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Reference 402706EP	Application No./Patent No. 01203820.4 - 2412 / 1326458
Applicant/Proprietor Koninklijke KPN N.V.	

Communication regarding the expiry of the time limit within which notice of opposition may be filed

You are hereby informed that on expiry of the nine-month time limit from the publication of the mention of the grant of European Patent No 1326458 no notice of opposition had reached the files.

The entry in the Register of European Patents will be automatically generated by the electronic data processing system.

Examining Division



EPPU 02: 22.02.06 2412



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12.01.06

Reference 402706EP	Application No./Patent No. 01203820.4 - 2412 / 1326458
Applicant/Proprietor Koninklijke KPN N.V.	

Decision to grant a European patent pursuant to article 97(2) EPC

Following examination of European patent application No. 01203820.4 a European patent with the title and the supporting documents indicated in the communication pursuant to Rule 51(4) EPC dated 03.08.05 is hereby granted in respect of the designated Contracting States.

Patent No. : 1326458
Date of filing : 09.10.01
Priority claimed : /

Designated Contracting States
and Proprietor(s) : AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
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This decision will take effect on the date on which the European Patent Bulletin mentions the grant (Art. 97(4) and (5) EPC).

The mention of the grant will be published in European Patent Bulletin 06/08 of 22.02.06.

Examining Division

Rabe M

Donnini C

Hodgins W



Registered letter
EPO Form 2006A 07.02 05.01.06

to EPO postal service: 05.01.06

ANMERKUNG ZUR ENTSCHEIDUNG ÜBER DIE ERTEILUNG
EINES EUROPÄISCHEN PATENTS (EPA Form 2006)

1. **EPA Informationsbroschüre "Nationales Recht zum EPÜ"**
Diese Broschüre enthält nützliche Informationen zu den formalen Erfordernissen und den Handlungen, die vor den Patentbehörden der Vertragsstaaten vorzunehmen sind, um Rechte in diesen Staaten zu erlangen. Da diese Handlungen einem ständigen Wandel unterworfen sind, sollte immer nur die neueste Ausgabe der Broschüre benutzt werden. Nachträgliche Informationen werden im Amtsblatt veröffentlicht.
2. **Übersetzung der europäischen Patentschrift nach Artikel 65(1) des Europäischen Patentübereinkommens**
Sie werden erneut darauf hingewiesen, dass bestimmte Vertragsstaaten nach Artikel 65(1) EPÜ eine Übersetzung der europäischen Patentschrift verlangen; hierauf wird in der Mitteilung gemäss Regel 51(6) verwiesen. **Die Nichteinreichung dieser Übersetzung kann zur Folge haben, dass das Patent in dem betreffenden Staat/in den betreffenden Staaten als von Anfang an nicht eingetreten gilt.** Weitere Einzelheiten entnehmen Sie bitte der oben genannten Broschüre.
3. **Zahlung von Jahresgebühren für europäische Patente**
Nach Artikel 141 EPU können "nationale" Jahresgebühren für das europäische Patent für die Jahre erhoben werden, die an das Jahr anschliessen, in dem der Hinweis auf die Erteilung des europäischen Patents im "Europäischen Patentblatt" bekanntgemacht wird. Weitere Einzelheiten entnehmen Sie bitte der oben genannten Broschüre.

NOTE RELATING TO THE DECISION TO GRANT A
EUROPEAN PATENT (EPO Form 2006)

1. **EPO Information Brochure "National law relating to the EPC".**
This brochure provides useful information regarding formal requirements and the steps to be taken before the patent authorities of the Contracting States in order to acquire rights in those states. Since the necessary steps are subject to change the latest edition of the brochure should always be used. Subsequent information is published in the Official Journal.
2. **Translation of the European patent specification under Article 65(1) of the European Patent Convention**
Your attention is again drawn to the requirements regarding translation of the European patent specification laid down by a number of Contracting States under Article 65(1) EPC, to which reference is made in the communication under Rule 51(6). **Failure to supply such translation(s) may result in the patent being deemed to be void "ab initio" in the State(s) in question.** For further details you are recommended to consult the above-mentioned brochure.
3. **Payment of renewal fees for European patents**
Under Article 141 EPC "national" renewal fees in respect of a European patent may be imposed for the years which follow that in which the mention of the grant of the European patent is published in the "European Patent Bulletin". For further details you are recommended to consult the above-mentioned brochure.

REMARQUE RELATIVE A LA DECISION DE DELIVRANCE
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1. **Brochure d'information de l'OEB "Droit national relatif à la CBE"**
Cette brochure fournit d'utiles renseignements sur les conditions de forme requises et sur les actes à accomplir auprès des offices de brevet des Etats contractants aux fins d'obtenir des droits dans les Etats contractants. Etant donné que les actes indispensables sont susceptibles de modifications, il serait bon de toujours consulter la dernière édition de la brochure. Toute information ultérieure est publiée au Journal Officiel.
2. **Traduction du fascicule du brevet européen en vertu de l'article 65(1) de la Convention sur le brevet européen**
Votre attention est de nouveau attirée sur l'obligation faite par certains Etats contractants, en vertu de l'article 65(1) CBE, de fournir une traduction du fascicule du brevet européen, à laquelle il est fait référence dans la notification établie conformément à la règle 51(6). **Si la(les) traduction(s) n'est(ne sont) pas fournie(s), le brevet européen peut, dès l'origine, être réputé sans effet dans cet(ces) Etat(s).** Pour plus de détails, nous vous renvoyons à la brochure susmentionnée.
3. **Paiement des taxes annuelles pour le brevet européen**
Conformément à l'article 141 CBE, les taxes annuelles "nationales" dues au titre du brevet européen peuvent être perçues pour les années suivant celle au cours de laquelle la mention de la délivrance du brevet européen est publiée au "Bulletin européen des brevets". Pour plus de détails, nous vous renvoyons à la brochure susmentionnée.

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September 29, 2005

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August 3, 2005

Our reference
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Enclosure(s)

2

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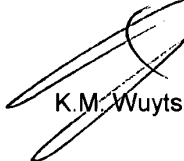
Subject: EP Patent application 01 203 820.4 - 2412

Referring to the Communication under Rule 51 (4) EPC dated August 3, 2005 please be informed that the Applicant approves the Druckexemplar.

Please find enclosed in duplicate translations of the claims in the two other EPO official languages.

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REVENDECATIONS

1. Procédé destiné à vérifier au moins un paramètre (BS_TX_PWR_MAX) et/ou une valeur modifiés obtenus en changeant au moins un paramètre et/ou une valeur opérationnels d'au moins un composant d'un réseau radio, caractérisé en ce que ladite vérification est réalisée sur la base d'au moins une règle métier comprenant au moins une exigence opérationnelle déduite de l'utilisation opérationnelle du réseau radio et différant des exigences de réglage de paramètre techniquement suffisantes.
2. Procédé selon la revendication 1 dans lequel l'au moins un paramètre (BS_TX_PWR_MAX) et/ou une valeur modifiés sont vérifiés avant la mise en œuvre dans le réseau radio (1) comprenant les étapes consistant à :
- copier dans une base de données (62) l'au moins un paramètre et/ou une valeur opérationnels provenant du réseau radio (1) ;
 - changer l'au moins un paramètre et/ou une valeur opérationnels en l'au moins un paramètre (BS_TX_PWR_MAX) et/ou une valeur modifiés ;
 - vérifier l'au moins un paramètre (BS_TX_PWR_MAX) et/ou une valeur modifiés en vérifiant si l'au moins une règle métier sélectionnée comprenant l'au moins une exigence opérationnelle a été respectée.
3. Procédé selon la revendication 2 dans lequel un signal de non-conformité est généré si l'au moins un paramètre modifié (BS_TX_PWR_MAX) ne respecte pas l'au moins une exigence opérationnelle.
4. Procédé selon les revendications 2 ou 3 dans lequel l'au moins un paramètre opérationnel est stocké dans une première partie (63) de la base de données (62) et l'au moins un paramètre modifié (BS_TX_PWR_MAX) est stocké dans une seconde partie (65) de la base de données (62).

5. Procédé selon la revendication 4 dans lequel la première et la seconde partie de la base de données (62) sont des bases de données séparées.
- 5 6. Procédé selon l'une quelconque des revendications 2 à 5 dans lequel au moins l'un de l'au moins un paramètre opérationnel ou l'au moins un paramètre modifié (BS_TX_PWR_MAX) est stocké dans la base de données (62) en utilisant une technique à rangées comprimées.
- 10 7. Procédé selon l'une quelconque des revendications 2 à 5 dans lequel la base de données (62) comprend au moins un tableau de hiérarchie pour stocker et avoir accès à l'au moins un paramètre opérationnel et l'au moins un paramètre modifié (BS_TX_PWR_MAX).
- 15 8. Procédé selon la revendication 7 dans lequel l'au moins un tableau de hiérarchie est utilisé pour vérifier si l'au moins un paramètre modifié (BS_TX_PWR_MAX) respecte l'au moins une règle métier sélectionnée.
- 20 9. Procédé selon l'une quelconque des revendications précédentes dans lequel l'au moins un paramètre modifié (BS_TX_PWR_MAX) concerne au moins un niveau d'une hiérarchie de réseau GSM ou DCS.
- 25 10. Procédé selon la revendication 9 dans lequel les niveaux de la hiérarchie de réseau GSM sont le commutateur de service mobile (MSC) (20), le centre d'exploitation et de maintenance (OMC) (25), le contrôleur de station de base (BSC) (30), la fonction de commande de support (29) et/ou la station de base (BTS) (31).
- 30 11. Procédé selon la revendication 9 ou 10 dans lequel les niveaux de la hiérarchie de réseau GSM sont le niveau de l'émetteur-récepteur (TRX) (37), le transfert intercellulaire (HO) (36) et/ou le niveau de canal (CH) (38).

12. Procédé selon l'une quelconque des revendications 1 à 8 dans lequel l'au moins un paramètre modifié (BS_TX_PWR_MAX) concerne au moins un niveau d'une hiérarchie GPRS.

5 13. Procédé selon la revendication 12 dans lequel les niveaux de la hiérarchie GPRS sont le commutateur de service mobile (MSC) (20), le centre d'exploitation et de maintenance (OMC) (25), le contrôleur de station de base (BSC) (30), le nœud de support GPRS de service (SGSN) (34), la fonction de commande de support (29).

10 14. Procédé selon la revendication 13 dans lequel les niveaux de la hiérarchie GPRS sont le niveau de l'émetteur-récepteur (TRX) (37), le transfert intercellulaire (HO) (36) et/ou le niveau de canal (CH) (38).

15 15. Procédé selon l'une quelconque des revendications 9-14 dans lequel la vérification de l'au moins un paramètre (BS_TX_PWR_MAX) et/ou une valeur modifiés en vérifiant si l'au moins une règle métier sélectionnée comprenant l'au moins une exigence opérationnelle a été respectée est appliquée à au moins l'un des niveaux de la hiérarchie GSM, DCS ou
20 GPRS.

16. Procédé selon l'une quelconque des revendications 9-15 dans lequel les relations sont vérifiées entre différents paramètres opérationnels et/ou modifiés dans le même niveau de hiérarchie ou des niveaux de
25 hiérarchie différents du réseau radio.

17. Procédé selon l'une quelconque des revendications précédentes dans lequel l'au moins une règle métier sélectionnée est programmée par un opérateur ou au moins commandée ou influencée par l'opérateur (69)
30 du réseau radio (1).

18. Procédé selon l'une quelconque des revendications précédentes dans lequel l'au moins une exigence opérationnelle implique une exigence administrative.
35

19. Procédé selon la revendication 17 dans lequel l'exigence opérationnelle implique une exigence techniquement préférable programmée, commandée et/ou influencée par l'opérateur (69) du réseau radio (1).
- 5 20. Procédé selon la revendication 3 dans lequel le signal de non-conformité est un fichier ou un message affiché pour l'opérateur.
21. Procédé selon la revendication 3 ou 20 dans lequel le signal de non-conformité est programmable.
- 10 22. Système (60) destiné à vérifier au moins un paramètre (BS_TX_PWR_MAX) et/ou une valeur modifiés obtenus en changeant au moins un paramètre et/ou une valeur opérationnels d'au moins un composant d'un réseau radio, caractérisé en ce que ledit système est adapté pour réaliser ladite vérification sur la base d'au moins une règle métier comprenant au moins une exigence opérationnelle dérivant de l'utilisation opérationnelle du réseau radio et différant des exigences de réglage de paramètre techniquement suffisantes.
- 15 23. Système (60) selon la revendication 22 destiné à vérifier l'au moins un paramètre (BS_TX_PWR_MAX) et/ou une valeur modifiés avant la mise en œuvre dans le réseau radio (1), comprenant :
- 20 une première partie (63) d'une base de données (62) pour stocker l'au moins un paramètre et/ou une valeur opérationnels provenant du réseau radio ;
- 25 une seconde partie (65) d'une base de données (62) pour stocker l'au moins un paramètre et/ou une valeur modifiés ;
- un vérificateur de règle métier (71) qui vérifie si l'au moins un paramètre et/ou une valeur modifiés respecte l'au moins une exigence opérationnelle.
- 30 24. Système (60) selon la revendication 23 dans lequel un générateur de signaux peut générer un signal de non-conformité si l'au moins un paramètre modifié (BS_TX_PWR_MAX) ne respecte pas l'au moins une exigence opérationnelle.
- 35

25. Système (60) selon les revendications 23 ou 24 comprenant en outre un moyen de script (72) afin de définir les règles métier et/ou les messages d'erreur à utiliser par le vérificateur de règle métier (71).

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26. Programme informatique destiné à fonctionner sur un système informatique comprenant des parties de code logiciel destinées à vérifier à vérifier au moins un paramètre (BS_TX_PWR_MAX) et/ou une valeur modifiés obtenus en changeant au moins un paramètre et/ou une valeur opérationnels d'au moins un composant d'un réseau radio, caractérisé en ce que ladite vérification est réalisée sur la base d'au moins une règle métier comprenant au moins une exigence opérationnelle dérivant de l'utilisation opérationnelle du réseau radio et provenant d'exigences de réglage de paramètre techniquement suffisantes.

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27. Programme informatique selon la revendication 26, comprenant en outre des parties de code logiciel destinées à vérifier l'au moins un paramètre (BS_TX_PWR_MAX) et/ou une valeur modifiés avant la mise en œuvre dans le réseau radio (1) comprenant les étapes consistant à :

20

copier dans une base de données (62) l'au moins un paramètre et/ou une valeur opérationnels provenant du réseau radio (1) ;

changer l'au moins un paramètre et/ou une valeur opérationnels en l'au moins un paramètre et/ou une valeur modifiés ;

25

vérifier l'au moins un paramètre et/ou une valeur modifiés en vérifiant si l'au moins une règle métier sélectionnée comprenant l'au moins une exigence opérationnelle a été respectée.

30

28. Programme informatique selon la revendication 26 ou 27 dans lequel au moins l'un de l'au moins un paramètre opérationnel ou l'au moins un paramètre modifié est stocké dans une base de données (62) en utilisant une technique à rangées comprimées.

EP 1 326 458

Patentansprüche

1. Verfahren zum Überprüfen von mindestens einem modifizierten Parameter (BS_TX_PWR_MAX) und/oder Wert, der vom Verändern von mindestens einem Arbeitsparameter und/oder Wert von mindestens einer Komponente eines Funknetzwerkes erhalten worden ist, dadurch gekennzeichnet, dass das besagte Überprüfen auf der Basis von mindestens einer Geschäftsregel durchgeführt wird, welche mindestens ein operationelles Erfordernis umfasst, welches von dem operationellen Einsatz des Funknetzwerk abgeleitet ist und von technisch ausreichenden Parametereinstellungserfordernissen abweicht.

2. Verfahren nach Anspruch 1, bei dem der mindestens eine modifizierte Parameter (BS_TX_PWR_MAX) und/oder Wert vor der Implementierung in den Funknetzwerken (1) überprüft wird, welches die Schritte umfasst:

- Kopieren in eine Datenbank (62) von dem mindestens einen operationellen Parameter und/oder Wert aus dem Funknetzwerk (1),
- Wechsel von dem mindestens einen operationellen Parameter und/oder Wert zu dem mindestens einen modifizierten Parameter (BS_TX_PWR_MAX) und/oder Wert,
- Überprüfen des mindestens einen modifizierten Parameters (BS_TX_PWR_MAX) und/oder Wert durch das Überprüfen, ob der mindestens einen ausgewählten Geschäftsregel, die das mindestens eine operationelle Erfordernis umfasst, gefolgt worden ist.

3. Verfahren nach Anspruch 2, bei dem ein Nichtübereinstimmungssignal erzeugt wird, falls der mindestens eine modifizierte Parameter (BS_TX_PWR_MAX) nicht dem mindestens einen operationellen Erfordernis gehorcht.

4. Verfahren nach Anspruch 2 oder 3, bei dem der mindestens eine operationelle Parameter in einem ersten Teil (63) der Datenbank (62) gespeichert wird und der mindestens eine modifizierte Parameter (BS_TX_PWR_MAX) in einem zweiten Teil (65) der Datenbank (62) gespeichert wird.

5. Verfahren nach Anspruch 4, bei dem der erste und der zweite Teil der Datenbank (62) getrennte Datenbanken sind.

6. Verfahren nach einem der Ansprüche 2 bis 5, bei dem mindestens einer der mindestens eine operationelle Parameter oder der mindestens eine modifizierte Parameter (BS_TX_PWR_MAX) in der Datenbank (62) unter Einsatz einer komprimierten Zeilentechnik gespeichert wird.

7. Verfahren einem der Ansprüche 2 bis 5, bei dem die Datenbank (62) mindestens eine Hierarchietabelle umfasst, um den mindestens einen operationellen Parameter zu speichern und zu dem mindestens einen operationellen Parameter und dem mindestens einen modifizierten Parameter (BS_TX_PWR_MAX) Zugang zu haben.

8. Verfahren nach Anspruch 7, bei dem die mindestens eine Hierarchietabelle eingesetzt wird, um zu überprüfen, ob der mindestens eine modifizierte Parameter (BS_TX_PWR_MAX) der mindestens einen ausgewählten Geschäftsregel gehorcht.

9. Verfahren nach einem der vorstehenden Ansprüche, bei dem der mindestens modifizierte Parameter (BS_TX_PWR_MAX) sich auf mindestens ein Niveau einer GSM oder DCS-Netzwerkhierarchie bezieht.

10. Verfahren nach Anspruch 9, bei dem die Niveaus der

Hierarchie des GSM-Netzwerkes sind: Mobile Vermittlungsstelle (MSC) (20), operationelle Verwaltungsstelle (OMC) (25), Basisstationssteuerung (BSC) (30), Haltersteuerfunktion (29) und) (oder Basisübertragerstation (BTS) (34).

11. Verfahren nach Anspruch 9 oder 10, bei dem die Niveaus der Hierarchie des GSM Netzwerkes sind: Übertragerniveau (TRX) (37), Übergabe (HO) (36) und) (oder Kanalniveau (CH) (38).

12. Verfahren nach einem der vorstehenden Ansprüche 1 bis 8, bei dem der mindestens eine modifizierte Parameter (BS_TX_PWR_MAX) sich auf mindestens ein Niveau einer GPRS-Hierarchie bezieht.

13. Verfahren nach Anspruch 12, bei dem die Niveaus der GPRS-Hierarchie sind: mobile Vermittlungsstelle (MSC) (20), operationelle Verwaltungszentrum (OMC) (25), Basisstationssteuerung (BSC) (30), unterstützender GPRS-Unterstützungsknoten (SGSN) (34), Haltersteuerfunktion (BCF) (29) und) (oder Basisübertragerstation (BTS) (31).

14. Verfahren nach Anspruch 13, bei dem die Niveaus der GPRS-Hierarchie sind: Übertragerniveau (TRX) (37), Übergabe (HO) (36) und) (oder Kanalniveau (CH) (38).

15. Verfahren nach einem der Ansprüche 9 bis 14, bei dem das Überprüfen von dem mindestens einem modifizierten Parameter (BS_TX_PWR_MAX) und/oder Wert durch das Verifizieren stattfindet, ob der mindestens einen ausgewählten Geschäftsregel, die mindestens ein operationelles Erfordernis umfasst, gefolgt worden ist, auf mindestens eines der Niveaus der GSM-, DCS- oder GPRS-Hierarchie angewandt wird.

16. Verfahren nach einem der Ansprüche 9 bis 15, bei dem

die Verhältnisse zwischen verschiedenen operationellen und/oder modifizierten Parametern in dem selben oder unterschiedlichen hierarchischen Niveaus des Funknetzwerks überprüft werden.

17. Verfahren nach einem der vorstehenden Ansprüche, bei dem die mindestens eine ausgewählte Geschäftsregel durch einen Betreiber programmiert wird oder mindestens beauftragt oder beeinflusst wird durch den Betreiber (69) des Funknetzwerks (1).

18. Verfahren nach einem der vorstehenden Ansprüche, bei dem das mindestens eine operationelle Erfordernis ein Verwaltungserfordernis umfasst.

19. Verfahren nach Anspruch 17, bei dem das operationelle Erfordernis ein technisch bevorzugtes Erfordernis umfasst, welches programmiert, beauftragt und/oder beeinflusst ist durch den Betreiber (69) des Funknetzwerkes (1).

20. Verfahren nach Anspruch 3, bei dem das Nichtübereinstimmungssignal eine Datei oder eine Nachricht ist, die einem Betreiber angezeigt wird.

21. Verfahren nach Anspruch 3 oder 20, bei dem das Nichtübereinstimmungssignal programmierbar ist.

22. Ein System (60) zum Überprüfen von mindestens einem modifizierten Parameter (BS_TX_PWR_MAX) und/oder Wert, der durch das Ändern von mindestens einem operationellen Parameter und/oder Wert von mindestens einer Komponente eines Funknetzwerkes erhalten wird, dadurch gekennzeichnet, dass das besagte System angepasst ist, um das Prüfen auf der Basis von mindestens einer Geschäftsregel auszuführen, die mindestens

ein operationelles Erfordernis umfasst, welches von dem operativen Einsatz des Funknetzwerkes abgeleitet wird und von technisch ausreichenden Parametereinstellungserfordernissen abweicht.

23. System (66) nach Anspruch 22 zum Überprüfen von dem mindestens einen modifizierten Parameter (BS_TX_PWR_MAX) und/oder Wert vor der Implementierung in dem Funknetzwerk (1), umfassend:

- einen ersten Teil (63) einer Datenbank (62), um den mindestens einen operationellen Parameter und/oder Wert aus dem Funknetzwerk zu speichern,
- einen zweiten Teil (65) einer Datenbank (62), um den mindestens einen modifizierten Parameter und/oder Wert zu speichern, und
- einen Geschäftsregelüberprüfer (71), der überprüft, ob der mindestens eine modifizierte Parameter und/oder Wert dem mindestens einen operationellen Erfordernis gehorcht.

24. System (60) nach Anspruch 23, bei dem ein Signalgenerator ein Nichtübereinstimmungssignal erzeugen kann, falls der mindestens eine modifizierte Parameter (BS_TX_PWR_MAX) nicht dem mindestens einen operativen Erfordernis gehorcht.

25. System (60) nach Anspruch 23 oder 24, weiterhin umfassend skripterzeugende Mittel (72), um Geschäftsregeln und/oder Fehlermeldungen zu definieren, die durch den Geschäftsregelüberprüfer (71) einzusetzen sind.

26. Computerprogramm zum Ausführen auf einem Computersystem mit Softwarecodeabschnitten zum Überprüfen von mindestens einem modifizierten Parameter (BS_TX_PWR_MAX) und/oder Wert, der durch das Ändern von mindestens einem operationellen

Parameter und/oder Wert von einer der mindestens einen Komponente eines Funknetzwerks erhalten wird, dadurch gekennzeichnet, dass das besagte Überprüfen auf der Basis von mindestens einer Geschäftsregel durchgeführt wird, die mindestens ein operationelles Erfordernis umfasst, welches von dem operationellen Einsatz des Funknetzwerkes abgeleitet wird und von den technisch ausreichenden Parametereinstellungserfordernissen abweicht.

27. Computerprogramm nach Anspruch 26, weiterhin umfassend Softwarecodeabschnitte zum Überprüfen von dem mindestens einem modifizierten Parameter (BS_TX_PWR_MAX) und/oder Wert vor der Implementierung in dem Funknetzwerk (1), umfassend die Schritte des

- Kopierens zu einer Datenbank (62) von dem mindestens einem operationellen Parameter und/oder Wert des Funknetzwerkes (1),
- Abändern von dem mindestens einem operationellen Parameter und/oder Wert zu dem mindestens einem modifizierten Parameter und/oder Wert, und
- Überprüfen des mindestens einen modifizierten Parameters und/oder Wertes durch Verifizieren, ob die mindestens eine ausgewählte Geschäftsregel, die das mindestens eine operationelle Erfordernis umfasst, gefolgt wird.

28. Computerprogramm nach Anspruch 26 oder 27, bei dem mindestens einer der mindestens einen operationellen Parameter oder der mindestens eine modifizierte Parameter in einer Datenbank (62) unter Einsatz einer komprimierten Zeilentechnik gespeichert wird.

Annex to EPO Form 2004, Communication under Rule 51(4) EPC

Bibliographical data of European patent application No. 01 203 820.4

For the intended grant of a European patent, the bibliographical data are set out below, for information:

Title of invention:

- System und Verfahren zur Überprüfung von Parametereinstellungen in Funknetzen
- System and method for checking parameter settings of radio networks
- Système et procédé pour vérifier l'établissement de paramètres dans des réseaux radio

Classification: H04Q7/34

Date of filing: 09.10.2001

Priority claimed:

Contracting States*
for which fees have been paid: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

Extension States*
for which fees have been paid:

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*) In case the time limits pursuant to Article 79(2) and Rule 85a EPC have not yet expired, **all Contracting States/Extension States** have been mentioned.
**) In case two or more applicants have designated different Contracting States, this is indicated here.



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Application No. 01 203 820.4 - 2412	Ref. 402706EP	Date 03.08.2005
Applicant Koninklijke KPN N.V.		

