



- (51) **International Patent Classification:**
H04W 4/14 (2009.01) *H04W 36/14* (2009.01)
- (21) **International Application Number:**
PCT/EP2012/001524
- (22) **International Filing Date:**
5 April 2012 (05.04.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
11002842.0 5 April 2011 (05.04.2011) EP
11171561.1 27 June 2011 (27.06.2011) EP
PCT/EP2012/000789
23 February 2012 (23.02.2012) EP
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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**
— with international search report (Art. 21(3))
- (88) **Date of publication of the international search report:**
21 March 2013

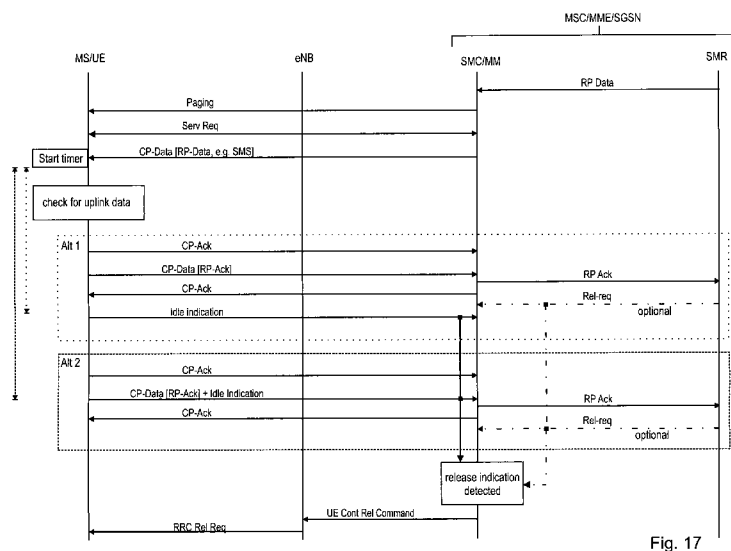
(54) **Title:** IMPROVED SHORT MESSAGE TRANSMISSION AND HANDOVER PROCEDURES

Fig. 17

(57) **Abstract:** The present invention relates to an improved method for handover of a mobile node from E-UTRAN to UTRAN in a scenario where SMS is the only service of the mobile node. The improved handover method allows saving radio resources by establishing the signalling connection for SMS exchange in the target network, and avoiding the data connection in the target network, since it is not used. The MME takes the decision to establish or not the data connection in the target UTRAN, and accordingly instructs the SGSN and UE to set the corresponding PDP contexts for the data connection to a "preserved" state, so as to avoid the establishment of same. Embodiments further relate to improved SMS delivery for IDLE mode UEs that activate ISR so as to avoid the involvement of the MSC server. Instead, packet-switched domain nodes are to be involved only.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/001524

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04W4/14 H04W36/14
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)
H04W H04Q

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, COMPENDEX, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	"3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access (Release 11)", 3GPP STANDARD; 3GPP TS 23.401, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, no. V11.1.0, 12 March 2012 (2012-03-12), pages 1,2,167-190, XP002675861, cited in the application pages 168-174, paragraph 5.5.2.1.2-5.5.2.1.3 figure 5.5.2.1.2_1 figure 5.5.2.1.3_1 ----- -/-	1-19



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

"E" earlier application or patent but published on or after the international filing date

"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)

"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

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search

14 May 2012

Date of mailing of the international search report

03/01/2013

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2012/001524

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	"3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3 (Release 10)", 3GPP STANDARD; 3GPP TS 24.301, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, no. V10.2.0, 1 April 2011 (2011-04-01), pages 1-315, XP050476784, cited in the application pages 150-152, paragraph 6.4.1 -----	1-19
A	"3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Technical realization of the Short Message Service (SMS) (Release 10)", 3GPP STANDARD; 3GPP TS 23.040, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, no. V10.0.0, 1 April 2011 (2011-04-01), pages 1-202, XP050476761, pages 15-16, paragraph 3.1 figures 15a,15h page 120, line 1 - page 122, line 2 -----	1-19
A	"3rd Generation Partnership Project; Technical Specification Group Core Network and Terminals; Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface (Release 9)", 3GPP STANDARD; 3GPP TS 24.011, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, no. V9.0.0, 14 December 2009 (2009-12-14), pages 1-108, XP050400797, page 100, lines 9-12 figure F2 figure 2.1a ----- -/--	1-19

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2012/001524

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KAARANEN H ET AL: "UMTS NETWORKS, ARCHITECTURE, MOBILITY AND SERVICES. passage", UMTS NETWORKS. ARCHITECTURE, MOBILITY AND SERVICES, WILEY, US, 1 January 2001 (2001-01-01), pages 213-214, -, 265-270, XP002658895, pages 213-214, paragraph 9.1.3 figure 9.3 page 265, paragraph 10.1 - page 267 figure 10.1 pages 267-270, paragraph 10.1.1 - paragraph 10.1.2 -----	1-19
A	"3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Radio Resource Control (RRC); Protocol Specification (Release 9)", 3GPP STANDARD; 3GPP TS 25.331, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, no. V9.0.0, 1 September 2009 (2009-09-01), pages 1-1710, XP050368029, pages 93-110, paragraph 8.1.2 - paragraph 8.1.3 pages 558-559, paragraph 10.2.20 - paragraph 102.21 pages 588-591, paragraph 10.2.39 page 665, paragraph 10.3.3.11 pages 676-677, paragraph 10.3.3.22 - paragraph 10.3.3.23 -----	1-19
A,P	PANASONIC: "Optimized SMS transmission over NAS signalling", 3GPP DRAFT; S2-112501 SIMTC OPTSMS-TRANSMISSION V2, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. SA WG2, no. Xi'An; 20110516, 11 May 2011 (2011-05-11), XP050525490, the whole document ----- -/--	1-19

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/001524

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	PANASONIC: "Optimized SMS transmission over NAS connection", 3GPP DRAFT; S2-113304 SIMTC SMS-TRANSPORT V0-3, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. SA WG2, no. Naantali; 20110711, 5 July 2011 (2011-07-05), XP050548590, the whole document -----	1-19
A	WO 99/18742 A1 (ERICSSON TELEFON AB L M [SE]) 15 April 1999 (1999-04-15) abstract -----	1-19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2012/001524

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-19-----

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-19

Handover from first network to second network while
transmitting small data

2. claims: 20-44

Controlling release of radio resources when
receiving/transmitting short messages

3. claims: 45-70

Transmitting downlink small data packets using control plane
connectivity.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2012/001524

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9918742	A1	15-04-1999	
		AR 013973 A1	31-01-2001
		AU 9467498 A	27-04-1999
		BR 9814062 A	26-09-2000
		CA 2305149 A1	15-04-1999
		US 6097962 A	01-08-2000
		WO 9918742 A1	15-04-1999
