

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VOLKSWAGEN GROUP OF AMERICA, INC.,
Petitioner

v.

NEO WIRELESS, LLC
Patent Owner

Case IPR2022-01539
U.S. Patent No. 10,965,512

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,965,512**

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	1. A POSA would have been motivated to combine Kim and Tong	18

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(a)	A POSA would have been motivated to implement beamforming in Kim’s base station, as taught by Tong.....	18
(b)	A POSA would have been motivated to use Kim’s pilots for channel estimation, and to recover the transmitted data, as taught by Tong.	20
2.	Independent Claim 1.	23
(a)	[1.P]: An orthogonal frequency division multiple access (OFDMA)-compatible base station that uses subcarriers in a frequency domain and time slots in a time domain, the OFDMA-compatible base station comprising:	23
(b)	[1.1] a plurality of antennas; and a transmitter operably coupled to the plurality of antennas;	24
(c)	[1.2] the transmitter configured to: insert first pilots of a first type onto a first plurality of subcarriers, wherein the first pilots are cell-specific pilots; and	26
(d)	[1.3] insert data and second pilots of a second type onto a second plurality of subcarriers;	28
(e)	[1.4] wherein at least some subcarriers of the first plurality of subcarriers or the second plurality of subcarriers are beam-formed; and	33
(f)	[1.5] the plurality of antennas configured to transmit the first plurality of subcarriers and the second plurality of subcarriers in at least one of the time slots;	34
(g)	[1.6] wherein the second type is different than the first type and wherein the first pilots do not interfere with the second pilots.	36
3.	Independent Claim 8	37
(a)	[8.P] A method performed by an orthogonal frequency division multiple access (OFDMA)-compatible base station that uses subcarriers in a frequency domain and time slots in a time domain, the method comprising:	37

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- (b) [8.1] inserting, by the OFDMA-compatible base station, first pilots of a first type onto a first plurality of subcarriers, wherein the first pilots are cell-specific pilots;38
 - (c) [8.2] inserting, by the OFDMA-compatible base station, data and second pilots of a second type onto a second plurality of subcarriers;38
 - (d) [8.3] wherein at least some subcarriers of the first plurality of subcarriers or the second plurality of subcarriers are beam-formed; and.....38
 - (e) [8.4] transmitting, by the OFDMA-compatible base station, the first plurality of subcarriers and the second plurality of subcarriers in at least one of the time slots using a plurality of antennas;38
 - (f) [8.5] wherein the second type is different than the first type and wherein the first pilots do not interfere with the second pilots.38
4. Independent Claim 1539
- (a) [15.P] An orthogonal frequency division multiple access (OFDMA)-compatible mobile station that uses subcarriers in a frequency domain and time slots in a time domain, the OFDMA-compatible mobile station comprising:39
 - (b) [15.1] at least one antenna; and a receiver; and ...39
 - (c) [15.2] the at least one antenna and the receiver are configured to: receive first pilots of a first type on a first plurality of subcarriers, wherein the first pilots are cell-specific pilots; and.....40
 - (d) [15.3] receive second pilots of a second type and data on a second plurality of subcarriers, wherein the first plurality of subcarriers and the second plurality of subcarriers are received in at least one of the time slots;41
 - (e) [15.4] wherein at least some subcarriers of the first plurality of subcarriers or the second plurality of subcarriers are beam-formed; and.....41

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(f)	[15.5] the receiver is further configured to: recover the data using channel estimates from at least the second pilots; and	42
(g)	[15.6] recover cell-specific information using the cell-specific pilots;	44
(h)	[15.7] wherein the second type is different than the first type and wherein the first pilots do not interfere with the second pilots.	45
5.	Independent Claim 23	45
(a)	[23.P] A method performed by an orthogonal frequency division multiple access (OFDMA)-compatible mobile station that uses subcarriers in a frequency domain and time slots in a time domain, the method comprising:	45
(b)	[23.1] receiving first pilots of a first type on a first plurality of subcarriers, wherein the first pilots are cell-specific pilots;	45
(c)	[23.2] receiving second pilots of a second type and data on a second plurality of subcarriers, wherein the first plurality of subcarriers and the second plurality of subcarriers are received in at least one of the time slots;	46
(d)	[23.3] wherein at least some subcarriers of the first plurality of subcarriers or the second plurality of subcarriers are beam-formed;.....	46
(e)	[23.4] recovering the data using channel estimates from at least the second pilots; and	46
(f)	[23.5] recovering cell-specific information using the cell-specific pilots;	46
(g)	[23.6] wherein the second type is different than the first type and wherein the first pilots do not interfere with the second pilots.	46
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