Communication under Rule 51(4) EPC

You are informed that the Examining Division intends to grant a European patent on the basis of the above application with the text and drawings as indicated below:

In the text for the Contracting States:

AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

Description, Pages

7-13, 16 as originally filed
1-6, 14, 15 received on 12.05.2004 with letter of 06.05.2004

Claims, Numbers

5-19 received on 12.05.2004 with letter of 06.05.2004
1-4, 20-28 received on 03.01.2005 with letter of 20.12.2004

Drawings, Sheets

1/6-6/6 received on 12.05.2004 with letter of 06.05.2004

With the following amendments to the above-mentioned documents by the examining division

Description, Pages 1,5-7,12
Claims, Numbers 1*,22*,26*,28

Comments

* Rule 29 (1) EPC; two-part form corrected as added feature is not disclosed in WO 92/21182 A1 on which the preambles of said claims are based



A copy of relevant documents is enclosed

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated Contracting States, the registered name of the applicant and the bibliographic data are shown on the attached EPO Form 2056.

You are requested within a **non-extendable** period of four months of notification of this communication

1.	to file 1 set of translations of the claim(s) in the two other EPO official languages;		EUR
2a.	to pay the fee for grant including the fee for printing up to and including 35 pages;		
	Reference 007		715.00
2b.	to pay the printing fee for the 36th and each additional page;		
	number of pages: 0		
		Reference 008	0.00
3.	to pay the additional claim fee(s) (Rule 51(7) EPC);		
	number of claims fees payable: 0		
		Reference 016	0.00
		Total amount	715.00

Concerning the possibility of a request for accelerated grant pursuant to Article 97(6) EPC, reference is made to OJ EPO 2001, 459.

If the grant, printing or claims fees are not paid, or the translations not filed, in due time the European patent application will be deemed to be withdrawn (Rule 51(8) EPC).

For all payments you are requested to use EPO Form 1010 or to refer to the relevant reference number.

After publication, the European patent specification can be downloaded free of charge from the EPO publication server <https://publications.european-patent-office.org> or ordered only from the Vienna sub-office upon payment of a fee (OJ EPO 2005, 126).

Upon request in writing each proprietor will receive the certificate for the European patent **together with one copy** of the patent specification only if the request is filed within the time limit of Rule 51(4) EPC. If such request has been previously filed, it has to be confirmed within the time limit of Rule 51(4) EPC. The requested copy is free of charge. If the request is filed after expiry of the Rule 51(4) EPC time limit, the certificate will be delivered without a copy of the patent specification.

Translation of the priority document(s)

If the translation of the priority document(s), as required by Article 88(1) EPC, or the declaration according to Rule 38(5) EPC has not yet been filed, Form 2530 will be despatched separately. The translation is to be filed within the above mentioned time limit (Rule 38(5) EPC).

Note on payment of renewal fees



If a renewal fee falls due between notification of the present communication and the proposed date of publication of the mention of the grant of the European patent, publication will be effected only after the renewal fee and any additional fee have been paid (Rule 51(9) EPC).

Under Article 86(4) EPC, renewal fees are payable to the European Patent Office until the year in which the mention of the grant of the European patent is published.

Filing of translations in the Contracting States

Pursuant to Article 65(1) EPC the following Contracting States require a translation of the specification of the European patent in their/one of their official language(s) (Rule 51(10) EPC), **insofar** this specification will not be published in their/one of their official language(s)

- within **three** months of publication of the mention of such decision:

AT	AUSTRIA	FR	FRANCE
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- within **six** months of publication of the mention of such decision:

IE IRELAND

The date on which the European Patent Bulletin publishes the mention of the grant of the European patent will be indicated in the decision on the grant of the European patent (EPO Form 2006).

The translation must be filed with the national Patent Offices of the Contracting or Extension States in accordance with the provisions applying thereto in the State concerned. Further details (e.g. appointment of a national representative or indication of an address for service within the country) are given in the EPO information brochure "National law relating to the EPC", and in the supplementary information published in the Official Journal of the EPO, or available on the EPO website.

Failure to supply such translation to the Contracting and Extension States in time and in accordance with the requirements may result in the patent being deemed to be void ab initio in the State concerned.

Note to users of the automatic debiting procedure

Unless the EPO receives prior instructions to the contrary, the fee(s) will be debited on the last day of the period of payment. For further details see the Arrangements for the automatic debiting procedure (see Supplement to OJ EPO 2, 2002).



Date 03.08.2005

Sheet 4

Application No.: 01 203 820.4

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Enclosure(s): Form 2056
 28 Copies of the relevant documents



ADDITIONAL SHEET

+++ IMPORTANT INFORMATION +++

1. **For communications under Rule 51(4) EPC issued on or after 01.04.2005 the time limit of four months is not extendable anymore:**

According to Rule 51(4) EPC as amended the time limit set in the communication under Rule 51(4) EPC will be four months in all applications without possibility of extension.

Amended Rule 51(4) EPC applies to all applications for which a communication under Rule 51(4) EPC is issued on or after 01.04.2005.

2. **A copy of the patent specification will only be annexed to the European Patent certificate upon special request within the time limit of the 51(4) EPC communication:**

Under Rule 54 EPC as amended and the decision of the President of the EPO dated 22.12.2004 (OJ EPO 2005, 122) each proprietor will receive the certificate for the European patent together with a copy of the patent specification upon request in writing and only if the request is filed within the time limit of Rule 51(4) EPC. If such request has been previously filed, it has to be confirmed within the time limit of Rule 51(4) EPC. The requested copy is free of charge.

If the request is filed after expiry of the Rule 51(4) EPC time limit, the certificate will be delivered without a copy of the patent specification.

After publication, the European patent specification can be downloaded free of charge from the EPO publication server <https://publications.european-patent-office.org> or ordered from the Vienna sub-office upon payment of a fee (OJ EPO 2005, 126).

As before, upon payment of an administrative fee a duplicate copy of the European patent certificate with the patent specification attached or a certified copy of the patent specification will also be supplied.

SYSTEM AND METHOD FOR CHECKING PARAMETER SETTINGS
OF RADIO NETWORKS

Field of the invention

5 The invention relates to a method and system
 for checking ^{at least one modified} parameter ^{and/or value obtained from changing} settings of a radio network. ~~More~~
 specifically the invention relates to a method and system
 for checking various parameters of components of a cellular
 radio networks on the basis of business rules.

10 at least one operational parameter and/or value
 of an at least one component of a radio network.
 The invention further relates to a computer program, according to the
 preamble of claim 1 corresponding

Background

Fig. 1 shows a schematic representation of a
 contemporary cellular network 1. The architecture of these
 15 cellular networks comprises a network subsystem 2, a base
 station subsystem 3 and a mobile station 4. Examples of
 these cellular networks are GSM and DCS and extensions of
 these networks such as GPRS, UMTS etc. The network
 subsystems main component involves the mobile switching
 20 centre 20 (MSC) providing the interface of the cellular
 network and wire bound networks 5 (PSTN, ISDN, ADSL etc.)
 as well as roaming and call-routing facilities (Home
 Location Register 21, Visitor Location Register 22,
 Equipment Identity Register 23 and Authentication Centre
 25 24).

The base station subsystem 3 consists of a
 number of base stations. The base station subsystem 3
 constitutes the connection between a mobile station 4 and
 the MSC 20. The base station subsystem 3 may be
 30 distinguished into two parts, the Base Transceiver Station
 31 (BTS) and the Base Station Controller 30 (BSC). The BTS
 31 houses radio transceivers that define a cell and handles
 the radio-link protocols with the mobile station 4. In a
 large urban area, there will potentially be a large number

of BTSs deployed. The BSC 30 manages the radio resources for one or more BTSs 31. It handles radio-channel set-up, frequency hopping, and handovers.

The mobile station 4 is the mobile equipment that enables a user to communicate with others through the cellular network. A mobile station 4 usually comprises mobile equipment 41 and a Subscriber Identity Module 42 (SIM).

As the complexity of cellular networks increases flexible operation of these networks becomes more difficult. Configuration and reconfiguration of a cellular network is complex since the parametersettings of the different components of the cellular radio network affect eachother. ^{WO 92/21102} ~~United States Patent 5,343,798~~ of Ericsson, ~~P~~, describes a reconfiguration method and apparatus in which the cell parameters of particular mobile switching centres in a network are copied to a database, and the copied parameters are stored. A set of proposed changes to the stored parameters are prepared and the consistency of the prepared set of proposed changes is verified. Alterations to the set of proposed changes responsive to the verification are made and the verified set of proposed changes are copied to the concerned mobile switching centres. The verified set of proposed changes is then introduced into the network. An up-to-date image of the cell parameters in the mobile switching centres in the network is maintained in a system parameter database.

Problem definition and aims of the invention

Typically a cellular radio network comprises several MSC's and a larger number of base stations. Operation of such cellular radio networks requires a high degree of flexibility in the sense that configuration and reconfiguration of the cellular network has to be possible

within a limited period of time and with a high degree of accuracy. Such a reconfiguration of a radio network can be permanent or temporarily. Reasons for such a reconfiguration are numerous, e.g. a temporary cell split
5 needed to deal with an expected increase in traffic due to an event or the permanent integration of new elements both affecting the settings of already existing elements in the radio network. Therefore sophisticated methods and systems are required that administrate the parameter settings of
10 the various components, e.g. the BTS or BSC, of the cellular radio network and change the parameter settings of said components. Examples of parameters that can be changed include cell type, cell designation, cell direction, signal strength, signal to noise ratio, etc. Moreover means have
15 to be provided in order to check the consistency of the proposed parameter changes before the changes are implemented in the cellular network.

The reconfiguration method and system as revealed by ~~the 1798 patent~~^{wo 92/21182} can be improved with regard to,
20 inter alia, the performed routine to check the consistency of proposed parameter changes.

More particularly an improvement relates to the hierarchical levels that can be checked. The method of ~~the 1798 patent~~^{wo 92/21182} checks the consistency of the proposed
25 parameters only with regard to cells and handovers. Thus only a very limited part of the network hierarchy is checked, resulting in a less reliable and efficient control of the radio network.

~~the 1798 patent~~^{wo 92/21182} Another problem of the method described in
30 ~~the 1798 patent~~ relates to the type of rules used in performing the consistency check. The rules used in performing this check originate solely from technical requirements derived from cellular network technology. There is no possibility to apply rules derived from

operational practice as well. Moreover it is not possible to deviate from the technically sufficient parameter setting requirements if operational practice experience reveals a different more preferable technical parameter setting.

Still another problem of the method described in ^{wo 92/21182} ~~the 1798 patent~~ is that in performing the consistency check only pre-programmed rules are used. This limitation decreases the flexibility of the system for the operator that exploits a cellular radio network. It may be that such an operator is not satisfied with the requirements for the various parameters defined by the supplier of the network. The operator may want to define the requirements, including the technical requirements, himself.

The present invention aims to provide a method and system to check the consistency of the proposed changes of parameters.

□

Summary

The present invention provides a method and system that improve the reliability, flexibility and accuracy required for operating cellular radio networks.

It is an object of the invention to be able to verify the proposed changes in the parameter settings in all hierarchical levels of the radio network and of substantially every, i.e. any desired, relationship between parameters in the same or different hierarchical level of the radio network. By enabling verification on every hierarchical level the control and reliability of the network is significantly improved if changes in the parameter setting are to be implemented.

It is another object of the invention to enable the use of rules developed from operational practice in the verification of the parameter settings in one or

□ US 6,085,335 discloses a self-engineering system to produce new parameters for a communication network on the basis of current operating data and parameters. A simulator is employed to verify the new parameters.

12-05-2004

more of the levels of the network hierarchy and relationship between elements in the cellular radio network. Hereafter the rules used to verify the parameter settings will be referred to as business rules. These
 5 business rules comprise rules related to technically preferable requirements as well as rules derived from operational practice.

It is still another object of the invention to enable the use of programmable rules in the verification
 10 of the proposed changes of the parameter settings in one or more hierarchical levels and relationship of elements in the radio system. These rules may preferably be programmed by the operator of the radio network or at least being ordered or influenced by the operator of the radio network.
 15 Moreover also the error messages if the rules are not obeyed may be operator-programmable.

These objects are achieved by ~~the~~ providing the method, system and computer program according to the characterizing portions of claims 1, 22 and 26 respectively. This will be clarified in the description of the preferred embodiments.

Short description of the drawings
 Fig.1 shows an elementary representation of a
 20 GSM radionetwork;

Fig.2 shows examples of representations of different hierarchies the invention is able to handle;

Fig.3 shows a detailed scheme of the parameter management;

25 Fig.4A,B shows a flow-chart illustrating an example of the business rule checking process;

Fig.5 shows a table of operational examples of business rules;

Fig.6A-B shows a few business rule modules.

30

Description of preferred embodiments of the invention

For the purpose of teaching the invention, preferred embodiments of the method and devices of the invention are described in the sequel. It will be apparent

to the person skilled in the art that other alternative and equivalent embodiments of the invention can be conceived and reduced to practice, ~~without departing from the true spirit of the invention, the scope of the invention being~~
5 ~~only limited by the claims as finally granted.~~

< see figure 2 > A radio network 1, as schematically shown in figure 1 may be represented alternatively by a network hierarchy 11,12 comprising different levels. These levels correspond to physical as well as non-physical parts of
10 radio network 1. The hierarchies 11,12 may differ in their representation between several commercial suppliers of these kinds of radio networks 1. As an example figure 2 shows the network hierarchies of Ericsson 11 and Nokia 12 radio networks 1. It can be observed that the Ericsson and
15 Nokia hierarchies 11 and 12 differ in some aspects, but are equivalent in other aspects.

The Ericsson hierarchy 11 comprises a MSC level 20. The MSC 20 is coupled to a transcoder 32 (TRC) and a BSC/TRC 33. The next level comprises the BSC 30. This
20 BSC 30 may be linked to the TRC 32 or the BSC/TRC 33. In the case that a GPRS radio network should be represented an additional element Service GPRS Support Node 34 (SGSN) is introduced. The SGSN 34 may comprise different hierarchical levels itself. Next the Ericsson hierarchy 11 shows a Radio
25 Base System 35 (RBS) level. The RBS may be linked to a BSC 30 or a BSC/TRC 33. Afterwards a handover 36 (HO) and the BTS 31 are shown. Finally the Ericsson hierarchy 11 exhibits a transceiver level 37 (TRX) and a channel level 38 (CH).

30 The Nokia hierarchy 12 differs from the Ericsson hierarchy in some aspects. Firstly the TRC 32 and BSC/TRC 33 level are replaced by an Operational Maintenance Centre 25 (OMC). Moreover whereas the Ericsson hierarchy 11 contains TRC and BSC/TRC levels, the Nokia hierarchy

implements the OMC-level 25. The Ericsson hierarchy 11 and the Nokia hierarchy 12 are equivalent below the RBS 35 and the BCF ~~39~~ respectively.

It is noticed that the network hierarchies of
5 Ericsson 11 and Nokia 12 are only examples. Other network suppliers might handle different network hierarchies. The method and system according to the invention are suited for these network hierarchies as well.

It is one of the objects of the invention to
10 provide a method and system to handle the parameter settings in these kind of hierarchies. More specifically a method and system are provided to supply operators of cellular radio networks with a control facility on each and every hierarchical level and on relationships between
15 elements of the radio network before changes in the parameter settings are implemented into the network.

Figure 3 shows an example of a process flow according to a preferred embodiment of the invention. The parameters and/or values uploaded from the radio network 1
20 may originate from each of the hierarchical levels shown in figure 2. E.g. in the case of the Nokia hierarchy 11 the parameters may be uploaded from the Nokia omc 25, whereas in case the Ericsson hierarchy 12 is applied parameters obtained from the Ericsson MSC 20 may be uploaded. The
25 database 62 can be distinguished into three parts indicated as omc 63, ref 64 and mut 65. The omc part contains the operational parameters and values as set for the radio network. The ref part 64 contains the preferred new or changed parameters and values to be implemented in the
30 radio network. The mut part 65 contains the parameters and values that are subject to a change proposal from user 69. A database with frequency plans 67 and a database with location data 68 can be present. A list of differences 66 can be generated containing the differences between the

actual radio network and its representation in the omc part of the database. The user 69 handles the list of differences and can choose to change some parameter values. A system administrator may add or delete parameters. All
5 these changes are made into the mut part 65 of the database 62. The mutated parameters are checked by the business rule checker 70 and put in the ref part 64 of the database 62 if the changed parameters obey the business rules applied to them or no business rule exists for the changed parameter
10 or value. A delta list 76 is generated holding the values of the parameters that differ from the original values. These parameter values are implemented in the radio network 1 by means of a command file generator 75 and a downloader 77. Both the business rule modules and the command file are
15 scripts as indicated by 72 and 73.

The method and system according to an aspect of the invention relate to the management and control of the various parameters in a cellular radio network. Therefore the various parameters and/or values can be
20 stored in a database, indicated by 62 in figure 3. This database might be a commercially available database such as MS Access or Oracle. The method and system according to an aspect of the invention for storing the parameters and/or values uses a technique which will be referred to as the
25 compressed row technique. One of the advantages of this technique is a simplification of manipulating data within a given database. Furthermore this technique limits the number of records to an acceptable level and new parameters may be added easily. Also differences between sets of
30 parameters can be obtained quickly by comparison between the relevant strings instead of comparing individual parameters.

Basically the compressed row technique involves a convenient database which is linked to a

descriptive database. Therefore a database applying compressed row techniques contains at least two separate parts. The first part may store the real data as strings, the second part may contain the descriptive information
5 needed to process the real data from the first part. The second part will be referred to as the repository.

A preferable mechanism to apply the compressed row technique comprises the following steps. For every hierarchical level of the radio network 1 a parameter
10 table is formed in the database 62. In this parameter table all the parameters of all elements in the radio network of that hierarchical level are stored. For each element the parameters are divided into parameter groups, each parameter group containing a string (compressed row)
15 storing multiple parameters that may be divided by semi-colons. Each group of parameters has a number assigned that indicates the nature of the group. Finally each group of parameters includes an identifier corresponding to the element. In the repository table for each parameter the
20 group and the field within that group for that parameter is stored. To find the relevant element corresponding to an element identifier a hierarchy table is used. Various level-tables link the element identifiers to the parameter strings.

25 A simple example will clarify the mechanism described. Suppose that the value of the parameter BS_TX_PWR_MAX of base station 8662 (the maximum transmission power of that particular base station) is being sought. The hierarchy table HIERARCHY_OMC_BTS contains a
30 base station with identifier 8662. Next it is deduced from the repository that the parameter being sought is e.g. located in parameter group 2 in field 9. The repository indicates moreover that the value on this location is expressed in dBm. The level table BTS_OMC then indicates

that for this particular BTS a parameterstring for group 2 exists containing e.g. the string
1;8;1;4;1;8;1;1;0;15;1;0;0;2;0;0;0;0;;;. The 9th value in this string is 0 which probably indicates that the BTS with
5 identifier 8662 is not active.

The example above is a simplified case. There are values of parameters that can not be obtained in this direct way, but have to be obtained indirectly by means of a translate table. In that case the parameter has a
10 translate identifier in the repository. By means of a field identifier, uniquely defining the parameter, the value of the parameter can be obtained from the translate table.

The business rule checker 70 performs a control function before parameters and/or values are implemented in the cellular radio network. In most cases there is a inter-dependency of the various parameters and values of parameters and therefore checking of new and modulated parameters and values before implementation in the network is preferable. However not only the bare technical sufficient requirements set for the various parameters should be checked. Since contemporary cellular radio networks have reached an considerable amount of complexity several other non-technical requirements as e.g. administrative data should preferably be checked as well. As e.g. the operators administration indicates all cells for 900 MHz GSM with a cell_id starting with #1 and all cells for 1800 MHz DCS with cell_id starting with #6, these requirements should be part of the business rule check as well before configuration or reconfiguration of the network takes place.

Moreover it is preferable that the bare technical sufficient requirements can be altered according to rules obtained from daily operational use of the radio network. It can e.g. be technically sufficient to have a

channel distance of 20 Hz between different cells. All channel distances above this value then will pass the bcc/bcch consistency check. However, in practice it may be that a channel difference of 50 Hz between the cells

5 guarantees a more reliable operation. In that case, according to the invention, it is possible to use the preferred channel distance of 50 Hz as obtained from the operational practice as a business rule instead of the technically sufficient channel distance. Such a technical

10 requirement will hereinafter referred to as a preferred technical requirement.

The business rule checker 70 can use the hierarchy tables from the repository part of the database 62. The business rules may be formulated by the user and

15 implemented as a script.

Figures 4A and 4B show a flow chart to illustrate schematically the application of business rules to parameter changes for the radio network 1 as proposed by

20 the user 69. In the first step 81 a parameter group that is changed in mut 65 is read. Next the hierarchical level is determined from this parameter group at 82 and subsequently the parameter is found at 83. For this parameter it may be that no business rule has been defined or programmed. In

25 that case 84 the parameter is put directly into the ref part 64 of database 62 and is ready to be implemented in the radio network 1. If a business rule does exist for the particular parameter that business rule is read at 85. It is checked whether the parameter does obey the business

30 rule. If the parameter does not obey the business rule an error list is generated and the parameter and corresponding value are put on that list at 86. If the parameter does obey to the business rule defined or programmed for that parameter the next step is to find out whether other

parameters have been changed that belong to the parameter group under consideration. These parameters may run through the same series of steps as described above. If all the changed parameters have been put to the business rule test as described above, it is determined whether other parameter groups have been changed as well. The same series of steps as described above may be applied to the parameters belonging to that parameter group. Finally if all the parameter groups have been checked, the business rule checker 70 stops at step 87. As a result of the business rule checking process the parameters that obey the business rules defined or programmed for them are put in the ref part 64 of the database 62 at step 88 and are ready to be implemented in the radio network 1. If the parameters or values do not obey the business rules the parameters and corresponding values appear on the generated error list and after finalisation of the business rule checking of all the parameter groups this error list is put to the user. The user then has to correct the parameters, as shown at step 89. The corrected parameters or values then can be put to the ref part 64 of database 62 as well. Now the complete set of parameters and corresponding values does obey the business rules and is ready to be implemented to the cellular radio network 1. Although in figures 4A and B only individual parameters are checked whether or not they obey a business rule, also relations of parameters can be checked on a business rule (see e.g. figure 6A as discussed below).

Figure 5 shows a table of business rules defined for a particular type of cellular radio network 1. It is stressed that an almost infinite amount of these kind of business rules can be defined so the rules shown in figure 5 only give a few examples. The table shown in figure 5 shows columns defining a business rule

identification number BR_ID, the state of the business rule, the file name or module, the iteration level and the message to be shown when a parameter does not obey the business rule. Additional columns can include e.g. the
5 priority level, author of the business rule, date of modification, version number, remarks etc.

The state of a business rule establishes whether that business rule is taken into consideration when the business rule checking is performed. It is not
10 necessary that all the business rules have to be checked in a particular configuration or reconfiguration project with regard to the radio network. It may be up to the user to select the business rules he wants to apply. However it may be that some business rules have to be checked at all times
15 and therefore can not be put aside by the user. Business rules can e.g. be applied by running a main script calling the separate business rule modules selected by the user or imposed by the system.

The iteration level relates to the
20 hierarchical level of the elements of the cellular radio network to be checked. Generally, if the business rule is defined or programmed for another element at the same or a higher hierarchical level the iteration level will be higher than the highest of the hierarchical levels of all
25 the elements involved for that specific business rule. An example of such a business rule is shown in figure 5 and 6B as module bts013.br. If the business rule is defined for the element internally the iteration level and the hierarchical level are the same. An example of such a
30 business rule is shown in figure 5 and 6A as module bcf002.br.

The message relates to the messages shown to the user in the generated error list at 86 when a parameter or value does not obey the business rule applied to that

parameter or value. These error messages are operator-programmable as well. Different error levels can be distinguished, such as a blocking message (i.e. a serious error indicating that the proposed change may not be implemented in the radio network under any circumstances) or a warning message (i.e. an error indicating that the proposed change is not desirable, but does not do harm to the operation of the cellular radio network if implemented). Other error levels can be used as well, like e.g. engineering messages indicating that the change to be implemented does not achieve the optimal result.

The description column of the table in figure 5 defines the business rule in human language. In figure 6 the contents of some of the files used for the business rule check are displayed.

Figures 6A-^B show a few examples of business rule modules that are also mentioned in the table of figure 5. Figure 6A shows the script of the business rule module bcf002.br, which is a business rule of the administrative kind as mentioned previously. It checks whether the requirement that a BCF 29 of type DE21 has more than 3 BTS's 31 connected according to e.g. the Nokia hierarchy 12 of figure 2. If it does, a blocking message appears on the error list indicating to the user 69 that that particular BCF does have more than 3 BTS's.

Figure 6B shows the script of the business rule module bts013.br. It states that one Access Grant Block (AGB) is required for each Basic Communication Channel. A blocking message appears if the business rule is not obeyed.

~~Figure 6C shows the script of the business rule module bts015.br, which is a business rule of the technical kind as mentioned above. This module checks the number of TRX's for each LABD link. A LABD link basically~~

~~represents a direct or indirect physical link between two~~
or more BSC's. For a bitrate of 16 respectively 64 a
maximum of 12 resp. 10 TRX's is allowed for each LABB-link.
If this requirement is not obeyed, a blocking message
5 appears on the error list.

Figure 6D shows the script of the business
rule module ho006.br, which is a business rule of the
technical kind as mentioned previously. This module checks
whether a cell has neighbour BTS's with the same base
10 station communication channel BCCH. A warning message is
~~generated on the error list if this happens to be the case.~~

It is explicitly stated that the examples
and embodiments as described in this section do not limit
15 the scope of the invention in any way. Modifications of the
examples and embodiments fall within the scope of this
application. E.g. it may be advantageous to distribute
the cellular radio network amongst several geographic
regions each of these regions having an operator. Basically
20 the same system of network management, including the
business rule checker, can be applied in this situation.
Measures can be taken to avoid conflicts when more than one
user 69 tries to change the parameter settings in his
region, especially around the borderlines of the respective
25 regions. This possible conflict can be solved by allowing
only one proposal to change the parameters. The system
signals succeeding users trying to change the same
parameters that an earlier proposal has already been made
including the data of that particular user.

