamble only occupies the CB

(Primary preamble)

('431 patent, Fig. 8(a))

1. Its autocorrelation exhibits a relatively large ratio between the correlation peak and sidelobe levels.
2. Its cross-correlation coefficient with another EP <sup>30</sup> sequence is significantly small with respect to the power of the EP sequences.
3. Its peak-to-average ratio is relatively small.
4. The number of EP sequences that exhibit the above three <sup>35</sup> properties is relatively large.

('431 patent 5:28-35 similar to claim 1)

## Overview of Challenges

- Trial instituted on claims 1 and 2
- Claims 1 and 2 challenged under two sets of references:

<b><u>First challenge</u></b>	<b><u>Second challenge</u></b>	<b><u>Ex. No.</u></b>
Li	Li	1002
Yamaura, UTRA (Beta)	Yamaura, UTRA (Beta)	1003 1007
Zhuang		1004
	Mody	1005
	Nobilet	1006
	Popovic	1008

(See Decision on Institution, pp. 5 and 7)

# Summary of claim 1

1. In a variable bandwidth wireless communication system communicating under multiple different communication schemes that each have a different bandwidth, a process performed by a base station of generating an information bearing signal for wireless transmission, the process comprising:

utilizing by the base station a number of subcarriers to construct a variable bandwidth wireless channel;  
utilizing by the base station groups of subcarriers, wherein each group includes a plurality of subcarriers;  
maintaining a fixed spacing between adjacent subcarriers;  
adding or subtracting, by the base station, groups of subcarriers to scale the variable bandwidth wireless channel and achieve an operating channel bandwidth; and

wherein a core-band, including a plurality of subcarrier groups, substantially centered at an operating center frequency of the different communication schemes, is utilized by the base station as a broadcast channel carrying radio control and operation signalling, where the core-band is substantially not wider than a smallest possible operating channel bandwidth of the system; and

wherein the information bearing signal has a primary preamble sufficient for basic radio operation and wherein:

the primary preamble is a direct sequence in the time domain with a frequency content confined within the core-band, or is an orthogonal frequency-divisional multiplexing (OFDM) symbol corresponding to a particular frequency pattern within the core-band; and

wherein properties of the primary preamble comprise: an autocorrelation having a large correlation peak with respect to sidelobes;

a cross-correlation with other primary preambles having a small cross-correlation coefficient with respect to power of other primary preambles; and  
a small peak-to-average ratio; and

wherein a large number of primary preamble sequences exhibit the properties.

(1) Variable bandwidth multi-subcarrier systems

(2) Core-band

(3) Primary Preamble

(Discussed in *inter alia* Petition

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