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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CQI AND RANK PREDICTION FOR LIST SPHERE DECODING AND ML MIMO RECEIVERS

(57) Abstract: Systems and methodologies are described that facilitate integrating a list-sphere decoding design in a multiple input-multiple output (MIMO) wireless communication environment. According to various aspects, optimal rank selection and CQI computation for an optimal rank can be performed in conjunction with a non-linear receiver, such as a maximum likelihood (ML) MMSE receiver, a non-linear receiver with a list-sphere decoder, and the like. Optimal rank selection can be performed using a maximum rank selection protocol, a channel capacity-based protocol, or any other suitable protocol that facilitates rank selection, and CQI information can be generated based in part on effective SNRs determined with regard to a selected optimal rank.



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# INTERNATIONAL SEARCH REPORT

International application No.

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**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC: **H04B 1/02**( 2006.01),**1/10**( 2006.01),**7/02**( 2006.01),**7/10**( 2006.01);**H04L 27/00**( 2006.01)  
  
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**B. FIELDS SEARCHED**  
 Minimum documentation searched (classification system followed by classification symbols)  
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 IEEE Xplore

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	Tetsushi et. al., "A Hybrid MIMO System Using Spatial Correlation" 2002 IEEE (whole document)	1, 14 ----- 2-7, 12-13, 15-17, 18, 22-26, 27, 28-31, 33, 34-37, 39
Y	Boutros et. al., "Soft-input soft-output lattice sphere decoder for linear channels" IEEE 2003 (whole document)	2-7, 15-18, 23,29, 35
Y	Sayed et. al., U.S. 2003/0068994 10 April 2003 paragraphs [0010], [0035]-[0041]	3-7
Y	Kim et. al., U.S. 2004/0058687 25 March, 2004 Fig. 6-8, paragraphs [0016]-[0017] [0074]-[0076]	7, 13, 18,22-25, 27, 28-31,33-37 39
A	Thielecke et. al U.S. 20030003863 2 January 2003 whole document	1-39

Further documents are listed in the continuation of Box C.       See patent family annex.

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"A"	document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"O"	document referring to an oral disclosure, use, exhibition or other means	
"P"	document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

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