30 Another modification may be that proposals
can be stored instead of being implemented immediately.
This option is particularly relevant in the framework of
more projects. Several projects can be identified, e.g.
mass- updates involving future optimisation of large

numbers of parameters or the pre-integration of new network elements. More projects may be planned simultaneously based on the same set of data. In order to avoid conflicts between projects it is possible to establish a 'frozen state' for a limited period.

5

Druckexemplar

17

CLAIMS

- (BS-TX-PWR-MAX)
1. Method for checking at least one modified parameter^y and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network^y on the basis of at least one business rule comprising at least one operational requirement deduced from operational use of the radio network^y and deviating from technically sufficient parameter setting requirements.
 2. Method according to claim 1 wherein the at least one modified parameter^y and/or value is checked before implementation in the radio network^y comprising the steps of
 - (62) copying to a database^y the at least one operational parameter and/or value from the radio network;
 - (1) changing the at least one operational parameter and/or value to the at least one modified parameter^y and/or value;
 - (BS-TX-PWR-MAX) checking the at least one modified parameter^y and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.
 3. Method according to claim 2 wherein a non-compliance signal is generated if the at least one modified parameter^y does not obey the at least one operational requirement.
 4. Method according to claims 2 or 3 in which the at least one operational parameter is stored in a first part of the database⁽⁶²⁾ and the at least one modified parameter^y is stored in a second part of the database⁽⁶²⁾.

03-01-2005

5. Method according to claim 4 in which the first and second part of the database⁽⁶²⁾ are separate databases.
- 5 6. Method according to any of the claims 2-5 in which at least one of the the at least one operational parameter^(BS-TX-PWR-MAX) or the at least one modified parameter⁽⁶²⁾ is stored in the database⁽⁶²⁾ using a compressed row technique.
- 10 7. Method according to any of the claims 2-5 in which the database⁽⁶²⁾ comprises at least one hierarchy table to store and have access to the at least one operational parameter and the at least one modified parameter^(BS-TX-PWR-MAX).
- 15 8. Method according to claim 7 in which the at least one hierarchy table is used for checking whether the at least one modified parameter[^] obeys the at least one selected business rule. ^(BS-TX-PWR-MAX)
- 20 9. Method according to any of the preceding claims in which the at least one modified parameter^(BS-TX-PWR-MAX) relates to at least one level of a GSM or DCS network hierarchy.
10. Method according to claim 9 in which the levels of the
- 25 GSM network hierarchy are ~~MSC, OMC, BSC, BCF and/or BTS~~ mobile switching centre (MSC)(20), operational maintenance centre (OMC)(25), base station controller (BSC)(30), bearer control function (29) and/or base transceiver station (BTS)(31).
11. Method according to claim 9 or 10 in which ⁽³¹⁾ the levels of the GSM network hierarchy are ~~TRX, HO and/or CH~~ transceiver level (TRX)(37), hand-over (HO)(36) and/or channel level (CH)(30)
- 30 12. Method according to any of the ~~preceding~~¹⁻⁸ claims in which the at least one modified parameter[^] relates to at least one level of a GPRS hierarchy. ^(BS-TX-PWR-MAX)

13. Method according to claim 12 in which the levels of the GPRS hierarchy are ~~MSC, OMC, BSC, SGSN, BCF and/or BTS~~ mobile switching centre (MSC)(20), operational maintenance centre (OMC)(25), base station controller (BSC)(30), serving GPRS support node (SGSN)(34), bearer control function (BCF)(29) f
14. Method according to claim 13 in which the levels of ^(->)
- 5 the GPRS hierarchy are ~~TRX, HO and/or CH~~ transceiver level (TRX)(37), hand-over (HO)(36) and/or channel level (CH)(38)
15. Method according any of the claims 9-14 in which the checking of the at least one modified parameter ^(BS-TX-PWR-MAX) and/or value by verifying whether the at least one selected
- 10 business rule comprising at least one operational requirement has been obeyed is applied to at least one of the levels of the GSM, DCS or GPRS hierarchy.
16. Method according to any of claims 9-15 wherein
- 15 relationships are checked between different operational and/or modified parameters in the same or different hierarchical levels of the radio network.
17. Method according to any of the preceding claims in
- 20 which the at least one selected business rule is programmed by an operator or at least ordered or influenced by the operator ⁽⁶⁹⁾ of the radio network ⁽¹⁾.
18. Method according to any of the preceding claims in
- 25 which the at least one operational ~~practice~~ requirement involves an administrative requirement.
19. Method according to claim 17 in which the operational ~~practice~~ requirement involves a technically preferable
- 30 requirement programmed, ordered and/or influenced by the operator of the radio network ⁽⁶⁹⁾ ⁽¹⁾.

20

20. Method according to claim 3 in which the non-compliance signal is a file or message displayed to an operator.

- 5 21. Method according to claim 3 or 20 in which the non-compliance signal is programmable.

22. A system⁽⁶⁰⁾ for checking at least one modified parameter^(85, TX, PWR, MPR) and/or value obtained from changing at least one operational parameter and/or value of at least one component of a radio network⁽⁶³⁾ on the basis of at least one checking business rule comprising at least one operational requirement derived from operational use of the radio network⁽⁶³⁾ and deviating from technically sufficient parameter setting requirements.

15

23. System⁽⁶⁰⁾ according to claim 22 for checking the at least one modified parameter and/or value before implementation in the radio network⁽⁶³⁾, comprising:
 a first part⁽⁶³⁾ of a database⁽⁶²⁾ to store the at least one operational parameter and/or value from the radio network
 a second part⁽⁶³⁾ of a database⁽⁶²⁾ to store the at least one modified parameter and/or value;
 a business rule checker⁽⁷¹⁾ verifying whether the at least one modified parameter and/or value obeys the at least one operational requirement;

25

24. System⁽⁶⁰⁾ according to claim 23 wherein a signal generator can generate a non-compliance signal if the at least one modified parameter^(85, TX, PWR, MPR) does not obey the at least one operational requirement.

30

25. System⁽⁶⁰⁾ according to claims 23 or 24 further comprising scripting means⁽⁷²⁾ in order to define business rules and/or error messages to be used by the business rule checker.⁽⁷¹⁾

26. ~~Radio network comprising at least one component~~
 comprising at least one operational parameter and/or value
 5 that can be changed to at least one modified parameter
 and/or value wherein the at least one modified parameter
 and/or value can be checked on the basis of at least one
 business rule derived from operational use of the radio
 network.
- 10 27. Radio network according to claim 26 wherein the at
 least one operational parameter and the at least one
 modified parameter relate to at least one level of a GSM,
~~GPRS or GPRS hierarchy of the radio network.~~
- 15 28. Computer program for running on a computer system
 comprising software code portions for checking at least one
 modified parameter ^(BS-TX.pwr.max) and/or value obtained from changing at
 least one operational parameter and/or value of an at least
 20 one component of a radio network ^{characterized in that said checking is performed} on the basis of at least
 one business rule comprising at least one operational
 requirement derived from operational use of the radio
 network ⁽¹⁾ and deriving from technically sufficient parameter setting requirements.
- 25 ²⁷ 29. Computer program ^{according to claim 28, further} ~~for running on a computer system~~
 comprising software code portions for checking the at least
 one modified parameter ^(BS-TX.pwr.max) and/or value before implementation
 in the radio network ⁽¹⁾ comprising the steps of
 copying to a database ⁽⁶²⁾ the at least one
 30 operational parameter and/or value from the radio network; ⁽¹⁾
 changing the at least one operational
 parameter and/or value to the at least one modified
 parameter and/or value;

22

checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.

5

20 ~~30~~. Computer program according to claim ²⁶~~27~~ or ²⁷~~28~~ wherein at least one of the the at least one operational parameter or the at least one modified parameter is stored in a database (62) using a compressed row technique.

10

~~31. Data carrier stored with data loadable in a computer memory said data representing a computer program for running on a computer system at least including software code portions for checking at least one modified parameter and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network on the basis of at least one business rule comprising at least one operational requirement derived from operational use of the radio~~
20 network.

32. Data carrier according to claim 31 wherein software code portions are provided for checking the at least one modified parameter and/or value before implementation in
25 the radio network comprising the steps of

copying to a database the at least one operational parameter and/or value from the radio network;

changing the at least one operational parameter and/or value to the at least one modified
30 parameter and/or value;

checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.

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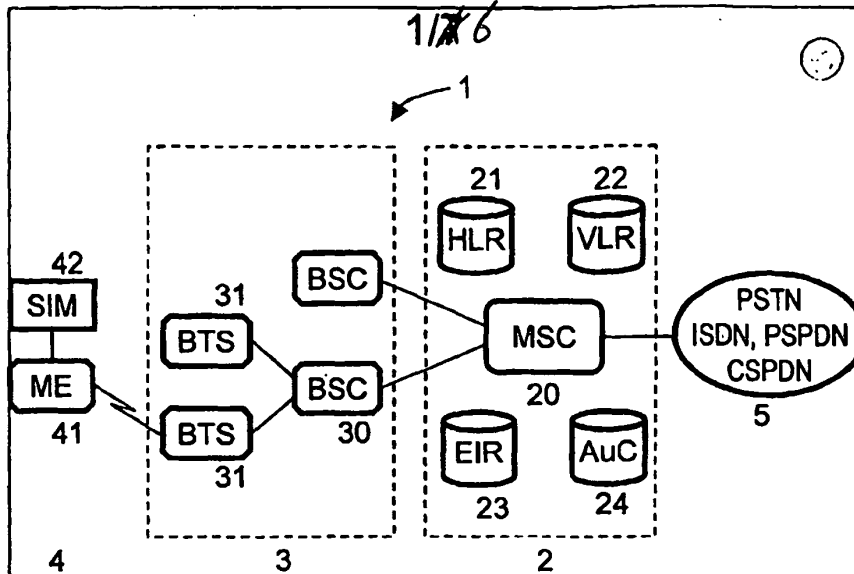


FIG. 1

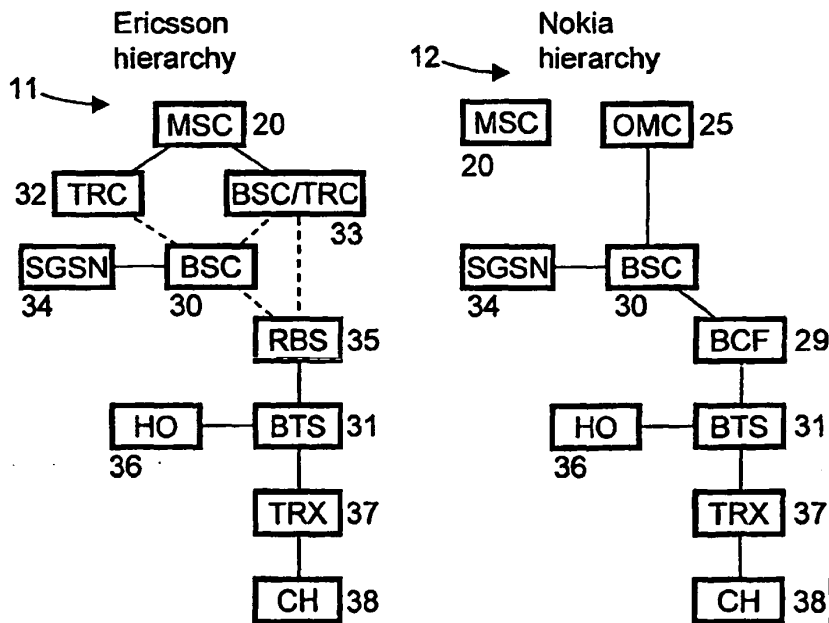
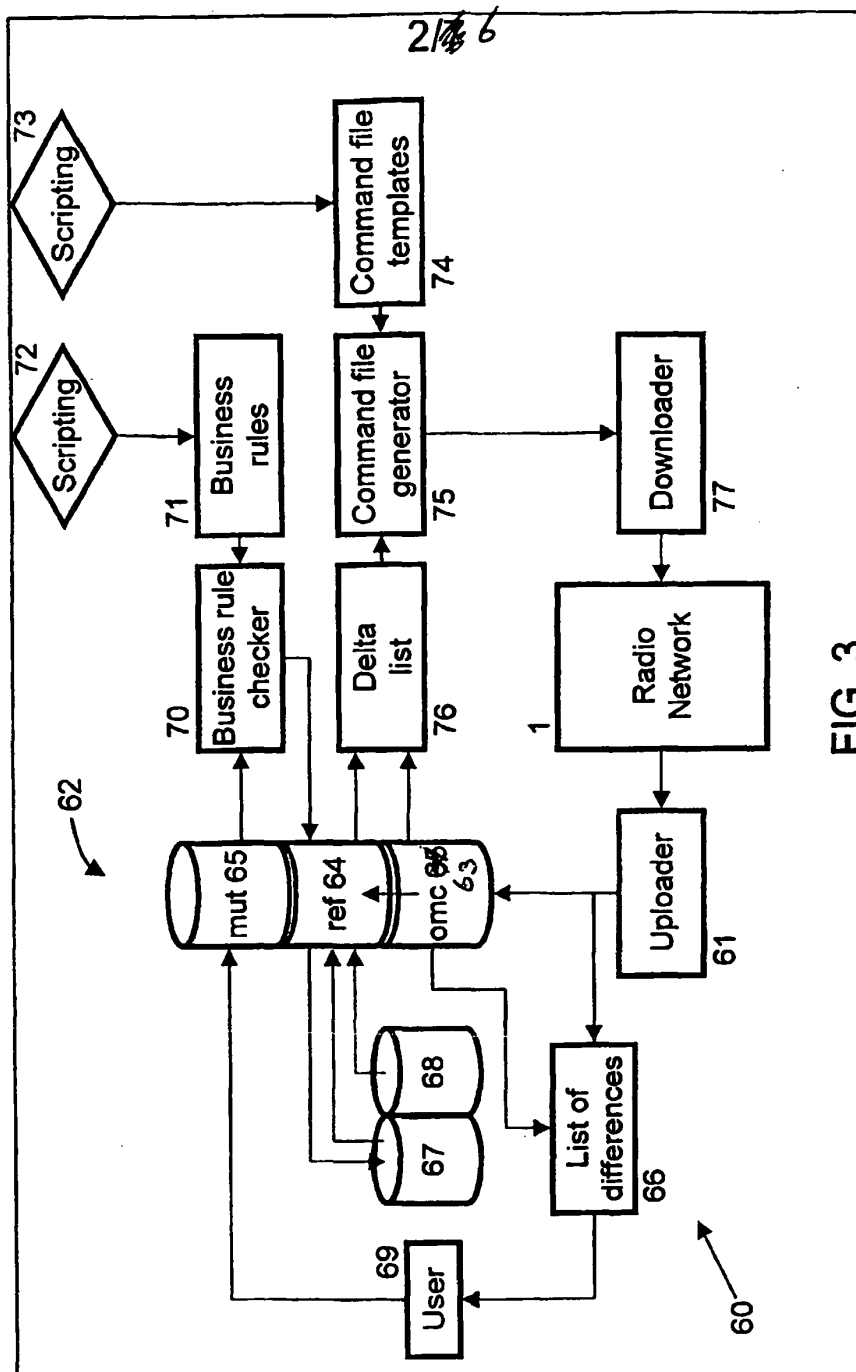


FIG. 2



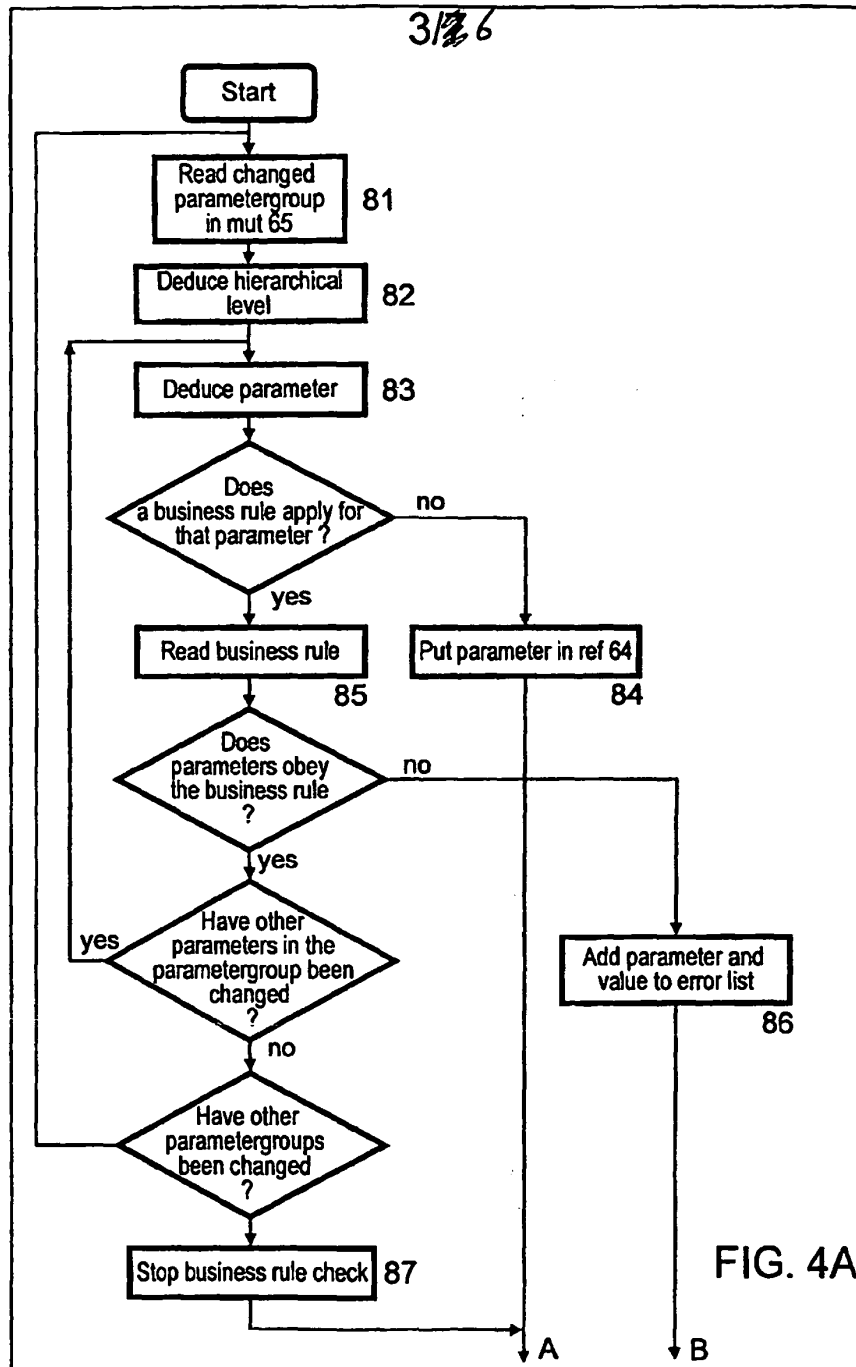


FIG. 4A

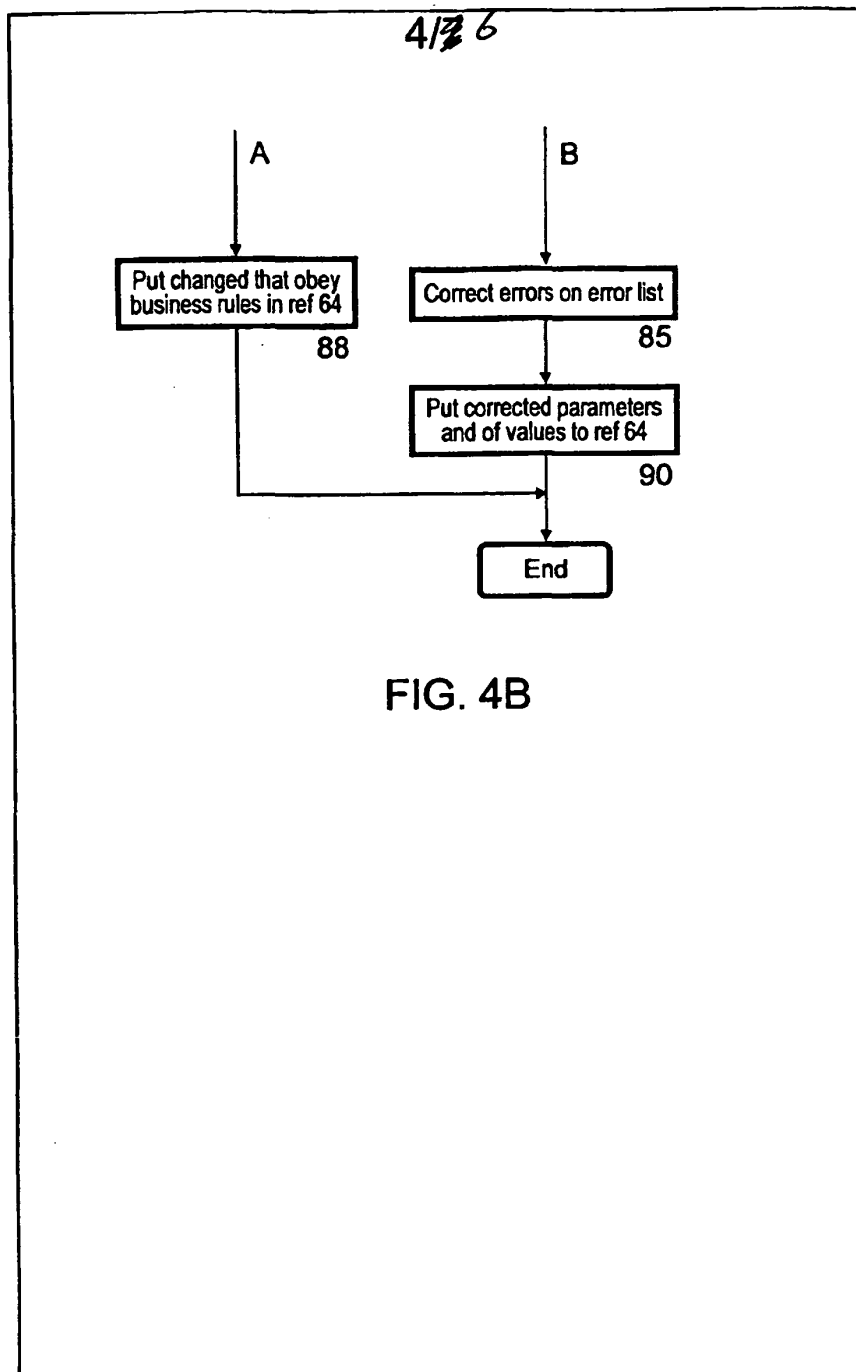


FIG. 4B

5/16

BR ID	STATE	MODULE	DESCRIPTION	ITERATION LEVEL	MESSAGE
2	1	bcf002.br	A BCF of type DE21 has a maximum of 3 BTS's	BCF - BTS	BLOCKING
4	1	bcf004.br	A BCF of type DE45 has a maximum of 1 BTS	BCF - BTS	BLOCKING
5	1	bcf005.br	A BCF has a maximum of 12 TRX's	BCF - TRX	BLOCKING
27	3	bts012.br	A BTS having > 3 TRX's has a additional SDCCH-channel	BTS - TRX	WARNING
28	1	bts013.br	At a combined BCCH 0...2 "no blocks for access grant" have to be used	BTS - CH	BLOCKING
29	1	bts014.br	At a non-combined BCCH 0...7 "no blocks for access grant" have to be used	BTS - CH	BLOCKING
30	3	bts015.br	Check on number of TRX's per LABD-link	BCF - TRX	WARNING
62	1	ho006.br	Preferably a cell has no neighbours using the same BCCH	BTS - TRX	WARNING
63	0	ho009.br	Neighbours are basically bi-directional	BTS - HO	WARNING
64	3	ho010.br	The sum of handover margin pbgt Should be larger than 0	BTS - HO	WARNING
79	1	trx001.br	Frequency difference of at least 2 channels of TRX's on same site for different BTS's	BTS - TRX	BLOCKING
83	1	trx004.br	A TRX has a LABD-link	TRX	BLOCKING
85	0	trx009.br	A new TRX is assigned a dummy frequency	TRX	BLOCKING
104	1	ch004.br	The BCCH has to be defined on TRX1	BTS-TRX-CH	WARNING

Figure 5

6/36

```
Iterate1Start(BCF)
  ResetCounter1
  If [BCF.bcf_type] == "$DE21" Then
    Iterate2Start(BTS)
    IncrementCounter1
  Iterate2End
  EndIf
  If Counter1 > "3" Then
    logBlocking(BCF,BCF of type DE21 exceeds maximum of 3 BTS's)
  EndIf
Iterate1End
```

Fig. 6A (module bcf002.br)

```
Iterate1Start(BTS)
  If [BTS.no_of_blocks_for_access_grant1] > "2" Then
    Iterate2Start(CH)
    If [CH.channel_type] == table(chMode,"MBCCB") Then
      logWarning(BTS,To much AccessGrantBlocks have been defined)
    EndIf
  Iterate2End
  EndIf
Iterate1End
```

Fig. 6B (module bts013.br)

CLAIMS

- (BS-TX-PWR-max)
1. Method for checking at least one modified parameter^Y
and/or value obtained from changing at least one
5 operational parameter and/or value of an at least one
component of a radio network⁽¹⁾ on the basis of at least
one business rule comprising at least one operational
requirement deduced from operational use of the radio
network⁽¹⁾ and deviating from technically sufficient parameter setting
10 requirements
 2. Method according to claim 1 wherein the at least one
modified parameter⁽¹⁾ and/or value is checked before
implementation in the radio network⁽¹⁾ comprising the steps
of
15 copying to a database⁽⁶²⁾ the at least one
operational parameter and/or value from the radio
network;⁽¹⁾
changing the at least one operational
parameter and/or value to the at least one modified
20 parameter⁽¹⁾ and/or value;
checking the at least one modified parameter^Y and/or value by verifying whether the at least one
selected business rule comprising the at least one
operational requirement has been obeyed.
 - 25 3. Method according to claim 2 wherein a non-compliance
signal is generated if the at least one modified
parameter⁽¹⁾ does not obey the at least one operational
requirement.
 - 30 4. Method according to claims 2 or 3 in which the at least
one operational parameter is stored in a first part⁽⁶³⁾ of
the database⁽⁶²⁾ and the at least one modified parameter^Y is
stored in a second part⁽⁶²⁾ of the database.

