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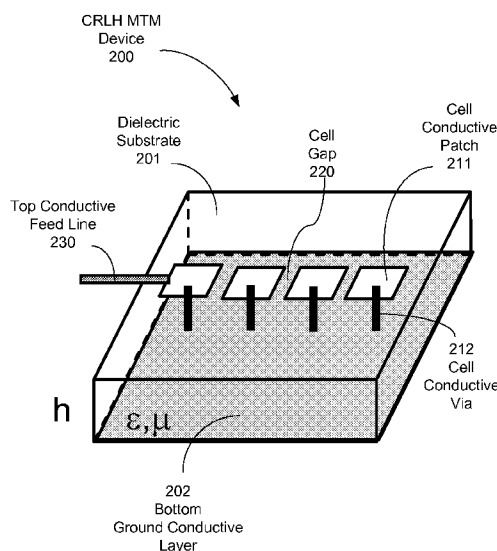
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(54) Title: ANTENNAS, DEVICES AND SYSTEMS BASED ON METAMATERIAL STRUCTURES

FIG. 2



(57) Abstract: Techniques, apparatus and systems that use one or more composite left and right handed (CRLH) metamaterial structures in processing and handling electromagnetic wave signals. Antenna, antenna arrays and other RF devices can be formed based on CRLH metamaterial structures. The described CRLH metamaterial structures can be used in wireless communication RF front-end and antenna sub-systems.

WO 2007/127955 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US07/67696

A. CLASSIFICATION OF SUBJECT MATTER

IPC: H01Q 1/38(2006.01)

USPC: 343/700MS,754,909

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 343/700MS, 754, 909

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
None

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST (metamaterial, antenna, CRLH, composite right and left handed)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7,068,234 A (SIEVENPIPER) 27 June 2006 (27.06.2006), entire document.	1-66
A	US 7,205,941 A (WANG et al) 17 April 2007 (17.04.2007), entire document.	1-66
A	US 7,256,753 A (WERNER et al) 14 August 2007 (14.08.2007), entire document.	1-66
A	US 2005/0225492 A (METZ) 13 October 2005 (13.10.2005), entire document.	1-66

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

* Special categories of cited documents:		
"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
"E" earlier application or patent published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"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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