

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P439-7WO	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/IB2018/050858	International filing date (<i>day/month/year</i>) 12 February 2018 (12-02-2018)	(Earliest) Priority Date (<i>day/month/year</i>) 10 February 2017 (10-02-2017)
Applicant HPS - HIGH PERFORMANCE STRUCTURES, GESTAO E		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 5 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

- the international application in the language in which it was filed
 a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

c. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. **Certain claims were found unsearchable** (See Box No. II)

3. **Unity of invention is lacking** (see Box No III)

4. With regard to the **title**,

- the text is approved as submitted by the applicant
 the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- the text is approved as submitted by the applicant
 the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 1B

- as suggested by the applicant
 as selected by this Authority, because the applicant failed to suggest a figure
 as selected by this Authority, because this figure better characterizes the invention

b. none of the figures is to be published with the abstract

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2018/050858

A. CLASSIFICATION OF SUBJECT MATTER
 INV. H01Q17/00 H01Q15/00
 ADD.
 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)
 H01Q
 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)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Chandrika Sudhendra ET AL: "An Ultra Wide Band Radar Absorber Based on Square Patch Resistive FSS", Proc. 7th annual Antenna Test and Measurement Society International Conference-ATMS 2014, 6 February 2014 (2014-02-06), pages 1-5, XP055399140, Chennai, India Retrieved from the Internet: URL:https://atmsindia.org/tech_papers/2014/20_FULL_PAPER_An_Ultra_Wide_Band_Radar_Absorber_Based_on_Square_Patch_Resistive_FSS.docx [retrieved on 2017-08-16] sections II. and III.; figures 1(a), 1(b), 2-6; table 1 ----- -/--	1-13

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 4 May 2018	Date of mailing of the international search report 15/05/2018
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Blech, Marcel
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INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2018/050858

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	SUDHENDRA CHANDRIKA ET AL: "A novel ultra wide band Radar Absorber based on hexagonal resistive patch FSS", 2013 IEEE APPLIED ELECTROMAGNETICS CONFERENCE (AEMC), IEEE, 18 December 2013 (2013-12-18), pages 1-2, XP032737454, DOI: 10.1109/AEMC.2013.7045118 sections I.-III.; figures 1, 2(b), 4, 5(a); table 1 -----	1-13
Y	SUDHENDRA CHANDRIKA ET AL: "A novel ultra wide band radar absorber with reduced thickness for circular polarization", 2014 INTERNATIONAL CONFERENCE ON ADVANCES IN ELECTRONICS COMPUTERS AND COMMUNICATIONS, IEEE, 10 October 2014 (2014-10-10), pages 1-4, XP032718000, DOI: 10.1109/ICAIECC.2014.7002410 sections I.-III.; figures 1(a), 1(b); table 1 -----	1-13
A	HUI ZHAO ET AL: "Study on the transmission characteristics of a double layered complementary frequency selective surface", 2016 11TH INTERNATIONAL SYMPOSIUM ON ANTENNAS, PROPAGATION AND EM THEORY (ISAPE), IEEE, 18 October 2016 (2016-10-18), pages 731-734, XP033053319, DOI: 10.1109/ISAPE.2016.7834062 sections II. and III.; page 731 - page 734; figures 1, 2, 4, 5, 10, 11 -----	14,15
Y	US 4 038 660 A (CONNOLLY THOMAS M ET AL) 26 July 1977 (1977-07-26) column 2, line 49 - column 2, line 50; figure 1 column 5, line 45 - column 5, line 53 column 6, line 31 - column 6, line 38 -----	1-13
Y	US 4 860 023 A (HALM RUDOLF [NL]) 22 August 1989 (1989-08-22) column 2, line 31 - column 2, line 58; figure 3 column 6, line 14 - column 6, line 20 column 3, line 55 - column 3, line 59 -----	1-13
A		14,15
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International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Arup Ray ET AL: "A Dual Tuned Complementary Structure Frequency Selective Surface for WLAN Applications", Journal of Microwaves, 20 June 2012 (2012-06-20), pages 144-153, XP055266427, DOI: 10.1590/S2179-10742012000100012 Retrieved from the Internet: URL:http://www.scielo.br/pdf/jmoea/v11n1/a12v11n1.pdf [retrieved on 2016-04-18] figures 1-3, 6-8	14,15
A	----- US 5 598 989 A (ROSS BARRY S [US] ET AL) 4 February 1997 (1997-02-04) column 2, line 3 - column 3, line 64; figures 2-5	1-13
A	----- TAKANO K ET AL: "Terahertz responses of near self-complementary metallic checkerboard patterns", INFRARED, MILLIMETER, AND TERAHERTZ WAVES, 2009. IRMMW-THZ 2009. 34TH INTERNATIONAL CONFERENCE ON, IEEE, PISCATAWAY, NJ, USA, 21 September 2009 (2009-09-21), page 1, XP031563255, ISBN: 978-1-4244-5416-7 the whole document	15
T	----- K. KEMPA: "Percolation effects in the checkerboard Babinet series of metamaterial structures", PHYSICA STATUS SOLIDI. RAPID RESEARCH LETTERS, vol. 4, no. 8-9, 2 July 2010 (2010-07-02), pages 218-220, XP055399396, DE ISSN: 1862-6254, DOI: 10.1002/pssr.201004266 sections 2-5; figures 1, 2	15
T	----- YOSUKE NAKATA ET AL: "Plane-wave scattering by self-complementary metasurfaces in terms of electromagnetic duality and Babinet's principle", PHYSICAL REVIEW. B, CONDENSED MATTER AND MATERIALS PHYSICS, vol. 88, no. 20, 22 November 2013 (2013-11-22), XP055399376, US ISSN: 1098-0121, DOI: 10.1103/PhysRevB.88.205138 section V.; page 5 - page 7; figures 3, 4	15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4038660	A	26-07-1977	NONE

US 4860023	A	22-08-1989	FR 2598339 A1 13-11-1987
		US 4860023 A	22-08-1989

US 5598989	A	04-02-1997	DE 69228352 D1 18-03-1999
		DE 69228352 T2	17-06-1999
		EP 0539951 A1	05-05-1993
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