20. Method according to claim 3 in which the non-compliance signal is a file or message displayed to an operator.

- 5 21. Method according to claim 3 or 20 in which the non-compliance signal is programmable.

22. A system⁽⁶⁰⁾ for checking at least one modified parameter^(85_TX_PWR_MAX) and/or value obtained from changing at least one operational parameter and/or value of at least one component of a radio network⁽¹⁾ on the basis of at least one checking business rule comprising at least one operational requirement derived from operational use of the radio network⁽¹⁾ and deviating from technically sufficient parameter setting requirements

- 15 23. System according to claim 22 for checking the at least one modified parameter and/or value before implementation in the radio network⁽¹⁾, comprising:
 a first part⁽⁶³⁾ of a database⁽⁶²⁾ to store the at least one operational parameter and/or value from the radio network
 20 a second part⁽⁶³⁾ of a database⁽⁶²⁾ to store the at least one modified parameter and/or value;
 a business rule checker⁽⁷¹⁾ verifying whether the at least one modified parameter and/or value obeys the at least one operational requirement;

24. System⁽⁶⁰⁾ according to claim 23 wherein a signal generator can generate a non-compliance signal if the at least one modified parameter^(85_TX_PWR_MAX) does not obey the at least one operational requirement.

25. System⁽⁶⁰⁾ according to claims 23 or 24 further comprising scripting means⁽⁷²⁾ in order to define business rules and/or error messages to be used by the business rule checker.⁽⁷¹⁾

- ~~26. Radio network comprising at least one component comprising at least one operational parameter and/or value~~
 5 that can be changed to at least one modified parameter and/or value wherein the at least one modified parameter and/or value can be checked on the basis of at least one business rule derived from operational use of the radio network.
- 10 27. Radio network according to claim 26 wherein the at least one operational parameter and the at least one modified parameter relate to at least one level of a GSM, ~~GPRS or GPRS hierarchy of the radio network.~~
- 15 26. ~~28.~~ Computer program for running on a computer system comprising software code portions for checking at least one modified parameter ^(BS_TX_PWR_MAX) and/or value obtained from changing at least one operational parameter and/or value of an at least
 20 one component of a radio network on the basis of at least one business rule comprising at least one operational requirement derived from operational use of the radio network.⁽¹⁾ and deriving from technically sufficient parameter setting requirements
- 27 25. ²⁶ Computer program ~~for running on a computer system~~ ^{according to claim 20, further} comprising software code portions for checking the at least one modified parameter ^(BS_TX_PWR_MAX) and/or value before implementation in the radio network⁽¹⁾ comprising the steps of
 copying to a database⁽⁶²⁾ the at least one
 30 operational parameter and/or value from the radio network;⁽¹⁾
 changing the at least one operational parameter and/or value to the at least one modified parameter and/or value;

checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.

5

27 28

28 ~~30~~. Computer program according to claim ~~28~~ or ~~29~~ wherein at least one of the the at least one operational parameter or the at least one modified parameter is stored in a database (62) using a compressed row technique.

10

~~31. Data carrier stored with data loadable in a computer~~
memory said data representing a computer program for running on a computer system at least including software code portions for checking at least one modified parameter
15 and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network on the basis of at least one business rule comprising at least one operational requirement derived from operational use of the radio
20 network.

32. Data carrier according to claim 31 wherein software code portions are provided for checking the at least one modified parameter and/or value before implementation in
25 the radio network comprising the steps of

copying to a database the at least one operational parameter and/or value from the radio network;

changing the at least one operational parameter and/or value to the at least one modified
30 parameter and/or value;

checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.



EPO - Munich
17
03. Jan. 2005

Date
December 20, 2004
Your letter of
June 23, 2004
Our reference
402706EP

European Patent Office
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D-80298 MÜNCHEN
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Subject: EP Patent application 01 203 820.4-2412

This letter is in response to the Communication of Art. 96(2) EPC of 23 June 2004 for the above-captioned application. The applicant herewith submits an amended set of claims, the subject-matter of which is believed to be patentable for the following reasons.

Basis for the amendments (Art. 123 EPC)

Independent claims 1, 22 and 26 have been amended by adding the phrase: *and deviating from technically sufficient parameter setting requirements*. The basis for this amendment can be found on page 4, lines 3 and 4 of the application as filed. Although this sentence defines a problem of the prior art, it is submitted that the present invention clearly solves this problem as is clear from page 4, line 32 - page 5, line 7 and page 10, line 13 - page 11, line 11 of the application as filed.

Clarity (Art. 84 EPC)

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It is submitted that the word "sufficient" introduced with the amended phrase is clear within the context of the present application. This can be illustrated by reference to the paragraph ranging from page 10, line 31 to page 11, line 11, wherein a preferred technical requirement is contrasted with a sufficient technical requirement. The message of this paragraph is that a technical requirement that is theoretically sufficient does not guarantee reliable operation of the radio network, while a preferred technical requirement does. The invention allows checking of business rules comprising such preferable technical requirements.

Novelty (Art. 54 EPC)

The applicant respectfully submits that D1 does not teach the use of business rules with requirements deviating from the technically sufficient parameter setting requirements in the consistency check described on page 22, lines 4 - 30 of D1. The Examiner referred in the first full paragraph on page 2 of the Communication to lines 13-15 on page 22 for D1. The rule wherein the base station power level corresponds to the size of the cell is a perfect example of a technically sufficient requirement. This is a 'known' rule. However, the business rule for checking the parameter setting of the radio network may require that the base station power level should in fact be somewhat larger than the required cell size due to e.g. signal disturbing objects in the area covered by this base station. In other words, the business rule may deviate from the known rule.

On the other hand, should one interpret this known rule as that the cell size is solely determined by the base station power level, i.e. there exists a one-to-one relationship between cell size and base station power level, no deviation is possible between cell size and base station power level



and, accordingly, this known rule does not constitute an example of a requirement deviating from a technically sufficient parameter setting requirement.

In contrast to the Examiners opinion, the applicant thus submits that a business rule according to the invention is different from the 'known' rules of D1.

Similarly, D2 does not mention the use of rules relating to requirements deviating from technically sufficient parameter setting requirements.

Accordingly, the subject-matter of the independent claims 1, 22 and 26 is novel.

Inventive step (Art. 56 EPC)

The applicant respectfully disagrees with the view of the Examiner on the interpretation of D2. As is clear from Fig. 6 of D2, the rules referred to in D2 only play a role in the production of new operating parameters and do not form part of any verification, checking or simulation process. The simulator referred to in D2 only simulates operation of the communication system based on the newly produced operating parameters. In this simulation, statistical techniques are applied as is clear from column 14, lines 57 - column 15, line 3. D2 does neither teach nor suggest that any rules, let alone business rules with operational requirements deviating from technically sufficient parameter setting requirements, are applied in the method for checking modified parameters for the radio network.

The applicant does not agree with the Examiner that the skilled person would combine documents D1 and D2. However, as neither D1 nor D2 discloses a method or system for checking



Our reference:
402706EP

Date:
December 20, 2004

modified parameters or parameter values on the basis of business rules comprising at least one operational requirement deviating from technically sufficient parameter setting requirements, also the combination of D1 and D2 does not disclose this feature. Accordingly, the method, system and computer program as defined in independent claims 1, 22 and 26 involve an inventive step.

Dependent claims

The applicant submits that, now the amended independent claims comply with the requirements for patentability, the dependent claims can be maintained in the application.

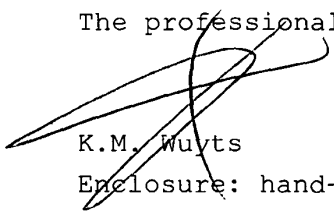
Formal requirements

The applicant believes that all formal requirements have been complied with in his response to the first Communication of the Examiner. Incorrect references have been corrected in claims 27 and 28.

Summary

The applicant request favourable action of the Examiner for the amended claims as these claims are believed to comply with the requirements of novelty and inventive step.

The professional representative,



K.M. Wuyts

Enclosure: hand-amended pages 17, 20-22.



European Patent Office
Directorate General 2
D-80298 MÜNCHEN
Deutschland



Date
December 20, 2004
Your letter of
June 23, 2004
Our reference
402706EP



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Subject: EP Patent application 01 203 820.4-2412

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Clarity (Art. 84 EPC)

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Empf.zeit:21/12/2004 12:01

Empf.nr.:151 P.001



Our reference:

402706EP

Date:

December 20, 2004

It is submitted that the word "sufficient" introduced with the amended phrase is clear within the context of the present application. This can be illustrated by reference to the paragraph ranging from page 10, line 31 to page 11, line 11, wherein a preferred technical requirement is contrasted with a sufficient technical requirement. The message of this paragraph is that a technical requirement that is theoretically sufficient does not guarantee reliable operation of the radio network, while a preferred technical requirement does. The invention allows checking of business rules comprising such preferable technical requirements.

Novelty (Art. 54 EPC)

The applicant respectfully submits that D1 does not teach the use of business rules with requirements deviating from the technically sufficient parameter setting requirements in the consistency check described on page 22, lines 4 - 30 of D1. The Examiner referred in the first full paragraph on page 2 of the Communication to lines 13-15 on page 22 for D1. The rule wherein the base station power level corresponds to the size of the cell is a perfect example of a technically sufficient requirement. This is a 'known' rule. However, the business rule for checking the parameter setting of the radio network may require that the base station power level should in fact be somewhat larger than the required cell size due to e.g. signal disturbing objects in the area covered by this base station. In other words, the business rule may deviate from the known rule.

On the other hand, should one interpret this known rule as that the cell size is solely determined by the base station power level, i.e. there exists a one-to-one relationship between cell size and base station power level, no deviation is possible between cell size and base station power level

2 van 4

Empf.zeit:21/12/2004 12:01

Empf.nr.:151 P.002



Our reference:
102706EP
Date:
December 20, 2004

and, accordingly, this known rule does not constitute an example of a requirement deviating from a technically sufficient parameter setting requirement.

In contrast to the Examiners opinion, the applicant thus submits that a business rule according to the invention is different from the 'known' rules of D1.

Similarly, D2 does not mention the use of rules relating to requirements deviating from technically sufficient parameter setting requirements.

Accordingly, the subject-matter of the independent claims 1, 22 and 26 is novel.

Inventive step (Art. 56 EPC)

The applicant respectfully disagrees with the view of the Examiner on the interpretation of D2. As is clear from Fig. 6 of D2, the rules referred to in D2 only play a role in the production of new operating parameters and do not form part of any verification, checking or simulation process. The simulator referred to in D2 only simulates operation of the communication system based on the newly produced operating parameters. In this simulation, statistical techniques are applied as is clear from column 14, lines 57 - column 15, line 3. D2 does neither teach nor suggest that any rules, let alone business rules with operational requirements deviating from technically sufficient parameter setting requirements, are applied in the method for checking modified parameters for the radio network.

The applicant does not agree with the Examiner that the skilled person would combine documents D1 and D2. However, as neither D1 nor D2 discloses a method or system for checking

3 van 4

Empf.zeit:21/12/2004 12:02

Empf.nr.:151 P.003



Our reference:
402706EP

Date:
December 20, 2004

modified parameters or parameter values on the basis of business rules comprising at least one operational requirement deviating from technically sufficient parameter setting requirements, also the combination of D1 and D2 does not disclose this feature. Accordingly, the method, system and computer program as defined in independent claims 1, 22 and 26 involve an inventive step.

Dependent claims

The applicant submits that, now the amended independent claims comply with the requirements for patentability, the dependent claims can be maintained in the application.

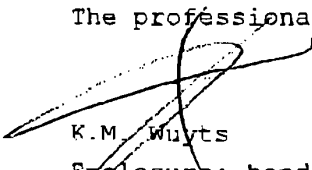
Formal requirements

The applicant believes that all formal requirements have been complied with in his response to the first Communication of the Examiner. Incorrect references have been corrected in claims 27 and 28.

Summary

The applicant request favourable action of the Examiner for the amended claims as these claims are believed to comply with the requirements of novelty and inventive step.

The professional representative,



K.M. Wuyts

Enclosure: hand-amended pages 17, 20-22.

4 van 4

Empf.zeit:21/12/2004 12:02

Empf.nr.:151 P.004

CLAIMS

(BS-TX-PWR-max)

1. Method for checking at least one modified parameter^y and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network⁽¹⁾ on the basis of at least one business rule comprising at least one operational requirement deduced from operational use of the radio network⁽¹⁾ and deriving from technically sufficient parameter setting requirements⁽¹⁾

5
2. Method according to claim 1 wherein the at least one modified parameter^y and/or value is checked before implementation in the radio network⁽¹⁾ comprising the steps of

10

copying to a database⁽⁶²⁾ the at least one operational parameter and/or value from the radio network⁽¹⁾;

changing the at least one operational parameter and/or value to the at least one modified parameter⁽⁶²⁾ and/or value;

20

checking the at least one modified parameter^y and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.

25
3. Method according to claim 2 wherein a non-compliance signal is generated if the at least one modified parameter^y does not obey the at least one operational requirement.

30
4. Method according to claims 2 or 3 in which the at least one operational parameter is stored in a first part⁽⁶²⁾ of the database⁽⁶²⁾ and the at least one modified parameter^y is stored in a second part⁽⁶²⁾ of the database.

35

20. Method according to claim 3 in which the non-compliance signal is a file or message displayed to an operator.

5 21. Method according to claim 3 or 20 in which the non-compliance signal is programmable.

(85_TX_PWR_max)
22. A system⁽⁶⁰⁾ for checking at least one modified parameter^r and/or value obtained from changing at least one
10 operational parameter and/or value of at least one component of a radio network¹⁰ on the basis of at least one checking business rule comprising at least one operational requirement derived from operational use of the radio network⁽¹⁾ and deviating from technically sufficient parameter setting requirements

15 23. System according to claim 22 for checking the at least one modified parameter and/or value before implementation in the radio network⁽¹⁾ comprising:
a first part⁽⁶¹⁾ of a database to store the at least one
20 operational parameter and/or value from the radio network⁽⁶²⁾
a second part⁽⁶³⁾ of a database to store the at least one modified parameter and/or value;
a business rule checker⁽⁷¹⁾ verifying whether the at least one modified parameter and/or value obeys the at least one
25 operational requirement;

(60)
24. System^r according to claim 23 wherein a signal generator can generate a non-compliance signal if the at least one modified parameter^(85_TX_PWR_max) does not obey the at least one
30 operational requirement.

(60)
25. System according to claims 23 or 24 further comprising scripting means⁽⁷²⁾ in order to define business rules and/or error messages to be used by the business rule checker.⁽⁷³⁾

26. Radio network comprising at least one component comprising at least one operational parameter and/or value that can be changed to at least one modified parameter and/or value wherein the at least one modified parameter and/or value can be checked on the basis of at least one business rule derived from operational use of the radio network.
27. Radio network according to claim 26 wherein the at least one operational parameter and the at least one modified parameter relate to at least one level of a GSM, GPRS or GPRS hierarchy of the radio network.
28. Computer program for running on a computer system comprising software code portions for checking at least one modified parameter and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network on the basis of at least one business rule comprising at least one operational requirement derived from operational use of the radio network.⁽¹⁾ and deriving from technically sufficient parameter setting requirements
29. Computer program ²⁶ according to claim 28, further comprising software code portions for checking the at least one modified parameter and/or value before implementation in the radio network comprising the steps of
 copying to a database ⁽⁶²⁾ the at least one operational parameter and/or value from the radio network;⁽¹⁾
 changing the at least one operational parameter and/or value to the at least one modified parameter and/or value;

checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.

5
27 28^p
29 30. Computer program according to claim 28 or 29 wherein at least one of the the at least one operational parameter or the at least one modified parameter is stored in a database(62) using a compressed row technique.

10
31. ~~Data carrier stored with data loadable in a computer~~
memory said data representing a computer program for running on a computer system at least including software code portions for checking at least one modified parameter
15 and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network on the basis of at least one business rule comprising at least one operational requirement derived from operational use of the radio
20 network.

32. Data carrier according to claim 31 wherein software code portions are provided for checking the at least one modified parameter and/or value before implementation in
25 the radio network comprising the steps of
copying to a database the at least one operational parameter and/or value from the radio network;
changing the at least one operational parameter and/or value to the at least one modified
30 parameter and/or value;
checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.



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Datum/Date 28-10-2004

Zeichen/Ref./Réf. 402706EP	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°. 01203820.4-2412/
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire Koninklijke KPN N.V.	

EXTENSION OF TIME LIMIT PURSUANT TO RULE 84 EPC

Examination procedure

With reference to your request, the time limit for replying to the communication dated 23.06.04 has been extended

by 2 months
to a total of 6 months,

from the date of notification of the above-mentioned communication.

Please note: To the extent that your request exceeded the above extension, your request has been refused.

Note:

The granting of extensions to time limits is governed by the implementing Regulations to the EPC and the Guidelines for Examination in the EPO, part E-VIII, 1.6.

If no reply to the communication is received in due time, the European patent application will be deemed to be withdrawn (Article 96(3) EPC).

For the Examining Division:

BENIGAR M D Eozenou, Bernard
Tel. No.: (+49-89) 2399-2996





EPO - M. Mich
17
27 Okt. 2004

Date
October 21, 2004
Your letter of
June 23, 2004
Our reference
402706EP

European Patent Office
Directorate General 2
D-80298 MÜNCHEN
Duitsland



Enclosure(s)

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E-mail
a.d.m.michel@kpn.com

Subject: EP Patent Application 01 203 820.4-2412

Referring to the Communication pursuant to Article 96(2) EPC dated 23 June 2004, concerning the above-mentioned patent application please be informed that the applicant requests an extension of time of two months for reply.

Please acknowledge receipt of this letter by returning the copy of this letter.

The Professional Representative,

K.M. Wuyts

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European Patent Office
Directorate General 2
D-80298 MÜNCHEN
Deutschland



Date
October 21, 2004

Your letter of
June 23, 2004

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Subject: EP Patent Application 01 203 820.4-2412

Referring to the Communication pursuant to Article 96(2) EPC dated 23 June 2004, concerning the above-mentioned patent application please be informed that the applicant requests an extension of time of two months for reply.

Please acknowledge receipt of this letter by returning the copy of this letter.

The Professional Representative,

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Empf.zeit: 21/10/2004 15:08

Empf.nr.: 011 P.001

	Bescheid/Protokoll (Anlage)		Communication/Minutes (Annex)		Notification/Procès-verbal (Annexe)	
	Datum	23.06.2004	Blatt	1	Anmelde-Nr.:	01 203 820.4
	Date		Sheet		Application No.:	
	Date		Feuille		Demande n°:	

The examination is being carried out on the **following application documents**:

Text for the Contracting States:

AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR LI

Description, pages:

7-13,16	as originally filed			
1-6,14,15	as received on	12.05.2004	with letter of	06.05.2004

Claims, No.:

1-28	as received on	12.05.2004	with letter of	06.05.2004
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Drawings, sheets:

1/6-6/6	as received on	12.05.2004	with letter of	06.05.2004
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1. Even after having taken into consideration the arguments advanced by the Applicant in his reply dated 06.05.2004 regarding inventive step of the subject-matter of the present independent claims in the light of a combination of the prior art disclosed in documents **D1** and **D2**, and after having reconsidered the subject-matter of said claims in the light of this prior art, the **same** considerations as made in paragraphs 2 and 3 of the first communication dated 24.02.2004 in respect of inventive step of said claims are **maintained**.
2. The following comments are made in respect of the argumentation brought forward by the Applicant in his letter dated 06.05.2004:

The Examiner agrees in principle with the analysis of document **D1** provided by the Applicant in his letter ranging from the third paragraph on the first page to the second paragraph on the second page, as this analysis is about in line with the



Examiner's considerations made in paragraph 2 of the first communication dated 24.02.2004.

However, the Examiner is of the opinion that the checking in document **D1** is not merely based on "technical requirements", as document **D1** mentions testing (ie. checking) of parameters and/or values "to determine that they follow a number of known rules" (see eg. page 22, lines 13 to 18), wherein the rules each comprise at least one operational requirement (see eg. page 22, lines 13 to 15); furthermore, the "rules" defined in document **D1** are seen to correspond to the "business rules" of claim 1 as the term "business rules" does not imply anything different from the general term "rules".

It would be immediately apparent to the skilled person that, as the method for checking disclosed in document **D1** is based on **predetermined** business rules comprising **fixed** operational requirements, a major **disadvantage** of this known method is that it lacks flexibility of the definition of said business rules, eg. in dependence of operator requirements or operation thereof. The resulting **objective technical problem** related to the solution proposed in document **D1** thus can, as the Applicant correctly points out in the fourth paragraph on page 2 of his letter, be formulated as how to improve the certainty on the reliability of the radio network if the parameters have been modified.

In consulting the prior art in the general field of radio network reconfiguration, the skilled person, wishing to find a solution to overcome the above mentioned objective technical problem, would come across document **D2** (see in particular abstract; column 3, lines 16 to 55; column 4, lines 48 to 53; column 14, line 57 to column 15, line 17) which describes the **principle of** modifying operational parameters in a radio network (see in particular column 3, lines 16 to 24, **wherein it is clearly stated** that new operating parameters are produced on the basis of current operating data and current operating parameters, ie. the current operating parameters are modified) and checking said modified parameters on the basis of rules comprising operational requirements **deduced from** operational use of the radio network (see in particular column 4, lines 48 to 53; column 14, line 57 to column 15, line 3; **note that** the simulator performs checking of the modified parameters based on rules comprising operational requirements deduced from



operational use of the radio network, such as long and short term RSSI and C/I measurements, BER, ...).

In the second paragraph on page 3 of his letter, the **Applicant** is of the opinion that "D2 does not mention or suggest to use such knowledge for the subsequent process of checking the modified parameters". The **Examiner**, however, respectfully disagrees to this opinion, as document **D2** discloses **two** steps, the **first** being the production of new operating parameters on the basis of current operating data and current operating parameters, ie. the current operating parameters are modified (see in particular column 4, lines 48 to 52), and the **second** being to verify (ie. to check) these modified parameters by the simulator based on rules comprising operational requirements deduced from operational use of the radio network (see in particular column 4, lines 52 to 58 taken in combination with column 14, line 57 to column 15, line 3 and column 15, lines 14 to 23).

For the skilled person, therefore, starting from the method described in document **D1** and being aware both of the above disadvantage thereof and of the **principle** of the solution described in document **D2** (ie. checking on the basis of rules comprising operational requirements deduced from operational use of the radio network), it would be obvious to apply said principle to the method of document **D1**, in order to arrive at a method wherein the above disadvantage has been over-come.

The skilled person would thus arrive, **without** the exercise of inventive skill, at the method for checking corresponding to the subject-matter of claim 1.

The subject-matter of **claim 1** therefore does **not** involve an inventive step, Articles 52 (1) and 56 EPC, and thus claim 1 is **not** allowable.

The same considerations also apply to independent **claims 22 and 26** as said claims 22 and 26 include the same feature combination as claim 1 in terms of claims relating to a system and, respectively, computer program.

3. Furthermore, as present dependent claims 2 to 21, 23 to 25 and 27 to 28 corres-

**Bescheid/Protokoll (Anlage)**

Datum
Date 23.06.2004
Date

Communication/Minutes (Annex)

Blatt
Sheet 4
Feuille

Notification/Procès-verbal (Annexe)

Anmelde-Nr.:
Application No.: 01 203 820.4
Demande n°:

pond to previous claims 2 to 21, 23 to 25 and 29 to 30, the same considerations as already made in paragraphs 4 (for present claim 27) and 5 of the first communication dated 24.02.2004 remain valid for said present dependent claims 2 to 21, 23 to 25 and 27 to 28.

4. Due to the above reasons, it is at present still **not** apparent which part of the application could serve as a basis for a new, allowable claim. Should the Applicant nevertheless, despite the negative opinion expressed by the Examining Division both in the present communication and in the previous communication dated 24.02.2004, regard some particular matter of the present application as patentable, an independent claim including such particular matter should, **within the limits of Article 123 (2) EPC**, be filed taking account of Rule 29 (1) EPC. The Applicant should also indicate in the letter of reply the difference vis à vis the state of the art and the significance thereof (i.e. particular advantages).

In his letter of reply, the Applicant should indicate the parts of the originally filed application serving as a basis for subject-matter newly introduced into the claims !

5. Should the Applicant intend to file a new set of claims, the following requirements should also be taken into consideration:
- 5.1 The opening part of the description should be modified to bring it into agreement with any new independent claim, Rule 27 (1) (c) EPC. In particular, the definition of the problem to be solved and of the object of the invention should - in view of the nearest available prior art - be redefined (within the limits of Article 123 (2) EPC).
- 5.2 Claim 27 should be dependent on claim **26**, and claim 28 should be dependent on claim **26** or **27**, Article 84 EPC.
6. Care should be taken during revision not to add subject-matter which extends

**Bescheid/Protokoll (Anlage)**

Datum
Date
Date

23.06.2004

Communication/Minutes (Annex)

Blatt
Sheet
Feuille

5

Notification/Procès-verbal (Annexe)

Anmelde-Nr.:
Application No.: 01 203 820.4
Demande n°:

beyond the content of the application as originally filed, Article 123 (2) EPC.

In his letter of reply, the Applicant should indicate the parts of the originally filed application serving as a basis for subject-matter newly introduced into the claims.



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(Formalities and other matters)



Application No. 01 203 820.4 - 2412	Ref. 402706EP	Date 23.06.2004
Applicant Koninklijke KPN N.V.		

Communication pursuant to Article 96(2) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 78(2) and 83(2) and (4) EPC.

One set of amendments to the description, claims and drawings is to be filed within the said period on separate sheets (Rule 36(1) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 96(3) EPC).



