Exhibit 2

Company Name: Optis Wireless Technology, LLC	**Technical Specifications Including But Not Limited To:**
Original Assignee: Panasonic	[1] 3GPP TS 36.211 V8.9.0 [2] 3GPP TS 36.212 V8.8.0 [3] 3GPP TS 36.213 V8.8.0
Patent Number: US 8,149,727 B2	

Sample Claims:	Excerpts from Sample Technical Specification(s):
1 [pre]. A transmitting method for use by a transmitting apparatus for transmitting data and control information in a single carrier system, the method comprising:	Multiplexed data and uplink control information are transmitted on the physical uplink shared channel (PUSCH). [2] 5.2.2 Uplink shared channel Figure 5.2.2-1 shows the processing structure for the UL-SCH transport channel. Data arrives to the coding unit in the form of a maximum of one transport block every transmission time interval (TTI). The following coding steps can be identified: – Add CRC to the transport block – Code block segmentation and code block CRC attachment – Channel coding of data and control information – Rate matching – Code block concatenation – Multiplexing of data and control information – Channel interleaver The coding steps for UL-SCH transport channel are shown in the figure below.

[…]

5.2.2.7 Data and control multiplexing

The control and data multiplexing is performed such that HARQ-ACK information is present on both slots and is mapped to resources around the demodulation reference signals. In addition, the multiplexing ensures that control and data information are mapped to different modulation symbols.

The inputs to the data and control multiplexing are the coded bits of the control information denoted by $q_0, q_1, q_2, q_3, \ldots, q_{Q_{CQI}-1}$ and the coded bits of the UL-SCH denoted by $f_0, f_1, f_2, f_3, \ldots, f_{G-1}$. The output of the data and control multiplexing operation is denoted by $\underline{g}_0, \underline{g}_1, \underline{g}_2, \underline{g}_3, \ldots, \underline{g}_{H'-1}$, where $H = (G + Q_{CQI})$ and $H' = H / Q_m$, and where $\underline{g}_i$, $i = 0, \ldots, H'-1$ are column vectors of length Q_m. H is the total number of coded bits allocated for UL-SCH data and CQI/PMI information.

The control information and the data shall be multiplexed as follows:

Set *i*, *j*, *k* to 0

while $j < Q_{CQI}$ -- first place the control information

$$\underline{g}_k = [q_j \ldots q_{j+Q_m-1}]^T$$

$$j = j + Q_m$$

$$k = k + 1$$

end while

while $i < G$ -- then place the data

$$\underline{g}_k = [f_i \ldots f_{i+Q_m-1}]^T$$

$$i = i + Q_m$$

$$k = k + 1$$

end while

5.2.2.8 Channel interleaver

The channel interleaver described in this subclause in conjunction with the resource element mapping for PUSCH in [2] implements a time-first mapping of modulation symbols onto the transmit waveform while ensuring that the HARQ-ACK information is present on both slots in the subframe and is mapped to resources around the uplink demodulation reference signals.

The input to the channel interleaver are denoted by $\underline{g}_0, \underline{g}_1, \underline{g}_2, \ldots, \underline{g}_{H'-1}$, $\underline{q}_0^{RI}, \underline{q}_1^{RI}, \underline{q}_2^{RI}, \ldots, \underline{q}_{Q'_{RI}-1}^{RI}$ and $\underline{q}_0^{ACK}, \underline{q}_1^{ACK}, \underline{q}_2^{ACK}, \ldots, \underline{q}_{Q'_{ACK}-1}^{ACK}$. The number of modulation symbols in the subframe is given by $H'' = H' + Q'_{RI}$ .. The output bit sequence from the channel interleaver is derived as follows:

(1) Assign $C_{mux} = N_{\text{symb}}^{\text{PUSCH}}$ to be the number of columns of the matrix. The columns of the matrix are numbered 0, 1, 2,…, $C_{mux} - 1$ from left to right. $N_{\text{symb}}^{\text{PUSCH}}$ is determined according to section 5.2.2.6.

(2) The number of rows of the matrix is $R_{mux} = (H'' \cdot Q_m)/C_{mux}$ and we define $R'_{mux} = R_{mux}/Q_m$.

The rows of the rectangular matrix are numbered 0, 1, 2,…, $R_{mux} - 1$ from top to bottom.

(3) If rank information is transmitted in this subframe, the vector sequence $\underline{q}_0^{RI}, \underline{q}_1^{RI}, \underline{q}_2^{RI}, \ldots, \underline{q}_{Q'_{RI}-1}^{RI}$ is written onto the columns indicated by Table 5.2.2.8-1, and by sets of Q_m rows starting from the last row and moving upwards according to the following pseudocode.

Set i, j to 0.

Set r to $R'_{mux} - 1$

while $i < Q'_{RI}$

$$c_{RI} = \text{Column Set}(j)$$

$$\underline{y}_{r \times C_{mux} + c_{RI}} = \underline{q}_i^{RI}$$

$$i = i + 1$$

$$r = R'_{mux} - 1 - \lfloor i/4 \rfloor$$

$$j = (j+3) \bmod 4$$

end while

Where ColumnSet is given in Table 5.2.2.8-1 and indexed left to right from 0 to 3.

(4) Write the input vector sequence, for $k = 0, 1, \ldots, H' - 1$, into the $(R_{mux} \times C_{mux})$ matrix by sets of Q_m rows starting with the vector $\underline{y}_0$ in column 0 and rows 0 to $(Q_m - 1)$ and skipping the matrix entries that are already occupied:

$$\begin{bmatrix} \underline{y}_0 & \underline{y}_1 & \underline{y}_2 & \cdots & \underline{y}_{C_{mux}-1} \\ \underline{y}_{C_{mux}} & \underline{y}_{C_{mux}+1} & \underline{y}_{C_{mux}+2} & \cdots & \underline{y}_{2C_{mux}-1} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ \underline{y}_{(R'_{mux}-1)\times C_{mux}} & \underline{y}_{(R'_{mux}-1)\times C_{mux}+1} & \underline{y}_{(R'_{mux}-1)\times C_{mux}+2} & \cdots & \underline{y}_{(R'_{mux}\times C_{mux}-1)} \end{bmatrix}$$

The pseudocode is as follows:

Set i, k to 0.

While k < H',

if $\underline{y}_i$ is not assigned to RI symbols

$\underline{y}_i = \underline{g}_k$

k = k + 1

end if

i = i+1

end While

(5) If HARQ-ACK information is transmitted in this subframe, the vector sequence $\underline{q}_0^{ACK}, \underline{q}_1^{ACK}, \underline{q}_2^{ACK}, \ldots, \underline{q}_{Q'_{ACK}-1}^{ACK}$ is written onto the columns indicated by Table 5.2.2.8-2, and by sets of Q_m rows starting from the last row and moving upwards according to the following pseudocode. Note that this operation overwrites some of the channel interleaver entries obtained in step (4).

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