RABE M O
Primary Examiner
for the Examining Division

Enclosure(s): 5 page/s reasons (Form 2906)

CLAIMS

(BS-TX-PWR-max)

1. Method for checking at least one modified parameter⁽¹⁾ and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network⁽¹⁾ on the basis of at least one business rule comprising at least one operational requirement deduced from operational use of the radio network⁽¹⁾.
 5
2. Method according to claim 1 wherein the at least one modified parameter⁽¹⁾ and/or value is checked before implementation in the radio network⁽¹⁾ comprising the steps of
 10
 - (62)
 15 copying to a database⁽¹⁾ the at least one operational parameter and/or value from the radio network;
 changing the at least one operational parameter and/or value to the at least one modified parameter⁽¹⁾ and/or value;
 20 (BS-TX-PWR-max)
 checking the at least one modified parameter⁽¹⁾ and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.
 25
3. Method according to claim 2 wherein a non-compliance signal is generated if the at least one modified parameter⁽¹⁾ does not obey the at least one operational requirement.
 30
4. Method according to claims 2 or 3 in which the at least one operational parameter is stored in a first part⁽⁶³⁾ of the database⁽⁶²⁾ and the at least one modified parameter⁽¹⁾ is stored in a second part of the database.⁽⁶²⁾
 35

5. Method according to claim 4 in which the first and second part of the database⁽⁶²⁾ are separate databases.
- 5 6. Method according to any of the claims 2-5 in which at least one of the the at least one operational parameter or the at least one modified parameter⁽⁶²⁾ is stored in the database⁽⁶²⁾ using a compressed row technique.
- 10 7. Method according to any of the claims 2-5 in which the database⁽⁶²⁾ comprises at least one hierarchy table to store and have access to the at least one operational parameter and the at least one modified parameter⁽⁶²⁾.
- 15 8. Method according to claim 7 in which the at least one hierarchy table is used for checking whether the at least one modified parameter⁽⁶²⁾ obeys the at least one selected business rule. ^(BS-TX-PWR-MAX)
- 20 9. Method according to any of the preceding claims in which the at least one modified parameter⁽⁶²⁾ relates to at least one level of a GSM or DCS network hierarchy.
10. Method according to claim 9 in which the levels of the
- 25 GSM network hierarchy are ~~MSC, OMC, BSC, BCF and/or BTS~~ mobile switching centre (MSC)(20), operational maintenance centre (OMC)(25), base station controller (BSC)(36), bearer control function (29) and/or base transceiver station (BTS)
11. Method according to claim 9 or 10 in which ⁽³⁴⁾ the levels of the GSM network hierarchy are ~~TRX, HO and/or CH~~ transceiver level (TRX)(37), hand-over (HO)(36) and/or
- 30 channel level (CH)(38)
12. Method according to any of the ~~preceding~~¹⁻⁸ claims in which the at least one modified parameter⁽⁶²⁾ relates to at least one level of a GPRS hierarchy. ^(BS-TX-PWR-MAX)

and/or base transceiver station (BTS)(31)

19

13. Method according to claim 12 in which the levels of the GPRS hierarchy are ~~MSC, OMC, BSC, SGSN, BCF and/or BTS~~ mobile switching centre (MSC)(20), operational maintenance centre (OMC)(25), base station controller (BSC)(30), serving GPRS support node (SGSN)(34), bearer control function (BCF)(29) ~~and~~

14. Method according to claim 13 in which the levels of the GPRS hierarchy are ~~TRX, HO and/or CH~~ transceiver level (TRX)(37), hand-over (HO)(36) and/or channel level (CH)(38)

15. Method according any of the claims 9-14 in which the checking of the at least one modified parameter^{BS-TX.pwr-max} and/or value by verifying whether the at least one selected business rule comprising at least one operational requirement has been obeyed is applied to at least one of the levels of the GSM, DCS or GPRS hierarchy.

16. Method according to any of claims 9-15 wherein relationships are checked between different operational and/or modified parameters in the same or different hierarchical levels of the radio network.

17. Method according to any of the preceding claims in which the at least one selected business rule is programmed by an operator or at least ordered or influenced by the operator of the radio network.

(6g)

(1)

18. Method according to any of the preceding claims in which the at least one operational ~~practice~~ requirement involves an administrative requirement.

19. Method according to claim 17 in which the operational ~~practice~~ requirement involves a technically preferable requirement programmed, ordered and/or influenced by the operator of the radio network.

(6g)

(1)

20. Method according to claim 3 in which the non-compliance signal is a file or message displayed to an operator.

- 5 21. Method according to claim 3 or 20 in which the non-compliance signal is programmable.

22. A system⁽⁶⁰⁾ for checking at least one modified parameter⁽⁶¹⁾ and/or value obtained from changing at least one operational parameter and/or value of at least one component of a radio network⁽⁶¹⁾ on the basis of at least one checking business rule comprising at least one operational requirement derived from operational use of the radio network.⁽¹⁾

10

- 15 23. System according to claim 22 for checking the at least one modified parameter⁽⁶³⁾ and/or value before implementation in the radio network⁽¹⁾, comprising:
- a first part⁽⁶³⁾ of a database⁽⁶²⁾ to store the at least one operational parameter and/or value from the radio network
- 20 a second part⁽⁶³⁾ of a database⁽⁶²⁾ to store the at least one modified parameter and/or value;
- a business rule checker⁽⁷¹⁾ verifying whether the at least one modified parameter and/or value obeys the at least one operational requirement;
- 25

24. System⁽⁶⁰⁾ according to claim 23 wherein a signal generator can generate a non-compliance signal if the at least one modified parameter⁽⁶³⁾ does not obey the at least one operational requirement.

30

25. System⁽⁶⁰⁾ according to claims 23 or 24 further comprising scripting means⁽⁷²⁾ in order to define business rules and/or error messages to be used by the business rule checker.⁽⁷¹⁾

26. ~~Radio network comprising at least one component~~
 comprising at least one operational parameter and/or value
 5 that can be changed to at least one modified parameter
 and/or value wherein the at least one modified parameter
 and/or value can be checked on the basis of at least one
 business rule derived from operational use of the radio
 network.
- 10 27. Radio network according to claim 26 wherein the at
 least one operational parameter and the at least one
 modified parameter relate to at least one level of a GSM,
~~GPRS or GPRS hierarchy of the radio network.~~
- 15 26. ~~28.~~ Computer program for running on a computer system
 comprising software code portions for checking at least one
 modified parameter ^(BS-TX-PWR-MAX) and/or value obtained from changing at
 least one operational parameter and/or value of an at least
 20 one component of a radio network on the basis of at least
 one business rule comprising at least one operational
 requirement derived from operational use of the radio
 network.⁽¹⁾
- 27 25. ^{according to claim 20, further} ~~Computer program for running on a computer system~~
 comprising software code portions for checking the at least
 one modified parameter ^{BS-TX-PWR-MAX} and/or value before implementation
 in the radio network.⁽¹⁾ comprising the steps of
 copying to a database ⁽⁶²⁾ the at least one
 30 operational parameter and/or value from the radio network;⁽¹⁾
 changing the at least one operational
 parameter and/or value to the at least one modified
 parameter and/or value;

checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.

5

20 ~~30~~. Computer program according to claim 28 or 29 wherein at least one of the the at least one operational parameter or the at least one modified parameter is stored in a database (62) using a compressed row technique.

10

~~31. Data carrier stored with data loadable in a computer memory said data representing a computer program for running on a computer system at least including software code portions for checking at least one modified parameter and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network on the basis of at least one business rule comprising at least one operational requirement derived from operational use of the radio~~
 15 ~~network.~~
 20 ~~network.~~

32. Data carrier according to claim 31 wherein software code portions are provided for checking the at least one modified parameter and/or value before implementation in
 25 the radio network comprising the steps of
 copying to a database the at least one operational parameter and/or value from the radio network;
 changing the at least one operational parameter and/or value to the at least one modified
 30 parameter and/or value;
 checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.

~~39. Data carrier according to claims 31 or 32 wherein
software code portions are provided for executing the
method as claimed in any of the claims 3 - 21.~~

SYSTEM AND METHOD FOR CHECKING PARAMETER SETTINGS OF RADIO NETWORKS

Field of the invention

5 The invention relates to a method and system
for checking ^{at least one modified} parameter ^{and/or value obtained from changing} ~~settings of a radio network. More~~
specifically the invention relates to a method and system
for checking various parameters of components of a cellular
~~radio networks on the basis of business rules.~~

10 at least one operational parameter and/or value
or at least one component of a radio network.
The invention further relates to a computer program according to the
preamble of claim 4

Background

Background

Fig. 1 shows a schematic representation of a contemporary cellular network 1. The architecture of these cellular networks comprises a network subsystem 2, a base station subsystem 3 and a mobile station 4. Examples of these cellular networks are GSM and DCS and extensions of these networks such as GPRS, UMTS etc. The network subsystems main component involves the mobile switching centre 20 (MSC) providing the interface of the cellular network and wire bound networks 5 (PSTN, ISDN, ADSL etc.) as well as roaming and call-routing facilities (Home Location Register 21, Visitor Location Register 22, Equipment Identity Register 23 and Authentication Centre 24).

The base station subsystem 3 consists of a number of base stations. The base station subsystem 3 constitutes the connection between a mobile station 4 and the MSC 20. The base station subsystem 3 may be distinguished into two parts, the Base Transceiver Station 31 (BTS) and the Base Station Controller 30 (BSC). The BTS 31 houses radio transceivers that define a cell and handles the radio-link protocols with the mobile station 4. In a large urban area, there will potentially be a large number

which is considered the closest prior art,

2

of BTSSs deployed. The BSC 30 manages the radio resources for one or more BTSSs 31. It handles radio-channel set-up, frequency hopping, and handovers.

The mobile station 4 is the mobile equipment
5 that enables a user to communicate with others through the cellular network. A mobile station 4 usually comprises mobile equipment 41 and a Subscriber Identity Module 42 (SIM).

As the complexity of cellular networks increases
10 flexible operation of these networks becomes more difficult. Configuration and reconfiguration of a cellular network is complex since the parametersettings of the different components of the cellular radio network affect eachother. ^{WO 92/21102} ~~United States Patent 5,343,790~~ of Ericsson, ~~P~~,
15 describes a reconfiguration method and apparatus in which the cell parameters of particular mobile switching centres in a network are copied to a database, and the copied parameters are stored. A set of proposed changes to the stored parameters are prepared and the consistency of the
20 prepared set of proposed changes is verified. Alterations to the set of proposed changes responsive to the verification are made and the verified set of proposed changes are copied to the concerned mobile switching centres. The verified set of proposed changes is then
25 introduced into the network. An up-to-date image of the cell parameters in the mobile switching centres in the network is maintained in a system parameter database.

Problem definition and aims of the invention

30 Typically a cellular radio network comprises several MSC's and a larger number of base stations. Operation of such cellular radio networks requires a high degree of flexibility in the sense that configuration and reconfiguration of the cellular network has to be possible

within a limited period of time and with a high degree of accuracy. Such a reconfiguration of a radio network can be permanent or temporarily. Reasons for such a reconfiguration are numerous, e.g. a temporary cell split
 5 needed to deal with an expected increase in traffic due to an event or the permanent integration of new elements both affecting the settings of already existing elements in the radio network. Therefore sophisticated methods and systems are required that administrate the parameter settings of
 10 the various components, e.g. the BTS or BSC, of the cellular radio network and change the parameter settings of said components. Examples of parameters that can be changed include cell type, cell designation, cell direction, signal strength, signal to noise ratio, etc. Moreover means have
 15 to be provided in order to check the consistency of the proposed parameter changes before the changes are implemented in the cellular network.

The reconfiguration method and system as revealed by ~~the '798 patent~~^{wo 92/21102} can be improved with regard to,
 20 inter alia, the performed routine to check the consistency of proposed parameter changes.

More particularly an improvement relates to the hierarchical levels that can be checked. The method of ~~the '798 patent~~^{wo 92/21102} checks the consistency of the proposed
 25 parameters only with regard to cells and handovers. Thus only a very limited part of the network hierarchy is checked, resulting in a less reliable and efficient control of the radio network.

~~the '798 patent~~^{wo 92/21102} Another problem of the method described in
 30 ~~the '798 patent~~ relates to the type of rules used in performing the consistency check. The rules used in performing this check originate solely from technical requirements derived from cellular network technology. There is no possibility to apply rules derived from

operational practice as well. Moreover it is not possible to deviate from the technically sufficient parameter setting requirements if operational practice experience reveals a different more preferable technical parameter setting.

Still another problem of the method described in ^{WO 92/21182} ~~the 1798 patent~~ is that in performing the consistency check only pre-programmed rules are used. This limitation decreases the flexibility of the system for the operator that exploits a cellular radio network. It may be that such an operator is not satisfied with the requirements for the various parameters defined by the supplier of the network. The operator may want to define the requirements, including the technical requirements, himself.

The present invention aims to provide a method and system to check the consistency of the proposed changes of parameters.

□

Summary

The present invention provides a method and system that improve the reliability, flexibility and accuracy required for operating cellular radio networks.

It is an object of the invention to be able to verify the proposed changes in the parameter settings in all hierarchical levels of the radio network and of substantially every, i.e. any desired, relationship between parameters in the same or different hierarchical level of the radio network. By enabling verification on every hierarchical level the control and reliability of the network is significantly improved if changes in the parameter setting are to be implemented.

It is another object of the invention to enable the use of rules developed from operational practice in the verification of the parameter settings in one or

□ US 6,085,335 discloses a self-engineering system to produce new parameters for a communication network on the basis of current operating data and parameters. A simulator is employed to verify the new parameters.

more of the levels of the network hierarchy and relationship between elements in the cellular radio network. Hereafter the rules used to verify the parameter settings will be referred to as business rules. These
 5 business rules comprise rules relate to technically preferable requirements as well as rules derived from operational practice.

It is still another object of the invention to enable the use of programmable rules in the verification
 10 of the proposed changes of the parameter settings in one or more hierarchical levels and relationship of elements in the radio system. These rules may preferably be programmed by the operator of the radio network or at least being ordered or influenced by the operator of the radio network.
 15 Moreover also the error messages if the rules are not obeyed may be operator-programmable.

These objects are achieved by ~~the~~ providing the method, system and computer program according to the characterizing portions of claims 1, 22 and 26 respectively. This will be clarified in the description of the preferred embodiments.

Short description of the drawings
 Fig.1 shows an elementary representation of a
 20 GSM radionetwork;

Fig.2 shows examples of representations of different hierarchies the invention is able to handle;

Fig.3 shows a detailed scheme of the parameter management;

25 Fig.4A,B shows a flow-chart illustrating an example of the business rule checking process;

Fig.5 shows a table of operational examples of business rules;

Fig.6A-~~D~~^B shows a few business rule modules.

30

Description of preferred embodiments of the invention

For the purpose of teaching the invention, preferred embodiments of the method and devices of the invention are described in the sequel. It will be apparent

to the person skilled in the art that other alternative and equivalent embodiments of the invention can be conceived and reduced to practice, ~~without departing from the true spirit of the invention, the scope of the invention being~~
 5 ~~only limited by the claims as finally granted.~~

A radio network 1, as schematically shown in figure 1 may be represented alternatively by a network hierarchy 11,12 comprising different levels. These levels correspond to physical as well as non-physical parts of
 10 radio network 1. The hierarchies 11,12 may differ in their representation between several commercial suppliers of these kinds of radio networks 1. As an example figure 2 shows the network hierarchies of Ericsson 11 and Nokia 12 radio networks 1. It can be observed that the Ericsson and
 15 Nokia hierarchies 11 and 12 differ in some aspects, but are equivalent in other aspects.

The Ericsson hierarchy 11 comprises a MSC level 20. The MSC 20 is coupled to a transcoder 32 (TRC) and a BSC/TRC 33. The next level comprises the BSC 30. This
 20 BSC 30 may be linked to the TRC 32 or the BSC/TRC 33. In the case that a GPRS radio network should be represented an additional element Service GPRS Support Node 34 (SGSN) is introduced. The SGSN 34 may comprise different hierarchical levels itself. Next the Ericsson hierarchy 11 shows a Radio
 25 Base System 35 (RBS) level. The RBS may be linked to a BSC 30 or a BSC/TRC 33. Afterwards a handover 36 (HO) and the BTS 31 are shown. Finally the Ericsson hierarchy 11 exhibits a transceiver level 37 (TRX) and a channel level 38 (CH).

30 The Nokia hierarchy 12 differs from the Ericsson hierarchy in some aspects. Firstly the TRC 32 and BSC/TRC 33 level are replaced by an Operational Maintenance Centre 25 (OMC). Moreover whereas the Ericsson hierarchy 11 contains TRC and BSC/TRC levels, the Nokia hierarchy

parameter or value. These error messages are operator-programmable as well. Different error levels can be distinguished, such as a blocking message (i.e. a serious error indicating that the proposed change may not be implemented in the radio network under any circumstances) or a warning message (i.e. an error indicating that the proposed change is not desirable, but does not do harm to the operation of the cellular radio network if implemented). Other error levels can be used as well, like e.g. engineering messages indicating that the change to be implemented does not achieve the optimal result.

The description column of the table in figure 5 defines the business rule in human language. In figure 6 the contents of some of the files used for the business rule check are displayed.

Figures 6A-^B show a few examples of business rule modules that are also mentioned in the table of figure 5. Figure 6A shows the script of the business rule module bcf002.br, which is a business rule of the administrative kind as mentioned previously. It checks whether the requirement that a BCF 29 of type DE21 has more than 3 BTS's 31 connected according to e.g. the Nokia hierarchy 12 of figure 2. If it does, a blocking message appears on the error list indicating to the user 69 that that particular BCF does have more than 3 BTS's.

Figure 6B shows the script of the business rule module bts013.br. It states that one Access Grant Block (AGB) is required for each Basic Communication Channel. A blocking message appears if the business rule is not obeyed.

~~Figure 6C shows the script of the business rule module bts015.br, which is a business rule of the technical kind as mentioned above. This module checks the number of TRX's for each LABD link. A LABD link basically~~

~~represents a direct or indirect physical link between two~~
 or more BSC's. For a bitrate of 16 respectively 64 a
 maximum of 12 resp. 10 TRX's is allowed for each LABD-link.
 If this requirement is not obeyed, a blocking message
 5 appears on the error list.

Figure 6D shows the script of the business
 rule module ho006.br, which is a business rule of the
 technical kind as mentioned previously. This module checks
 whether a cell has neighbour BTS's with the same base
 10 station communication channel BCCH. A warning message is
~~generated on the error list if this happens to be the case.~~

It is explicitly stated that the examples
 and embodiments as described in this section do not limit
 15 the scope of the invention in any way. Modifications of the
 examples and embodiments fall within the scope of this
 application. E.g. it may be advantageous to distribute
 the cellular radio network amongst several geographic
 regions each of these regions having an operator. Basically
 20 the same system of network management, including the
 business rule checker, can be applied in this situation.
 Measures can be taken to avoid conflicts when more than one
 user 69 tries to change the parameter settings in his
 region, especially around the borderlines of the respective
 25 regions. This possible conflict can be solved by allowing
 only one proposal to change the parameters. The system
 signals succeeding users trying to change the same
 parameters that an earlier proposal has already been made
 including the data of that particular user.

30 Another modification may be that proposals
 can be stored instead of being implemented immediately.
 This option is particularly relevant in the framework of
 more projects. Several projects can be identified, e.g.
 mass- updates involving future optimisation of large

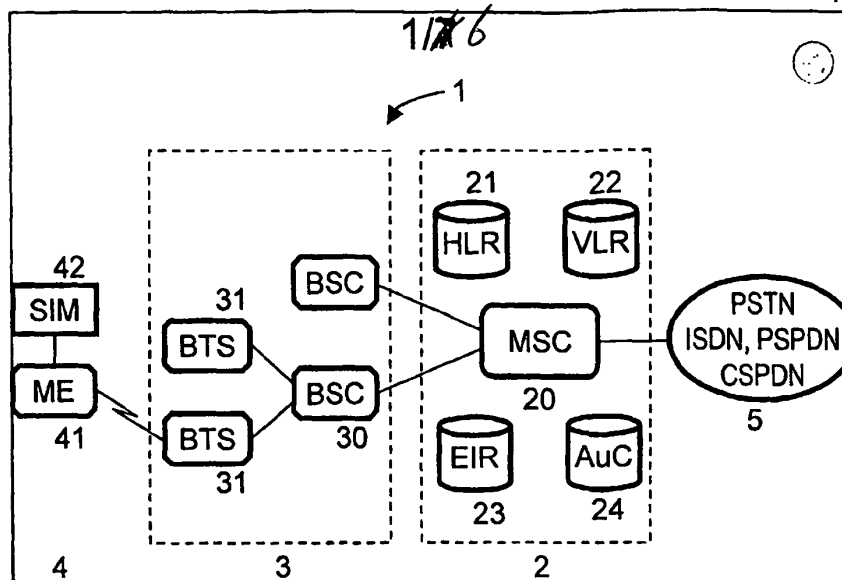


FIG. 1

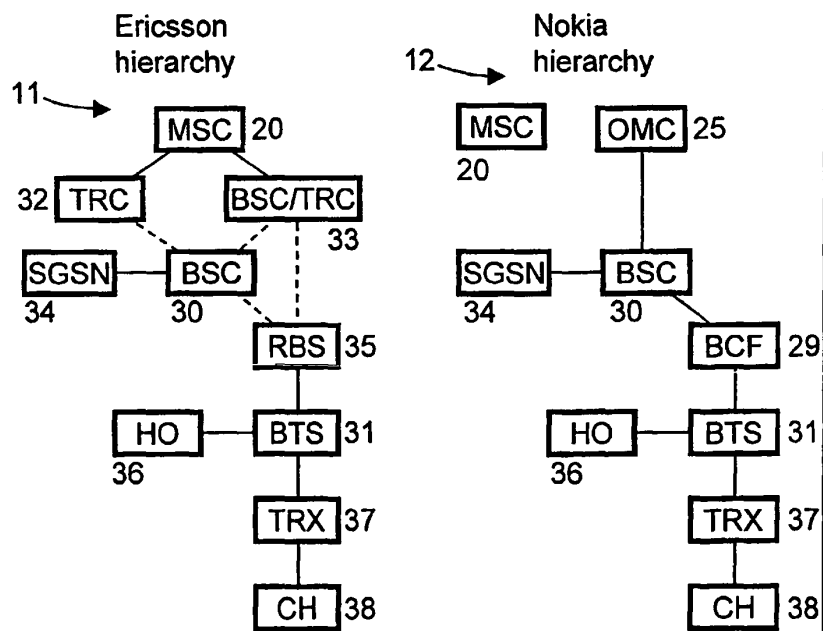


FIG. 2

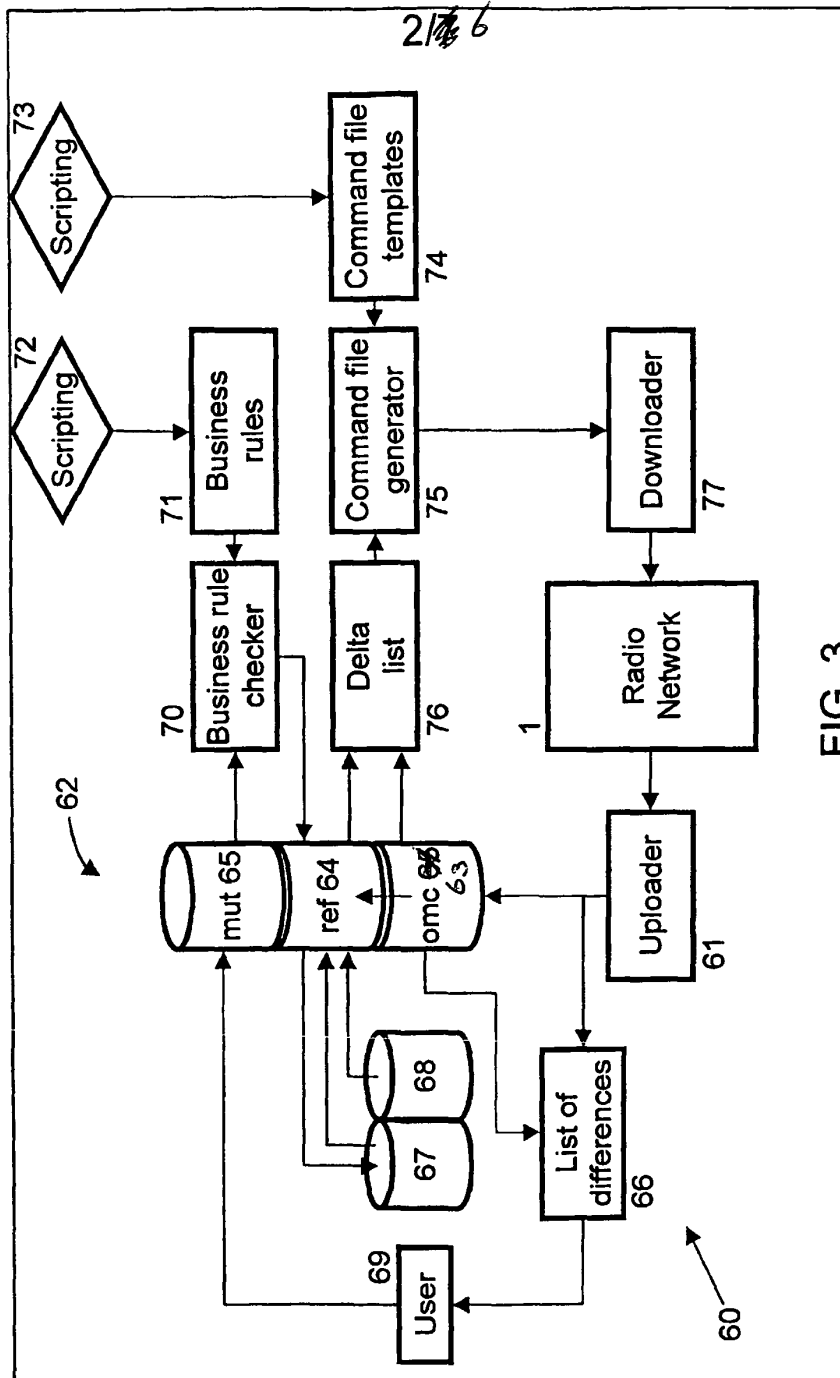
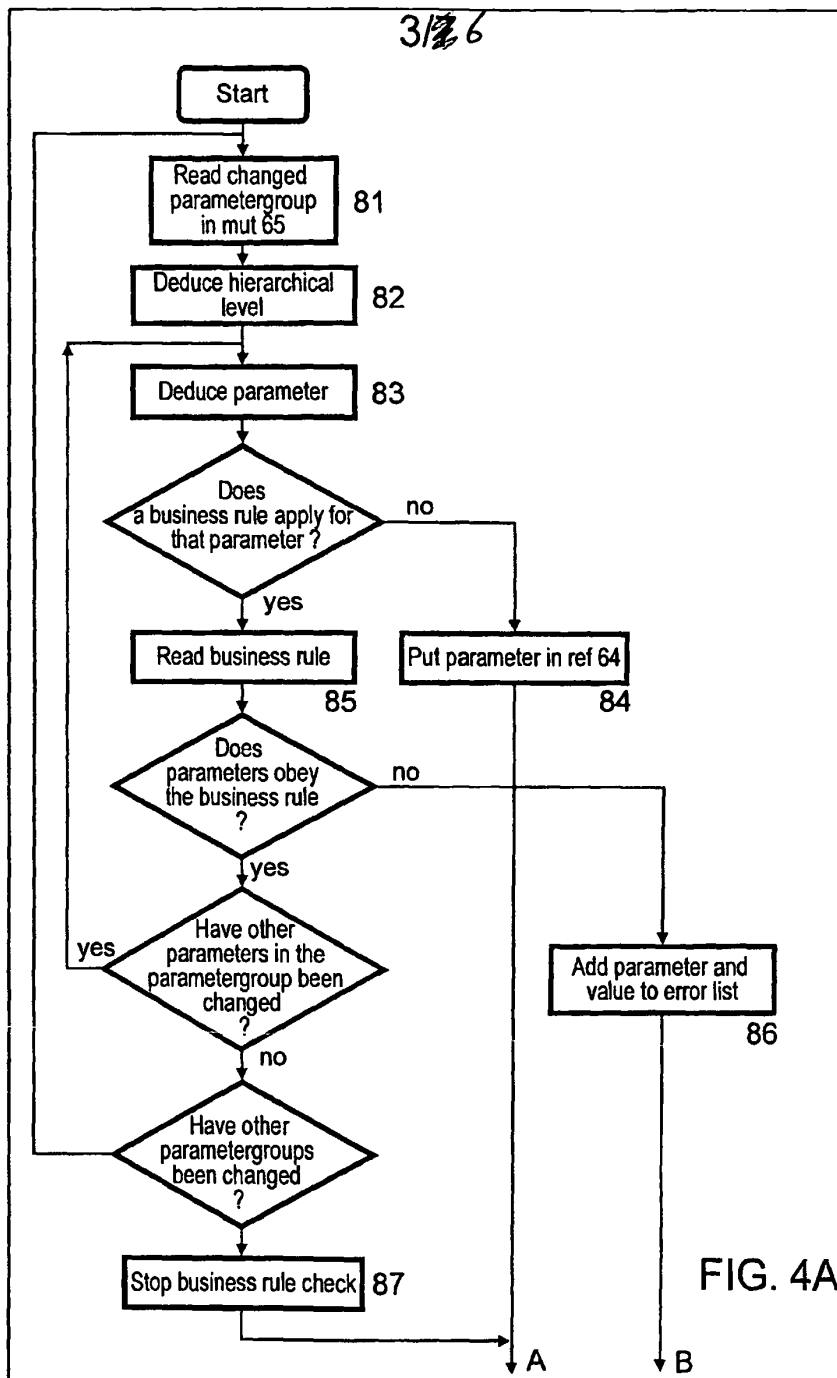


FIG. 3



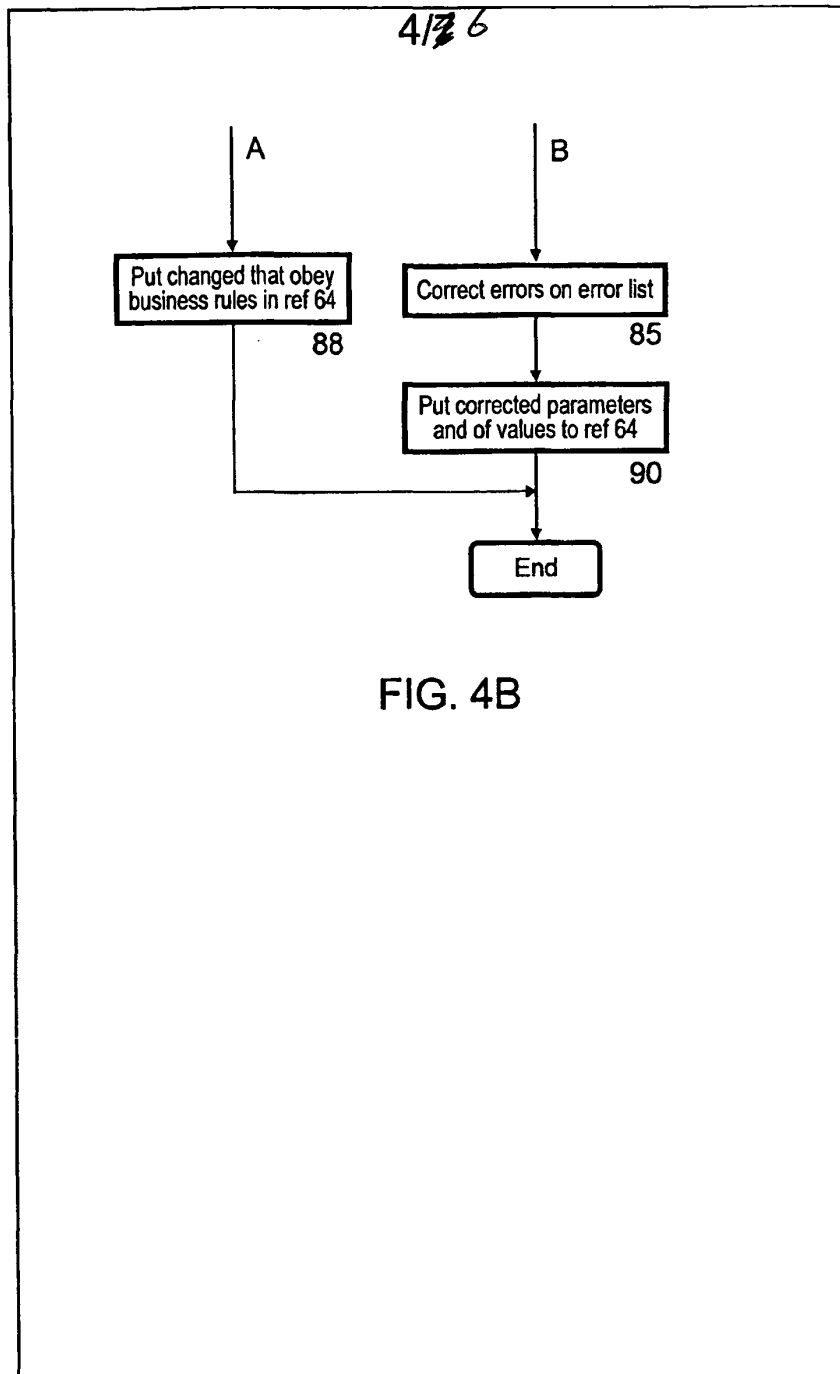


FIG. 4B

5/26

BR ID	STATE	MODULE	DESCRIPTION	ITERATION LEVEL	MESSAGE
2	1	bcf002.br	A BCF of type DE21 has a maximum of 3 BTS's	BCF - BTS	BLOCKING
4	1	bcf004.br	A BCF of type DE45 has a maximum of 1 BTS	BCF - BTS	BLOCKING
5	1	bcf005.br	A BCF has a maximum of 12 TRX's	BCF - TRX	BLOCKING
27	3	bts012.br	A BTS having > 3 TRX's has a additional SDCCH-channel	BTS - TRX	WARNING
28	1	bts013.br	At a combined BCCH 0...2 "no blocks for access grant" have to be used	BTS - CH	BLOCKING
29	1	bts014.br	At a non-combined BCCH 0...7 "no blocks for access grant" have to be used	BTS - CH	BLOCKING
30	3	bts015.br	Check on number of TRX's per LABD-link	BCF - TRX	WARNING
62	1	ho006.br	Preferrably a cell has no neighbours using the same BCCH	BTS - TRX	WARNING
63	0	ho009.br	Neighbours are basically bi-directional	BTS - HO	WARNING
64	3	ho010.br	The sum of handover margin pbgt Should be larger than 0	BTS - HO	WARNING
79	1	trx001.br	Frequency difference of at least 2 channels of TRX's on same site for different BTS's	BTS - TRX	BLOCKING
83	1	trx004.br	A TRX has a LABD-link	TRX	BLOCKING
85	0	trx009.br	A new TRX is assigned a dummy frequency	TRX	BLOCKING
104	1	ch004.br	The BCCH has to be defined on TRX1	BTS-TRX-CH	WARNING

Figure 5

6/76

```
Iterate1Start(BCF)
  ResetCounter1
  If [BCF.bcf_type] == "$DE21" Then
    Iterate2Start(BTS)
    IncrementCounter1
    Iterate2End
  EndIf
  If Counter1 > "3" Then
    logBlocking(BCF,BCF of type DE21 exceeds maximum of 3 BTS's)
  EndIf
Iterate1End
```

Fig. 6A (module bcf002.br)

```
Iterate1Start(BTS)
  If [BTS.no_of_blocks_for_access_grant1] > "2" Then
    Iterate2Start(CH)
    If [CH.channel_type] == table(chMode,"MBCCB") Then
      logWarning(BTS,To much AccessGrantBlocks have been defined)
    EndIf
    Iterate2End
  EndIf
Iterate1End
```

Fig. 6B (module bts013.br)



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59

12 Mai 2004

Date
May 6, 2004
Your letter of
24 February 2004
Our reference
402706EP

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Subject :EP Patent application 01203820.4

This letter is a response to the Communication under Art. 96(2) EPC of 24.02.2004 for the above-captioned application. The Communication comprises a plurality of objections, which will be dealt with below in the order followed in the Communication.

Lack of inventive step for claim 1

The Communication holds the subject-matter of the application to lack an inventive step over the combination of documents D1 and D2. The applicant respectfully disagrees with this opinion for the following reasons.

Document D1 discloses a method for performing reconfiguration of a cellular network. It is noted that document D1 is acknowledged in the application as filed (page 2, line 14), however by an incorrect reference. The correct reference is US 5,434,798.

The method of D1 involves copying of network parameters to a database, changing the copied parameters and verifying the consistency of the proposed changes in a consistency check. D1 constitutes the closest prior art for the application, since both D1 and the application relate to methods for checking modified or changed parameters.

D1 verifies the changed parameters in a consistency check. This consistency check involves the checking of the fulfilment of

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technical requirements for the parameters as mentioned in the application on page 3, lines 29-33. In particular D1, describes on page 22, lines 4-30 verification of the power level relationship between the cells, hand-off and location thresholds and intra- and inter-exchange hand-off relationships. In contrast, the check according to the invention involves a check of at least one business rule comprising at least one operational requirement deduced from operational use of the radio network. Such business rules relate to technically preferable requirements as well as rules derived from operational practice, as defined on page 5, lines 5-7.

Accordingly, the invention differs from D1 by the feature that the method of checking is performed on the basis of at least one business rule comprising at least one operational requirement deduced from operational use of the radio network.

The technical effect of this distinguishing feature is to obtain more certainty on the reliability of the radio network if the network parameters have been modified. As an example of the difference between technical and operational requirements, technical requirements are typically less strict than operational requirements (see page 10, line 31 - page 11, line 11). Further, operational requirements may involve other requirements that are not required from a technical point of view. The application gives the example of administrative data (page 10, line 24).

The objective problem for the skilled person, starting from D1 thus can be formulated as how to improve the certainty on the reliability of the radio network if these parameters have been modified.

Document D2 discloses a method for operating a self-engineering system for use with a communication network. The self-engineering system includes a self-engineering engine comprising an expert system and optionally a system simulator (see Fig. 4). The prime purpose of the self-engineering engine is to produce new operating parameters on the basis of current operating data and parameters (column 10, lines 14-17).

Since the focus of D2 is on the production of modified parameters, it is submitted that the skilled person would not consult D2. The production of modified parameters is a phase prior to the phase of checking of the modified parameters. The production phase for new parameters is not of interest for the skilled person confronted with the problem on how to arrive at a reliable radio network.

Even if the skilled person would consult D2 when confronted with the objective problem, D2 would not provide him with this information. The self-engineering engine comprises an optional system simulator for verifying the new operating parameters (column 4, lines 52-58). The indication of this module as "simulator" already makes it clear that the checking mechanism is the very opposite of that of the



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present invention. Instead of using requirements deduced from operational use as defined in claim 1, D2 proposes to simulate reality and produces simulated results (column 3, lines 34-38). Such a simulation involves the use of statistics (column 14, lines 57, 58).

Finally, the applicant notes that the expert system of D2 uses knowledge extracted from human experts that typically is not contained in documents but comes from experience, rules of thumb and judgement of humans working in the domain (column 10, lines 18-23). Such knowledge is similar to the business rules of the invention, examples of which are given in the table of Fig. 5 of the application. However, again this knowledge is used to produce new network parameters. D2 does not mention or suggest to use such knowledge for the subsequent process of checking the modified parameters.

In conclusion, it is submitted that even if the skilled person, starting from D1, would consult D2 (quod non), he would not arrive at the invention as defined in claim 1.

Further independent claims

As the Communication correctly states, the original independent claims 22 and 28 are based on the same feature combination as claim 1. Accordingly, the arguments provided in the previous section are *mutatis mutandis* valid for these claims as well.

Claim 29

Original claim 29 has been redrafted as a dependent claim on original claim 28. This clarifies that the basic invention is on the process of checking modified parameters rather than on the modification of the parameters as such. Further, the dependency removes the objections of the Examining Division on two independent claims for a computer program.

Dependent claims

It is submitted that the dependent claims can be maintained under the respective independent claims, the subject-matter of which is novel and involves an inventive step (Guidelines C-III, 3.5).



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Further, it is submitted in particular that neither D1 nor D2 discloses or suggests the use of the compressed row technique (claim 6), the checking of relationships between different parameters in different hierarchical levels (claim 16) and the use of administrative requirements (claim 18).

Claim categories and clarity

It is submitted that, pursuant to Rule 29(2) EPC, an applicant is entitled to at least one independent claim for each claim category specified in this Rule. Accordingly, a limitation to only one independent claim for a computer program as considered in section 7 of the Communication lacks a legal basis.

It is further submitted that the applicant operates in a complex and diversified branch of industry, wherein various parties are involved in operating and programming of the method and system according to the invention and ownership of the radio network. This is particularly true for claims related to the method and to the computer program. In order to obtain appropriate protection for its invention, the applicant needs to have separate independent claims.

The original claims 26, 27 and 31-33, relating to the radio network and the data carrier have been deleted. The claims relating to the computer program have been re-numbered accordingly.

Other requirements

In claims 18 and 19, the term "practice" has been deleted, such that a clear reference to the operational requirement in lines 7, 8 of claim 1 is obtained.

As new claim 27 is now dependent on new claim 26, the lack of an antecedent for "the at least one modified parameter" has been resolved.

The reference of claim 12 has been amended according to the instructions to claims 1-8.

The full meanings of the abbreviations used in claims 10, 11, 13 and 14 is included in these claims.

The two-part form has been applied for the independent claim, in accordance with Rule 29(1) EPC.

Reference signs have been included to comply with Rule 29(7) EPC.

D1 and D2 have been briefly acknowledged in the description. As mentioned above, D1 was already discussed although an incorrect



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reference was used. Instead of the US-reference the PCT-publication number has been used.

The introduction has been amended to comply with Rule 27(1)(c).

The general statement on page 6 has been deleted.

Corrections are made to eliminate the reference to Figs. 6C and 6D and any consequences thereof.

In Fig. 3, omc 65 is replaced by omc 63.

Conclusion

It is submitted that the application is now ready for grant. As a precaution, oral proceedings pursuant to Art. 116 EPC are requested in case the Examining Division is to refuse the patent application.

The professional representative

K.M. Wuyts

Enclosures:

- hand-amended pages 1-6,14,15,17-23
- hand-amended drawings 1-6



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Date
May 6, 2004
Your letter of
24 February 2004
Our reference
402/0682

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Subject :EP Patent application 01203820.4

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The technical effect of this distinguishing feature is to obtain more certainty on the reliability of the radio network if the network parameters have been modified. As an example of the difference between technical and operational requirements, technical requirements are typically less strict than operational requirements (see page 10, line 31 - page 11, line 11). Further, operational requirements may involve other requirements that are not required from a technical point of view. The application gives the example of administrative data (page 10, line 24).

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Document D2 discloses a method for operating a self-engineering system for use with a communication network. The self-engineering system includes a self engineering engine comprising an expert system and optionally a system simulator (see Fig. 4). The prime purpose of the self-engineering engine is to produce new operating parameters on the basis of current operating data and parameters (column 10, lines 14-17).

Since the focus of D2 is on the production of modified parameters, it is submitted that the skilled person would not consult D2. The production of modified parameters is a phase prior to the phase of checking of the modified parameters. The production phase for new parameters is not of interest for the skilled person confronted with the problem on how to arrive at a reliable radio network.

Even if the skilled person would consult D2 when confronted with the objective problem, D2 would not provide him with this information. The self-engineering engine comprises an optional system simulator for verifying the new operating parameters (column 4, lines 52-58). The indication of this module as "simulator" already makes it clear that the checking mechanism is the very opposite of that of the

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402706EP

present invention. Instead of using requirements deduced from operational use as defined in claim 1, D2 proposes to simulate reality and produces simulated results (column 3, lines 34-38). Such a simulation involves the use of statistics (column 14, lines 57, 58).

Finally, the applicant notes that the expert system of D2 uses knowledge extracted from human experts that typically is not contained in documents but comes from experience, rules of thumb and judgement of humans working in the domain (column 10, lines 18-23). Such knowledge is similar to the business rules of the invention, examples of which are given in the table of fig. 5 of the application. However, again this knowledge is used to produce new network parameters. D2 does not mention or suggest to use such knowledge for the subsequent process of checking the modified parameters.

In conclusion, it is submitted that even if the skilled person, starting from D1, would consult D2 (quod non), he would not arrive at the invention as defined in claim 1.

Further independent claims

As the Communication correctly states, the original independent claims 22 and 28 are based on the same feature combination as claim 1. Accordingly, the arguments provided in the previous section are *mutatis mutandis* valid for these claims as well.

Claim 29

Original claim 29 has been redrafted as a dependent claim on original claim 28. This clarifies that the basic invention is on the process of checking modified parameters rather than on the modification of the parameters as such. Further, the dependency removes the objections of the Examining Division on two independent claims for a computer program.

Dependent claims

It is submitted that the dependent claims can be maintained under the respective independent claims, the subject-matter of which is novel and involves an inventive step (Guidelines C-III, 3.5).

3 van 5

Empf.zeit:07/05/2004 16:15

Empf.nr.:006 P.003



Date:
May 6, 2004
Our reference:
402706EP

Further, it is submitted in particular that neither D1 nor D2 discloses or suggests the use of the compressed row technique (claim 6), the checking of relationships between different parameters in different hierarchical levels (claim 16) and the use of administrative requirements (claim 18).

Claim categories and clarity

It is submitted that, pursuant to Rule 29(2) EPC, an applicant is entitled to at least one independent claim for each claim category specified in this Rule. Accordingly, a limitation to only one independent claim for a computer program as considered in section 7 of the Communication lacks a legal basis.

It is further submitted that the applicant operates in a complex and diversified branch of industry, wherein various parties are involved in operating and programming of the method and system according to the invention and ownership of the radio network. This is particularly true for claims related to the method and to the computer program. In order to obtain appropriate protection for its invention, the applicant needs to have separate independent claims.

The original claims 26, 27 and 31-33, relating to the radio network and the data carrier have been deleted. The claims relating to the computer program have been re-numbered accordingly.

Other requirements

In claims 18 and 19, the term "practice" has been deleted, such that a clear reference to the operational requirement in lines 7, 8 of claim 1 is obtained.

As new claim 27 is now dependent on new claim 26, the lack of an antecedent for "the at least one modified parameter" has been resolved.

The reference of claim 12 has been amended according to the instructions to claims 1-8.

The full meanings of the abbreviations used in claims 10, 11, 13 and 14 is included in these claims.

The two-part form has been applied for the independent claim, in accordance with Rule 29(1) EPC.

Reference signs have been included to comply with Rule 29(7) EPC.

D1 and D2 have been briefly acknowledged in the description. As mentioned above, D1 was already discussed although an incorrect

4 van 5

Empf.zeit:07/05/2004 16:15

Empf.nr.:006 P.004



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May 6, 2004
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402706EP

reference was used. Instead of the US-reference the PCT-publication number has been used.

The introduction has been amended to comply with Rule 27(1)(c).

The general statement on page 6 has been deleted.

Corrections are made to eliminate the reference to Figs. 6C and 6D and any consequences thereof.

In Fig. 3, omc 65 is replaced by omc 63.

Conclusion

It is submitted that the application is now ready for grant. As a precaution, oral proceedings pursuant to Art. 116 EPC are requested in case the Examining Division is to refuse the patent application.

The professional representative

K.M. Wuyts

Enclosures:

- hand-amended pages 1-6,14,15,17-23
- hand-amended drawings 1-6

5 van 5

Empf.zeit:07/05/2004 16:16

Empf.nr.:006 P.005

5 The invention relates to a method and system
for checking ^{at least one modified} parameter ^{and/or value obtained from changing} settings of a radio network. More
specifically the invention relates to a method and system
for checking various parameters of components of a cellular
radio network on the basis of business rules.

10 at least one operational parameter and/or value
of an at least one component of a radio network.
The invention further relates to a computer program according to the
preamble of claim 1

Background

Fig. 1 shows a schematic representation of a cellular network 1. The architecture of these networks comprises a network subsystem 2, a base system 3 and a mobile station 4. Examples of networks are GSM and DCS and extensions of networks such as GPRS, UMTS etc. The network main component involves the mobile switching (MSC) providing the interface of the cellular wire bound networks 5 (PSTN, ISDN, ADSL etc.) roaming and call-routing facilities (Home Register 21, Visitor Location Register 22, Entity Register 23 and Authentication Centre

The base station subsystem 3 consists of a number of base stations. The base station subsystem 3 constitutes the connection between a mobile station 4 and the MSC 20. The base station subsystem 3 may be distinguished into two parts, the Base Transceiver Station 31 (BTS) and the Base Station Controller 30 (BSC). The BTS 31 houses radio transceivers that define a cell and handles the radio-link protocols with the mobile station 4. In a large urban area, there will potentially be a large number

A which is considered the closest prior art,

2

of BTSs deployed. The BSC 30 manages the radio resources for one or more BTSs 31. It handles radio-channel set-up, frequency hopping, and handovers.

The mobile station 4 is the mobile equipment
5 that enables a user to communicate with others through the cellular network. A mobile station 4 usually comprises mobile equipment 41 and a Subscriber Identity Module 42 (SIM).

As the complexity of cellular networks increases
10 flexible operation of these networks becomes more difficult. Configuration and reconfiguration of a cellular network is complex since the parametersettings of the different components of the cellular radio network affect eachother. ^{WO 92/21102} ~~United States Patent 5,343,799~~ of Ericsson, ~~E~~,
15 describes a reconfiguration method and apparatus in which the cell parameters of particular mobile switching centres in a network are copied to a database, and the copied parameters are stored. A set of proposed changes to the stored parameters are prepared and the consistency of the
20 prepared set of proposed changes is verified. Alterations to the set of proposed changes responsive to the verification are made and the verified set of proposed changes are copied to the concerned mobile switching centres. The verified set of proposed changes is then
25 introduced into the network. An up-to-date image of the cell parameters in the mobile switching centres in the network is maintained in a system parameter database.

Problem definition and aims of the invention

30 Typically a cellular radio network comprises several MSC's and a larger number of base stations. Operation of such cellular radio networks requires a high degree of flexibility in the sense that configuration and reconfiguration of the cellular network has to be possible

within a limited period of time and with a high degree of accuracy. Such a reconfiguration of a radio network can be permanent or temporarily. Reasons for such a reconfiguration are numerous, e.g. a temporary cell split
 5 needed to deal with an expected increase in traffic due to an event or the permanent integration of new elements both affecting the settings of already existing elements in the radio network. Therefore sophisticated methods and systems are required that administrate the parameter settings of
 10 the various components, e.g. the BTS or BSC, of the cellular radio network and change the parameter settings of said components. Examples of parameters that can be changed include cell type, cell designation, cell direction, signal strength, signal to noise ratio, etc. Moreover means have
 15 to be provided in order to check the consistency of the proposed parameter changes before the changes are implemented in the cellular network.

The reconfiguration method and system as revealed by ~~the 1798 patent~~ ^{wo 92/21182} can be improved with regard to,
 20 inter alia, the performed routine to check the consistency of proposed parameter changes.

More particularly an improvement relates to the hierarchical levels that can be checked. The method of ~~the 1798 patent~~ ^{wo 92/21182} checks the consistency of the proposed
 25 parameters only with regard to cells and handovers. Thus only a very limited part of the network hierarchy is checked, resulting in a less reliable and efficient control of the radio network.

~~the 1798 patent~~ ^{wo 92/21182} Another problem of the method described in
 30 /the 1798 patent/ relates to the type of rules used in performing the consistency check. The rules used in performing this check originate solely from technical requirements derived from cellular network technology. There is no possibility to apply rules derived from

operational practice as well. Moreover it is not possible to deviate from the technically sufficient parameter setting requirements if operational practice experience reveals a different more preferable technical parameter
5 setting.

Still another problem of the method described in ^{WO 92/21182} ~~the 1998 patent~~ is that in performing the consistency check only pre-programmed rules are used. This limitation decreases the flexibility of the system for the operator
10 that exploits a cellular radio network. It may be that such an operator is not satisfied with the requirements for the various parameters defined by the supplier of the network. The operator may want to define the requirements, including the technical requirements, himself.

15 The present invention aims to provide a method and system to check the consistency of the proposed changes of parameters.

□

Summary

20 The present invention provides a method and system that improve the reliability, flexibility and accuracy required for operating cellular radio networks.

It is an object of the invention to be able to verify the proposed changes in the parameter settings in
25 all hierarchical levels of the radio network and of substantially every, i.e. any desired, relationship between parameters in the same or different hierarchical level of the radio network. By enabling verification on every hierarchical level the control and reliability of the
30 network is significantly improved if changes in the parameter setting are to be implemented.

It is another object of the invention to enable the use of rules developed from operational practice in the verification of the parameter settings in one or

□ US 6,083,335 discloses a self-engineering system to produce new parameters for a communication network on the basis of current operating data and parameters. A simulator is employed to verify the new parameters.

Empf.zeit: 07/05/2004 16:17

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more of the levels of the network hierarchy and relationship between elements in the cellular radio network. Hereafter the rules used to verify the parameter settings will be referred to as business rules. These
 5 business rules comprise rules relate to technically preferable requirements as well as rules derived from operational practice.

It is still another object of the invention to enable the use of programmable rules in the verification
 10 of the proposed changes of the parameter settings in one or more hierarchical levels and relationship of elements in the radio system. These rules may preferably be programmed by the operator of the radio network or at least being ordered or influenced by the operator of the radio network.
 15 Moreover also the error messages if the rules are not obeyed may be operator-programmable.

These objects are achieved by ~~the~~ providing the method, system and computer program according to the characterizing portions of claims 1, 22 and 26 respectively. This will be described in the description of the preferred embodiments.

Short description of the drawings
 Fig.1 shows an elementary representation of a
 20 GSM radionetwork;

Fig.2 shows examples of representations of different hierarchies the invention is able to handle;

Fig.3 shows a detailed scheme of the parameter management;

25 Fig.4A,B shows a flow-chart illustrating an example of the business rule checking process;

Fig.5 shows a table of operational examples of business rules;

Fig.6A-~~F~~^G shows a few business rule modules.

30

Description of preferred embodiments of the invention

For the purpose of teaching the invention, preferred embodiments of the method and devices of the invention are described in the sequel. It will be apparent

to the person skilled in the art that other alternative and equivalent embodiments of the invention can be conceived and reduced to practice, ~~without departing from the true spirit of the invention, the scope of the invention being~~
 5 ~~only limited by the claims as finally granted.~~

A radio network 1, as schematically shown in figure 1 may be represented alternatively by a network hierarchy 11,12 comprising different levels. These levels correspond to physical as well as non-physical parts of
 10 radio network 1. The hierarchies 11,12 may differ in their representation between several commercial suppliers of these kinds of radio networks 1. As an example figure 2 shows the network hierarchies of Ericsson 11 and Nokia 12 radio networks 1. It can be observed that the Ericsson and
 15 Nokia hierarchies 11 and 12 differ in some aspects, but are equivalent in other aspects.

The Ericsson hierarchy 11 comprises a MSC level 20. The MSC 20 is coupled to a transcoder 32 (TRC) and a BSC/TRC 33. The next level comprises the BSC 30. This
 20 BSC 30 may be linked to the TRC 32 or the BSC/TRC 33. In the case that a GPRS radio network should be represented an additional element Service GPRS Support Node 34 (SGSN) is introduced. The SGSN 34 may comprise different hierarchical levels itself. Next the Ericsson hierarchy 11 shows a Radio
 25 Base System 35 (RBS) level. The RBS may be linked to a BSC 30 or a BSC/TRC 33. Afterwards a handover 36 (HO) and the BTS 31 are shown. Finally the Ericsson hierarchy 11 exhibits a transceiver level 37 (TRX) and a channel level 38 (CH).

30 The Nokia hierarchy 12 differs from the Ericsson hierarchy in some aspects. Firstly the TRC 32 and BSC/TRC 33 level are replaced by an Operational Maintenance Centre 25 (OMC). Moreover whereas the Ericsson hierarchy 11 contains TRC and BSC/TRC levels, the Nokia hierarchy

parameter or value. These error messages are operator-programmable as well. Different error levels can be distinguished, such as a blocking message (i.e. a serious error indicating that the proposed change may not be implemented in the radio network under any circumstances) or a warning message (i.e. an error indicating that the proposed change is not desirable, but does not do harm to the operation of the cellular radio network if implemented). Other error levels can be used as well, like e.g. engineering messages indicating that the change to be implemented does not achieve the optimal result.

The description column of the table in figure 5 defines the business rule in human language. In figure 6 the contents of some of the files used for the business rule check are displayed.

Figures 6A-~~C~~^B show a few examples of business rule modules that are also mentioned in the table of figure 5. Figure 6A shows the script of the business rule module bcf002.br, which is a business rule of the administrative kind as mentioned previously. It checks whether the requirement that a BCF 29 of type DE21 has more than 3 BTS's 31 connected according to e.g. the Nokia hierarchy 12 of figure 2. If it does, a blocking message appears on the error list indicating to the user 69 that that particular BCF does have more than 3 BTS's.

Figure 6B shows the script of the business rule module bts013.br. It states that one Access Grant Block (AGB) is required for each Basic Communication Channel. A blocking message appears if the business rule is not obeyed.

~~Figure 6C shows the script of the business rule module bts015.br, which is a business rule of the technical kind as mentioned above. This module checks the number of TRX's for each LBB link. A LBB link basically~~

~~represents a direct or indirect physical link between two~~
 or more BSC's. For a bitrate of 16 respectively 64 a
 maximum of 12 resp. 10 TRX's is allowed for each LABD-link.
 If this requirement is not obeyed, a blocking message
 5 appears on the error list.

Figure 6D shows the script of the business
 rule module ho006.br, which is a business rule of the
 technical kind as mentioned previously. This module checks
 whether a cell has neighbour BTS's with the same base
 10 station communication channel BCCH. A warning message is
~~generated on the error list if this happens to be the case.~~

It is explicitly stated that the examples
 and embodiments as described in this section do not limit
 15 the scope of the invention in any way. Modifications of the
 examples and embodiments fall within the scope of this
 application. E.g. it may be advantageous to distribute
 the cellular radio network amongst several geographic
 regions each of these regions having an operator. Basically
 20 the same system of network management, including the
 business rule checker, can be applied in this situation.
 Measures can be taken to avoid conflicts when more than one
 user 69 tries to change the parameter settings in his
 region, especially around the borderlines of the respective
 25 regions. This possible conflict can be solved by allowing
 only one proposal to change the parameters. The system
 signals succeeding users trying to change the same
 parameters that an earlier proposal has already been made
 including the data of that particular user.

30 Another modification may be that proposals
 can be stored instead of being implemented immediately.
 This option is particularly relevant in the framework of
 more projects. Several projects can be identified, e.g.
 mass- updates involving future optimisation of large

CLAIMS

(BS_TX_PWR_max)

1. Method for checking at least one modified parameter^y and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network⁽¹⁾ on the basis of at least one business rule comprising at least one operational requirement deduced from operational use of the radio network⁽¹⁾.
 5
2. Method according to claim 1 wherein the at least one modified parameter^y and/or value is checked before implementation in the radio network⁽¹⁾ comprising the steps of
 10 of
 copying to a database⁽⁶²⁾ the at least one operational parameter and/or value from the radio network⁽¹⁾;
 15 changing the at least one operational parameter and/or value to the at least one modified parameter^y and/or value;
 20 (BS_TX_PWR_max)
 checking the at least one modified parameter^y and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.
 25 (BS_TX_PWR_max)
3. Method according to claim 2 wherein a non-compliance signal is generated if the at least one modified parameter^y does not obey the at least one operational requirement.
 30 (BS_TX_PWR_max)
4. Method according to claims 2 or 3 in which the at least one operational parameter is stored in a first part⁽⁶³⁾ of the database⁽⁶²⁾ and the at least one modified parameter^y is stored in a second part of the database.⁽⁶²⁾
 35 (BS_TX_PWR_max)

5. Method according to claim 4 in which the first and second part of the database⁽⁶²⁾ are separate databases.
- 5 6. Method according to any of the claims 2-5 in which at least one of the the at least one operational parameter⁽⁶²⁾ or the at least one modified parameter⁽⁶²⁾ is stored in the database using a compressed row technique.
- 10 7. Method according to any of the claims 2-5 in which the database⁽⁶²⁾ comprises at least one hierarchy table to store and have access to the at least one operational parameter and the at least one modified parameter^(BS-TX-PWR-MAX).
- 15 8. Method according to claim 7 in which the at least one hierarchy table is used for checking whether the at least one modified parameter⁽⁶²⁾ obeys the at least one selected business rule. ^(BS-TX-PWR-MAX)
- 20 9. Method according to any of the preceding claims in which the at least one modified parameter^(BS-TX-PWR-MAX) relates to at least one level of a GSM or DCS network hierarchy.
10. Method according to claim 9 in which the levels of the
- 25 GSM network hierarchy are ~~MSC, OMC, BSC, BCF and/or BTS~~ mobile switching centre (MSC)(20), operational maintenance centre (OMC)(25), base station controller (BSC)(30), bearer control function (29) and/or base transceiver station (BTS)
11. Method according to claim 9 or 10 in which ⁽³¹⁾ the levels of the GSM network hierarchy are ~~TRX, HO and/or CH~~ transceiver level (TRX)(37), hand-over (HO)(36) and/or channel level (CH)(38)
- 30 12. Method according to any of the ~~preceding~~¹⁻⁸ claims in which the at least one modified parameter⁽⁶²⁾ relates to at least one level of a GPRS hierarchy. ^(BS-TX-PWR-MAX)

and/or base transceiver station (BTS)(31)

19

13. Method according to claim 12 in which the levels of the GPRS hierarchy are ~~MSC, OMC, BSC, SGSN, BCF and/or BTS~~ mobile switching centre (MSC)(26), operational maintenance centre (OMC)(25), base station controller (BSC)(30), serving GPRS support node (SGSN)(34), bearer control function (BCF)(23) ~~and/or~~

5 the GPRS hierarchy are ~~TRX, HO and/or CH~~ transceiver level (TRX)(37), hand-over (HO)(36) and/or channel level (CH)(38)

15. Method according any of the claims 9-14 in which the checking of the at least one modified parameter^{BS.TX.PWR.MAX} and/or value by verifying whether the at least one selected
10 business rule comprising at least one operational requirement has been obeyed is applied to at least one of the levels of the GSM, DCS or GPRS hierarchy.

16. Method according to any of claims 9-15 wherein
15 relationships are checked between different operational and/or modified parameters in the same or different hierarchical levels of the radio network.

17. Method according to any of the preceding claims in
20 which the at least one selected business rule is programmed by an operator or at least ordered or influenced by the operator⁽⁶⁹⁾ of the radio network.⁽¹⁾

18. Method according to any of the preceding claims in
25 which the at least one operational ~~practice~~ requirement involves an administrative requirement.

19. Method according to claim 17 in which the operational ~~practice~~ requirement involves a technically preferable
30 requirement programmed, ordered and/or influenced by the operator⁽⁶⁹⁾ of the radio network.⁽¹⁾

20. Method according to claim 3 in which the non-compliance signal is a file or message displayed to an operator.

5 21. Method according to claim 3 or 20 in which the non-compliance signal is programmable.

22. A system⁽⁶⁰⁾ for checking at least one modified parameter^(85_TX_PWR_MN) and/or value obtained from changing at least one operational parameter and/or value of at least one component of a radio network⁽¹⁾ on the basis of at least one checking business rule comprising at least one operational requirement derived from operational use of the radio network.⁽¹⁾

15 23. System⁽⁶⁰⁾ according to claim 22 for checking the at least one modified parameter and/or value before implementation in the radio network⁽¹⁾, comprising:
 a first part⁽⁶³⁾ of a database to store the at least one operational parameter and/or value from the radio network⁽⁶²⁾
 20 a second part⁽⁶³⁾ of a database⁽⁶²⁾ to store the at least one modified parameter and/or value;
 a business rule checker⁽⁷¹⁾ verifying whether the at least one modified parameter and/or value obeys the at least one operational requirement;

24. System⁽⁶⁰⁾ according to claim 23 wherein a signal generator can generate a non-compliance signal if the at least one modified parameter^(85_TX_PWR_MN) does not obey the at least one operational requirement.

25. System⁽⁶⁰⁾ according to claims 23 or 24 further comprising scripting means⁽⁷²⁾ in order to define business rules and/or error messages to be used by the business rule checker.⁽⁷¹⁾

- ~~26. Radio network comprising at least one component comprising at least one operational parameter and/or value~~
- 5 that can be changed to at least one modified parameter and/or value wherein the at least one modified parameter and/or value can be checked on the basis of at least one business rule derived from operational use of the radio network.
- 10
- ~~27. Radio network according to claim 26 wherein the at least one operational parameter and the at least one modified parameter relate to at least one level of a GSM, GPRS or GPRS hierarchy of the radio network.~~
- 15
26. ~~28.~~ Computer program for running on a computer system comprising software code portions for checking at least one modified parameter⁽¹⁾ and/or value obtained from changing at least one operational parameter and/or value of an at least
- 20 one component of a radio network on the basis of at least one business rule comprising at least one operational requirement derived from operational use of the radio network.⁽¹⁾
- 27
- 25 ~~29.~~ Computer program ^{according to claim 20, further} ~~for running on a computer system~~ comprising software code portions for checking the at least one modified parameter⁽¹⁾ and/or value before implementation in the radio network⁽¹⁾ comprising the steps of
- copying to a database⁽⁶⁾ the at least one
- 30 operational parameter and/or value from the radio network;⁽¹⁾
- changing the at least one operational parameter and/or value to the at least one modified parameter and/or value;

checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.

5

20 30. Computer program according to claim 28 or 29 wherein at least one of the the at least one operational parameter or the at least one modified parameter is stored in a database(62) using a compressed row technique.

10

~~31. Data carrier stored with data loadable in a computer~~
memory said data representing a computer program for running on a computer system at least including software code portions for checking at least one modified parameter
15 and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network on the basis of at least one business rule comprising at least one operational requirement derived from operational use of the radio
20 network.

32. Data carrier according to claim 31 wherein software code portions are provided for checking the at least one modified parameter and/or value before implementation in
25 the radio network comprising the steps of
copying to a database the at least one operational parameter and/or value from the radio network;
changing the at least one operational parameter and/or value to the at least one modified
30 parameter and/or value;
checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.

~~33. Data carrier according to claims 11 or 32 wherein
software code portions are provided for executing the
method as claimed in any of the claims 1 - 21.~~

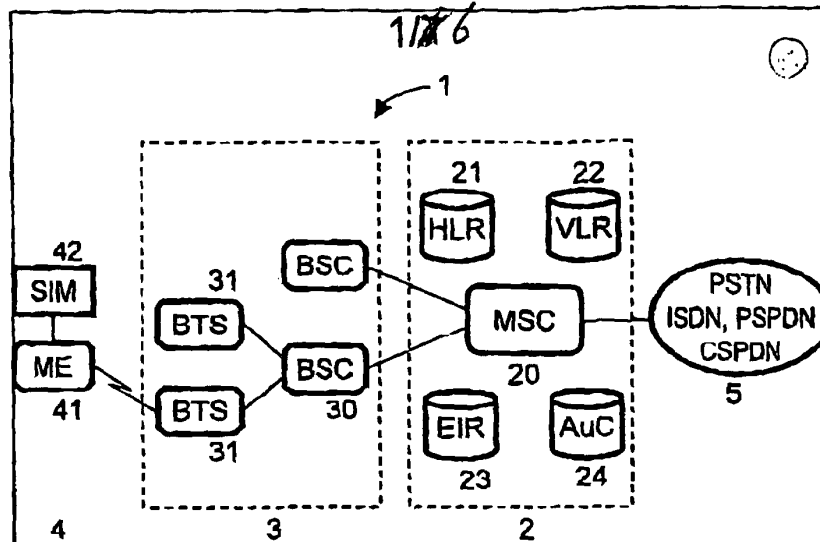


FIG. 1

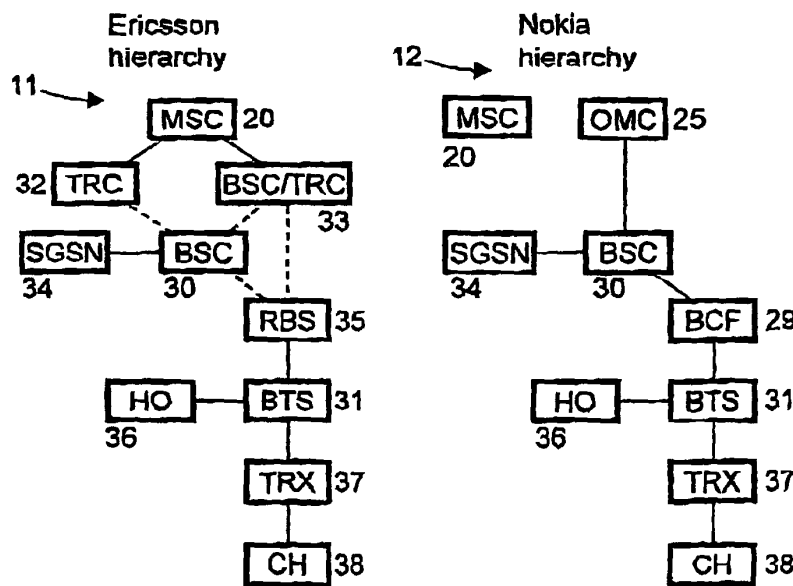
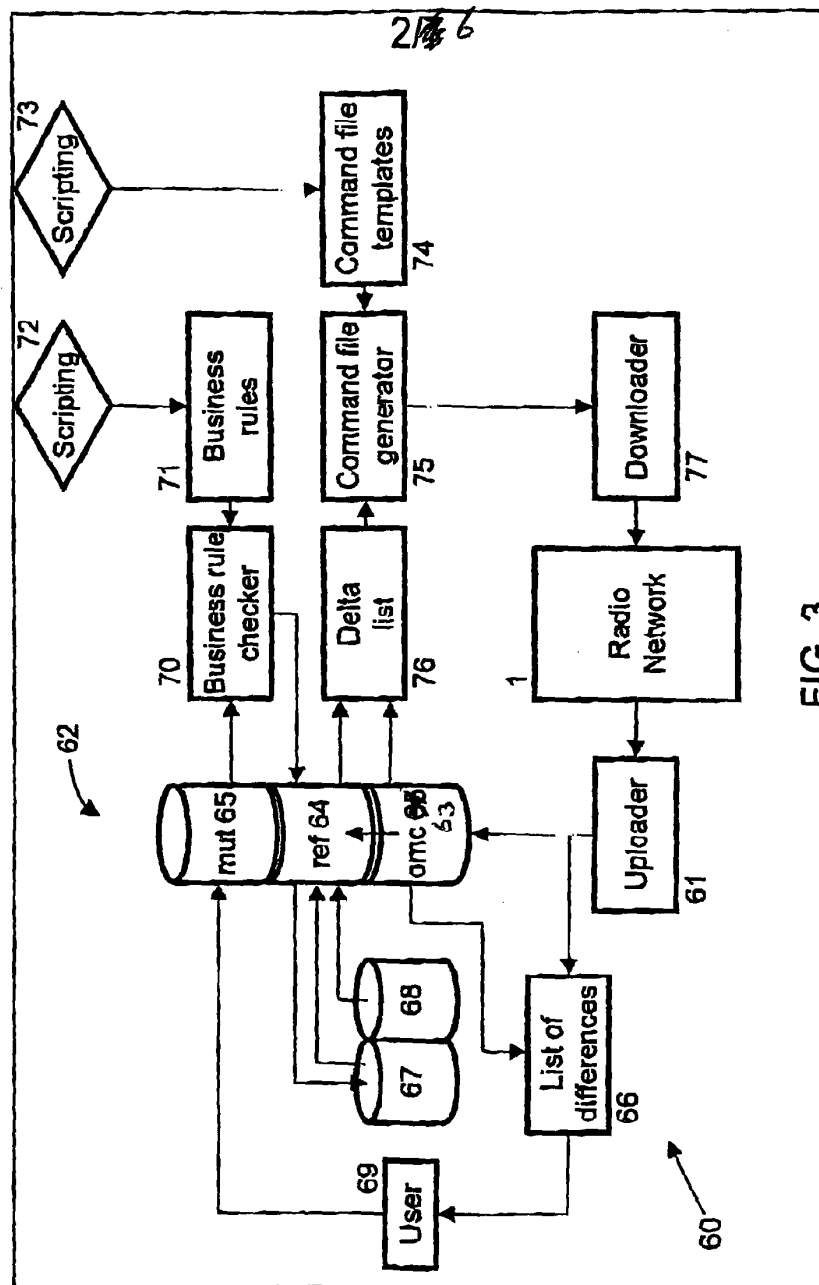
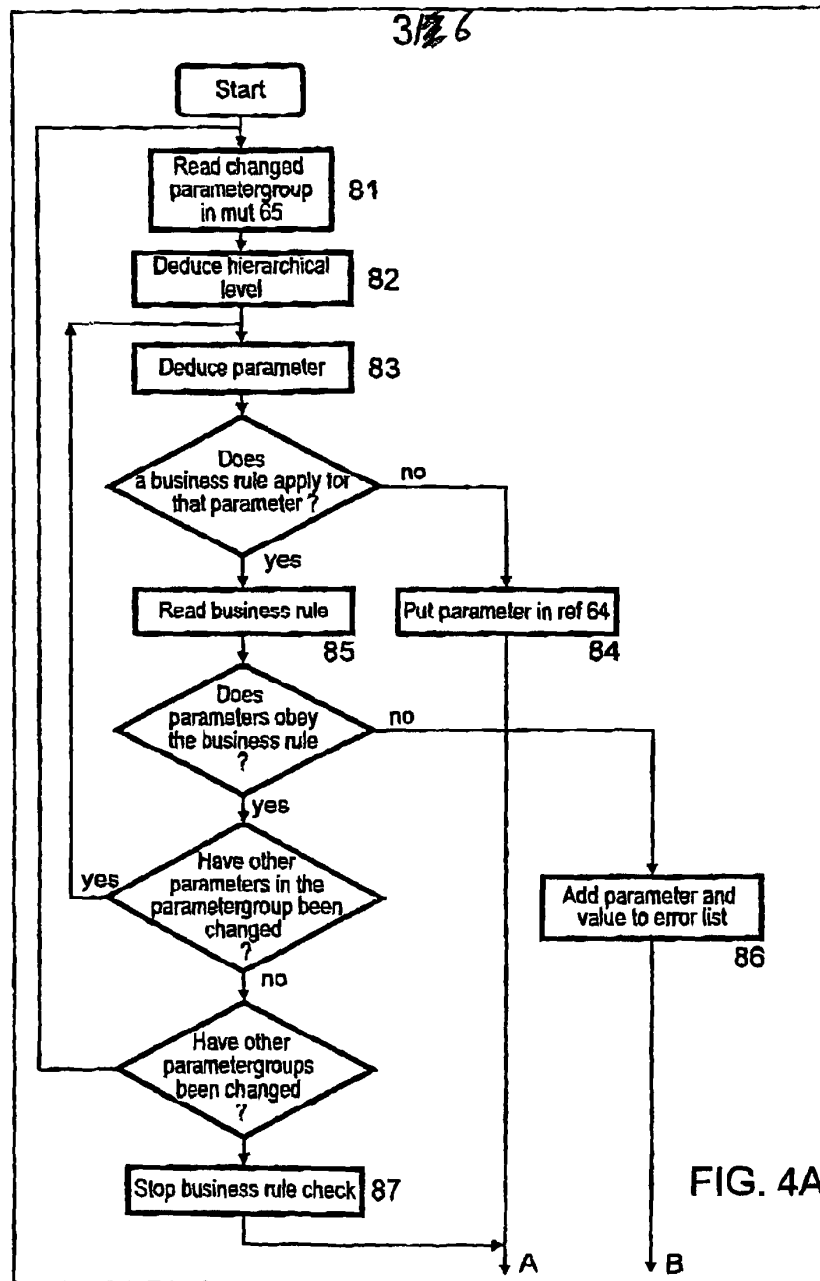


FIG. 2





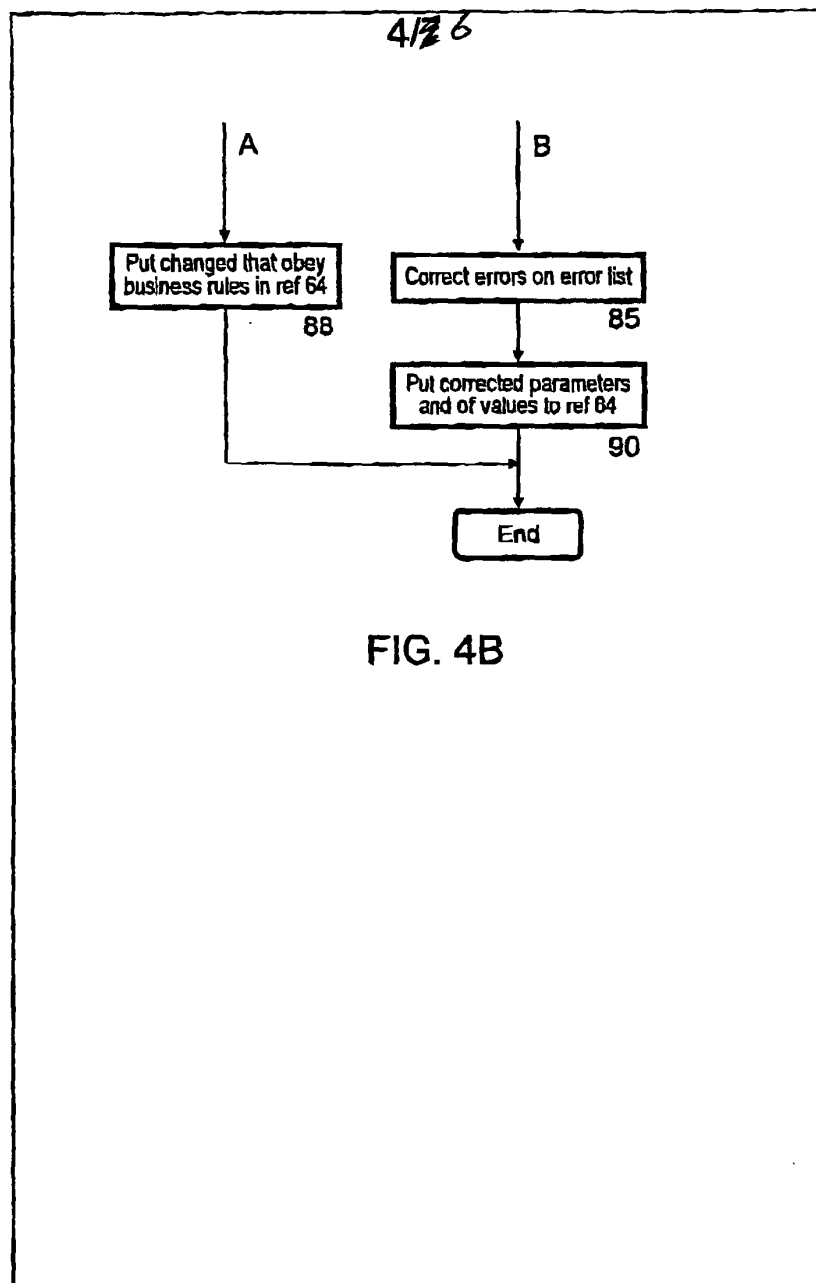


FIG. 4B

5/26

BR ID	STATE	MODULE	DESCRIPTION	ITERATION LEVEL	MESSAGE
2	1	bcf002.br	A BCF of type OE21 has a maximum of 3 BTS's	BCF - BTS	BLOCKING
4	1	bcf004.br	A BCF of type DE45 has a maximum of 1 BTS	BCF - BTS	BLOCKING
5	1	bcf005.br	A BCF has a maximum of 12 TRX's	BCF - TRX	BLOCKING
27	3	bts012.br	A BTS having > 3 TRX's has a additional SCCCH-channel	BTS - TRX	WARNING
28	1	bts013.br	At a combined BCCH 0...2 'no blocks for access grant' have to be used	BTS - CH	BLOCKING
29	1	bts014.br	At a non-combined BCCH 0...7 'no blocks for access grant' have to be used	BTS - CH	BLOCKING
30	3	bts015.br	Check on number of TRX's per LABD-link	BCF - TRX	WARNING
62	1	ho008.br	Preferably a cell has no neighbours using the same BCCH	BTS - TRX	WARNING
63	0	ho009.br	Neighbours are basically bi-directional	BTS - HO	WARNING
64	3	ho010.br	The sum of handover margin pbrt should be larger than 0	BTS - HO	WARNING
79	1	trx001.br	Frequency difference of at least 2 channels of TRX's on same site for different BTS's	BTS - TRX	BLOCKING
83	1	trx004.br	A TRX has a LABD-link	TRX	BLOCKING
85	0	trx009.br	A new TRX is assigned a dummy frequency	TRX	BLOCKING
104	1	ch004.br	The BCCH has to be defined on TRX1	BTS-TRX-CH	WARNING

Figure 5

Empf.zeit:07/05/2004 16:20

Empf.nr.:006 P.025

6/16

```
Iterate1Start(BCF)
  ResetCounter1
  If [BCF.bcf_type] == "$DE21" Then
    Iterate2Start(BTS)
    IncrementCounter1
    Iterate2End
  EndIf
  If Counter1 > "3" Then
    logBlocking(BCF,BCF of type DE21 exceeds maximum of 3 BTS's)
  EndIf
Iterate1End
```

Fig. 6A (module bcf002.br)

```
Iterate1Start(BTS)
  If [BTS.no_of_blocks_for_access_grant1] > "2" Then
    Iterate2Start(CH)
    If [CH.channel_type] == table(chMode,"MBCCB") Then
      logWarning(BTS,Too much AccessGrantBlocks have been defined)
    EndIf
    Iterate2End
  EndIf
Iterate1End
```

Fig. 6B (module bts013.br)

**Bescheid/Protokoll (Anlage)**

Datum
Date 24.02.2004
Date

Communication/Minutes (Annex)

Blatt
Sheet 1
Feuille

Notification/Procès-verbal (Annexe)

Anmelde-Nr.:
Application No.: 01 203 820.4
Demande n°:

The examination is being carried out on the **following application documents**:

Text for the Contracting States:

AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR LI

Description, pages:

1-16 as originally filed

Claims, No.:

1-33 as originally filed

Drawings, No.:

1-3,4A,4B,5,6A,
6B as originally filed

1. The following documents (D) are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

D1: WO 92/21182 A1

D2: US-A-6 085 335

2. Document **D1** (see in particular page 6, line 21 to page 9, line 16; page 14, line 12 to page 15, line 15; page 21, line 30 to page 23, line 16; Figures 4A and 6) discloses, according to the main features of **claim 1**, a method for checking at least one modified parameter and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network (see in particular page 7, lines 5 to 13; page 14, line 12 to page 15, line 15) on the basis of at least one business rule comprising at least one operational requirement (see in particular page 7, lines 13 to 15; page 21, line 30 to page 23, line 16).

**Bescheid/Protokoll (Anlage)**

Datum
Date
Date 24.02.2004

Communication/Minutes (Annex)

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Feuille 2

Notification/Procès-verbal (Annexe)

Anmelde-Nr.:
Application No.: 01 203 820.4
Demande n°:

It would be immediately apparent to the skilled person that, as the method for checking disclosed in document **D1** is based on predetermined business rules comprising fixed operational requirements, a major **disadvantage** of this known method is that it lacks flexibility of the definition of said business rules, eg. in dependence of operator requirements or operation thereof.

In consulting the prior art in the general field of radio network reconfiguration and related parameter checking, the skilled person, wishing to find a solution to overcome the above mentioned disadvantage, would come across document **D2** (see in particular abstract; column 3, lines 16 to 55; column 4, lines 48 to 53; column 14, line 57 to column 15, line 17) which describes the **principle** of modifying operational parameters in a radio network (see in particular column 3, lines 16 to 14) and checking said modified parameters on the basis of rules comprising operational requirements **deduced from** operational use of the radio network (see in particular column 3, lines 40 to 47; column 4, lines 48 to 53; column 14, line 57 to column 15, line 3).

For the skilled person, therefore, starting from the method described in document **D1** and being aware both of the above disadvantage thereof and of the **principle** of the solution described in document **D2** (ie. checking on the basis of rules comprising operational requirements deduced from operational use of the radio network), it would be obvious to apply said principle to the method of document **D1**, in order to arrive at a method wherein the above disadvantage has been overcome.

The skilled person would thus arrive, **without** the exercise of inventive skill, at the method for checking corresponding to the subject-matter of claim 1.

The subject-matter of claim 1 therefore does **not** involve an inventive step, Articles 52 (1) and 56 EPC, and thus claim 1 is **not** allowable.

3. The same considerations as made in above paragraph 2 regarding claim 1 are in essence also valid for **independent claims 22, 26, 28 and 31** since said claims 22, 26, 28 and 31 are based on the same feature combination as claim 1 in terms of claims relating to a system, a radio network, a computer program and a data

**Bescheid/Protokoll (Anlage)**

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Date 24.02.2004

Communication/Minutes (Annex)

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Feuille 3

Notification/Procès-verbal (Annexe)

Anmelde-Nr.:
Application No.: 01 203 820.4
Demande n°:

carrier, respectively.

The subject-matter of claims 22, 26, 28 and 31 therefore does **not** involve an inventive step, Articles 52 (1) and 56 EPC, and hence claims 22, 26, 28 and 31 are **not** allowable.

4. Furthermore, document **D1** (see in particular page 6, line 21 to page 9, line 16; page 14, line 12 to page 15, line 15; page 21, line 30 to page 23, line 16; Figures 4A and 6) discloses, according to the main features of **independent claim 29**, a method for checking at least one modified parameter and/or value before implementation in a radio network (see in particular page 6, lines 21 to 32), comprising the steps of

copying to a database at least one operational parameter and/or value from the radio network (see in particular page 7, lines 5 to 10);

changing the at least one operational parameter and/or value to the at least one modified parameter and/or value (see in particular page 7, lines 10 to 13);

checking the at least one modified parameter and/or value by verifying whether at least one selected business rule comprising at least one operational requirement has been obeyed (see in particular page 7, lines 13 to 15; page 21, line 30 to page 23, line 16).

The subject-matter of claim 29 differs from that disclosed in document **D1** merely in that the steps of the method of claim 29 are software code portions of a computer program which is run on a computer system.

However, it is **common** knowledge that any method may be implemented in the form of corresponding software code portions comprised in a computer program which is run on a computer system; this feature therefore does not require any documentary evidence.

The skilled person, being aware of the method described in document **D1** **would** therefore arrive, by effecting a simple and well known modification thereto, **without** the exercise of inventive skill, at the computer program corresponding to the subject-matter of independent claim 29.

**Bescheid/Protokoll (Anlage)**

Datum
Date
Date 24.02.2004

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Notification/Procès-verbal (Annexe)

Anmelde-Nr.:
Application No.: 01 203 820.4
Demande n°:

The subject-matter of claim 29 therefore does **not** involve an inventive step, Articles 52 (1) and 56 EPC, and thus claim 29 is **not** allowable.

5. **Dependent claims 2 to 21, 23 to 25, 27, 30, 32 and 33** do **not** contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step for the reason that the subject-matter of said claims is **either in principle** directly derivable from the disclosure of document **D1** (see in particular page 6, line 21 to page 9, line 16; page 14, line 12 to page 15, line 15; page 21, line 30 to page 23, line 16; Figures 4A and 6) or document **D2** (see in particular abstract; column 3, lines 16 to 55; column 4, lines 48 to 53; column 14, line 57 to column 15, line 17), **or** represents simple design details which are generally known to the person skilled in the field of radio network reconfiguration and related parameter checking.

Due to the above reasons, dependent claims 2 to 21, 23 to 25, 27, 30, 32 and 33 are **not** allowable, Articles 52 (1) and 56 EPC.

6. It is **not** at present apparent which part of the application could serve as a basis for a new, allowable claim. Should the Applicant nevertheless regard some particular matter as patentable, an independent claim including such particular matter should be filed taking account of Rule 29 (1) EPC. The Applicant should also indicate in the letter of reply the difference vis à vis the state of the art and the significance thereof (i.e. particular advantages).
7. The various definitions of the **computer program** given in independent claims 28 and 29 are such that the claims as a whole are **not concise**, contrary to Article 84 EPC. Moreover, **lack of clarity** of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

Under Article 84 EPC in combination with Rule 29 (2) EPC an application may

**Bescheid/Protokoll (Anlage)**

Datum
Date
Date 24.02.2004

Communication/Minutes (Annex)

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Feuille 5

Notification/Procès-verbal (Annexe)

Anmelde-Nr.:
Application No.: 01 203 820.4
Demande n°:

contain more than one independent claim in a particular category **only if** the subject matter claimed falls within one or more of the exceptional situations set out in paragraphs (a), (b) or (c) of Rule 29 (2) EPC. This is not the case in the present application however.

The Applicant is requested to file an amended set of claims which complies with Rule 29 (2) EPC. Failure to do so, or to submit convincing arguments as to why the current set of claims does in fact comply with these provisions, will lead to refusal of the application under Article 97(1) EPC.

In the present case it is considered appropriate to use **only one** independent claim relating to the computer program.

8. Should the Applicant intend to file a new set of claims, the following requirements should also be taken into consideration:
 - 8.1 Most of the features in **claims 18, 19 and 29** which are preceded by "... **the** ..." (see eg. "... **the** at least one modified parameter ..." in lines 2 and 3 of claim **29**) are not clear (Article 84 EPC) since said features have not been previously defined in said respective claims or in any claims on which said respective claims depend, ie. there is no antecedent for said features.
 - 8.2 **Claims 9 and 12** relate to different alternative embodiments of the hierarchy mentioned in said respective claims. Therefore, the dependency of claim 12 should be changed accordingly, so that claim 12 is only dependent on "any of claims 1 to 8", and not on any of claims 9 to 11 which represent an alternative embodiment (Article 84 EPC).
 - 8.3 The full meaning of the abbreviations used in **claims 10, 11, 13 and 14** should be included in said claims (Article 84 EPC).
 - 8.4 To meet the requirements of Rule 29 (1) EPC any new independent claim should be properly cast in the **two-part form**, with those features which in combination are part of the nearest prior art (eg. document **D1**) being placed in the preamble.



- 8.5 **Reference signs** in parentheses should be inserted in the claims to increase their intelligibility, Rule 29 (7) EPC. This applies to both the preamble and characterising portion (see the Guidelines, C-III, 4.11).
- 8.6 To meet the requirements of Rule 27 (1) (b) EPC, the cited documents **D1 and D2** should be acknowledged and briefly discussed in the opening part of the description.
- 8.7 The opening part of the description should be modified to bring it into agreement with any new independent claim, Rule 27 (1) (c) EPC. In particular, the part "Summary" of the description should disclose the invention, as claimed, in such terms that the solution of the technical problem can be understood.
- 8.8 The general statement in the description in lines 3 to 4 on page 6 (ie. "...spirit ...") is not clear, and when used to interpret the claims renders them also unclear, contrary to Article 84 EPC (see also EPO Guidelines, C-III, 4.3a). The statement therefore should be deleted.
- 8.9 Throughout the description, any reference to not-filed Figures 6C and 6D should be deleted (see also Applicant's letter dated 27.01.2003). The pages of the drawings should be renumbered accordingly.
- 8.10 In **Figure 3**, "omc 65" should be replaced by "omc **63**" (see page 7, line 26 of the description).
9. Care should be taken during revision not to add subject-matter which extends beyond the content of the application as originally filed, Article 123 (2) EPC.

In his letter of reply, the Applicant should indicate the parts of the originally filed application serving as a basis for subject-matter newly introduced into the claims.



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Patent Office

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Direction Générale 2

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Telephone numbers:

Primary Examiner +49 89 2399-8801
(substantive examination)

Formalities Officer / Assistant +49 89 2399-2996
(Formalities and other matters)



Application No. 01 203 820.4 - 2412	Ref. 402706EP	Date 24.02.2004
Applicant Koninklijke KPN N.V.		

Communication pursuant to Article 96(2) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 78(2) and 83(2) and (4) EPC.

One set of amendments to the description, claims and drawings is to be filed within the said period on separate sheets (Rule 36(1) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 96(3) EPC).



RABE M O
Primary Examiner
for the Examining Division

Enclosure(s): 6 page/s reasons (Form 2906)



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Patent Office**

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Generaldirektion 1

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Direction générale 1

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Date
14.07.03

Reference 402706EP	Application No./Patent No. 01203820.4 - 2412
Applicant/Proprietor Koninklijke KPN N.V.	

**Communication pursuant to Rule 50 EPC - reminder of payment of the designation fees
(Art. 79(2) EPC) and of the examination fee (Art. 94(2) EPC)**

The date on which the European Patent Bulletin mentions the publication of the European search report for the above-mentioned European patent application is: 09.07.03.

Your attention is drawn to Article 79(2) and (3) EPC as well as Article 94(2) and (3) EPC according to which within **SIX MONTHS** after the above-mentioned publication date of the search report

- the designation fee(s) must be paid,
- a written request for examination must be filed as well as the examination fee must be paid.
(A written request for examination has been filed already.)

The current rate of the designation fee for each contracting state designated is: EUR 75,00

If the application has been filed on or after 01 July 1999 the payment of seven times the amount of the designation fee is deemed to constitute payment of the designation fees for all contracting states (see OJ EPO 06/1999, 405).

The current rate of the examination fee is: EUR 1430,00

If at least one designation fee and the examination fee are not paid within the period laid down in Article 79(2) or 94(2) EPC, the application shall be deemed to be withdrawn (Arts. 79(3), 94(3) EPC).

Any extension fees are also payable within the above-mentioned period.

**NOTE TO USERS OF THE AUTOMATIC DEBITING PROCEDURE:****1) Designation fees**

If the application has been filed up to 30 June 1999, the designation fees for the contracting states marked under no. 2 of section 32 of the Request for Grant (EPO Form 1001) will be debited on the last day of the period pursuant to Article 79(2) EPC, unless the EPO receives prior instructions to the contrary.

If the application has been filed on or after 01 July 1999, seven times the amount of the designation fee will be debited on the last day of the period pursuant to Article 79(2) EPC. However, if contracting states are marked under no. 2 of section 32 of the Request for Grant (EPO Form 1001), the designation fees only for these contracting states will be debited unless instructions to the contrary have reached the EPO within the basic period for paying the designation fees.

2) Examination fee

Unless the EPO receives prior instructions to the contrary, the examination fee will be debited on the last day of the period for payment.

For further details see the Arrangements for the automatic debiting procedure, Supplement to OJ EPO 02/2002.

RECEIVING SECTION



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Datum/Date

28/05/03

Zeichen/Ref./Réf. 402706EP	Anmeldung Nr./Application No./Demande n°./Patent Nr./Patent No./Brevet n°. 01203820.4-2412 / 1326458
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire Koninklijke KPN N.V.	

NOTIFICATION OF EUROPEAN PUBLICATION NUMBER AND INFORMATION ON THE
APPLICATION OF ARTICLE 67(3) EPC

The Receiving Section hereby informs you that the technical preparations
for publication of the above-mentioned European patent application have
been completed.

The provisional protection under Art. 67(1) and (2) EPC in the indivi-
dual Contracting States becomes effective only when the conditions
referred to in Art. 67(3) EPC have been fulfilled (for further informa-
tion, see EPO brochure "National Law relating to the EPC").

This application will be published on 09.07.03 with
the European search report. The publication will be mentioned
in European Patent Bulletin number 2003/28

The publication number is: 1326458

The title of the invention in the three official languages of the
European Patent Office is worded as follows:

System und Verfahren zur Überprüfung von Parametereinstellungen in
Funknetzen

System and method for checking parameter settings of radio networks

Système et procédé pour vérifier l'établissement de paramètres dans
des réseaux radio

In all future communications to the EPO, please quote the application
number as indicated above, i.e. including the final four figures (which
identify the Directorate responsible for the subsequent procedure).
Amendments to a European patent application or European patent must
be filed in the language of the proceedings.

REMARK: An issue of the published European patent application will
be forwarded to you directly from our printer.

RECEIVING SECTION





File number: 01203820.4

17.05.03

Final instructions

regarding partial loss of rights

☐ PRIO

☐ CLMS

☒ DRAW

☐ DEST

☐ EXPT Please check also the payment situation of the EXPT states. If there is no payment, the EXPT state shall be deleted

- X 1. The partial loss of rights has become final because none of the possible legal remedies have been requested or any legal remedies applied for have been refused.
- X 2. LOPR(3) has been encoded and the respective partial right (PRIO/DEST/CLMS) has been deleted (DEWP).
- X 3. DIM5 has been encoded, if necessary.
CLMS : Textcode 0104/0105
DRAW : 0106/0107/0108/0109

For further information refer to Internal Note No. 7, section 3.4, on the publication of an application despite (partial) loss of rights.

27-05-2003
The Hague, ...

Karpf, Silvia
.....
(Formalities Officer)



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Datum/Date

07-02-2003

Zeichen/Ref./Réf. 402706EP	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°. 01203820.4-2412
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire Koninklijke KPN N.V.	

NOTING OF LOSS OF RIGHTS (Rule 69(1) EPC)

The drawing(s) and/or the references to the drawing(s) in the European patent application cited above are deemed to be deleted because within the time limit specified in the communication pursuant to Rule 43 EPC) (EPO Form 1114).

☒ no request for re-dating was received (Rule 43(1) EPC).

☐ no drawing(s) were submitted (Rule 43(2) EPC).

MEANS OF REDRESS

1) Request for a decision

If the applicant considers that the finding of the European Patent Office is inaccurate, he may, within (a non-extendable period of) TWO MONTHS after notification of this communication, apply in writing for a decision on the matter by the European Patent Office (Rule 69(2) EPC). The application can only lead to the finding being reversed, if this does not actually correspond to the factual or legal situation.

2) Restitutio in integrum

The applicant who, in spite of all due care required by the circumstances having been taken, was unable to observe the time limit, shall, upon application, have his rights re-established provided that the time limits and formal requirements laid down in Article 122 EPC are complied with.

RECEIVING SECTION

Crane, Eva



REGISTERED LETTER

EPO Form 1108 (06.99)

7006037 04/02/03

01203820.4 LOPR DRAW

021



EPO - Munich
64

29. Jan. 2003

EUROPEAN PATENT OFFICE
Directorate General 2
D-80298 MUNICH
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Your reference
01203820.4-2412

Your letter of
27 December 2002

Our reference
402706EP

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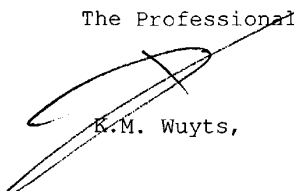
Enclosure(s)

Date
January 27, 2003

Subject
European Patent Application No. 01203820.4

Referring to the Communication under Rule 43(2)EPC, Art. 91(1)(g), missing drawings dated 27 December 2002 please be informed that any reference of the missing drawings in the application can be deleted.

The Professional Representative



R.M. Wuyts,

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Reg. No. 02045200
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Datum/Date
27-12-2002

Zeichen/Ref./Réf. 402706EP	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°. 01203820.4-2412
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire Koninklijke KPN N.V.	

() LATE-FILED DRAWING(S) (RULE 43(1) EPC)

The examination by the Receiving Section prescribed in Article 91(1)(g) EPC has revealed that the drawing(s) for the above-mentioned European patent application was (were) filed later than the date of filing, i.e. on

The drawing(s) and the references to the drawing(s) in the European patent application shall be deemed to be deleted unless you request within a period of ONE MONTH from notification of this communication that the application be re-dated to the date on which the drawing(s) was (were) filed. This time limit cannot be extended.

X MISSING DRAWING(S) (RULE 43(2) EPC)

The examination by the Receiving Section prescribed in Article 91(1)(g) EPC has revealed that no drawing(s) has (have) been filed although reference is made to the drawing(s) in the above-identified patent application.

You are hereby invited to file the missing drawing(s) within ONE MONTH from notification of this communication. This time limit cannot be extended.

If the drawing(s) is (are) filed in due time, the application will be re-dated to the date of filing of the drawing(s). Otherwise any reference to it (them) in the application shall be deemed to be deleted and the original date of filing will remain unchanged.

Your attention is drawn to the fact that, as a result of any re-dating of the date of filing, the priority date claimed may cease to lie within the 12-month period for claiming priority and that, accordingly, there may be no right of priority (Rule 41(3) EPC).

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X Fig. 6c and 6d mentioned on page 5 of the description.

REGISTERED LETTER

EPO Form 1114 (07.96)

7001114 18/12/02 021

01203820.4 DRAW (4)



**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 20 3820

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-03-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9221182 A	26-11-1992	US 5434798 A EP 0540718 A1 JP 3066077 B2 JP 6502290 T WO 9221182 A1	18-07-1995 12-05-1993 17-07-2000 10-03-1994 26-11-1992
US 6085335 A	04-07-2000	NONE	
DE 19813754 A	30-09-1999	DE 19813754 A1	30-09-1999
US 6185437 B1	06-02-2001	GB 2328581 A AU 9738498 A BR 9811210 A CN 1267438 T WO 9909773 A1 EP 1005771 A1 HU 0002804 A2	24-02-1999 08-03-1999 25-07-2000 20-09-2000 25-02-1999 07-06-2000 29-01-2001

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82



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Branch at
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**Office européen
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Département à
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Datum/Date

20.03.02

Zeichen/Ref./Réf. 402706EP	Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°. 01203820.4-2412-
Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire Koninklijke KPN N.V.	

COMMUNICATION

The European Patent Office herewith transmits as an enclosure the European search report for the above-mentioned European patent application.

If applicable, copies of the documents cited in the European search report are attached.

☐ Additional set(s) of copies of the documents cited in the European search report is (are) enclosed as well.

The following specifications given by the applicant have been approved by the Search Division:

☒ abstract

☒ title

☐ The abstract was modified by the Search Division and the definitive text is attached to this communication.

The following figure will be published together with the abstract: **4A, 4B**

REFUND OF THE SEARCH FEE

If applicable under Article 10 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	WO 92 21182 A (ERICSSON TELEFON AB L M) 26 November 1992 (1992-11-26) * abstract * * page 6, line 21 - page 9, line 16 * * page 14, line 12 - page 15, line 15 * * page 21, line 30 - page 23, line 16 * * figures 4A,6 * ---	1-33	H04Q7/34
Y	US 6 085 335 A (BASU KALYAN ET AL) 4 July 2000 (2000-07-04) * abstract * * column 3, line 16 - line 55 * * column 4, line 48 - line 53 * * column 14, line 57 - column 15, line 17 * ---	1-33	
A	DE 198 13 754 A (SIEMENS AG) 30 September 1999 (1999-09-30) * abstract * * column 1, line 40 - column 2, line 14 * * column 3, line 16 - line 40 * * column 5, line 42 - column 6, line 36 * ---	1-33	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	HIRSCH L: "EINHEITLICHES VERFAHREN ZUR PLAUSIBILITAETSKONTROLLE DER KONFIGURATIONSAENDERUNGEN VON RADIOPARAMETERN IN EINEM MOBILFUNKNETZ" , TECHNIK REPORT, SIEMENS AG.,ERLANGEN, DE, VOL. 2, NR. 2, PAGE(S) 52-56 XP000828537 ISSN: 1436-7777 * the whole document * --- -/--	1,2,22, 26,28, 29,31	H04Q
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 13 March 2002	Examiner Rabe, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

1

EPO FORM 1503 03.82 (P04C01)



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 6 185 437 B1 (BARK ANNA-SOFIE) 6 February 2001 (2001-02-06) * abstract * * column 2, line 54 - line 61 * * column 3, line 26 - line 42 * * figure 2 * -----	1,2,22, 26,28, 29,31	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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1

EPO FORM 1503 03.82 (P04C01)

Abstract

A method and system are disclosed for checking modified parameters of components of a radio network. Operational
5 parameters that have been modified are checked first on obeying business rules comprising requirements that have been deduced from operational use of the radio network, preferably before they are implemented in the network. The
10 method and system all application of compressed row techniques in databases comprising the parameters.

+ figure 4A and 4B

CLAIMS

(23)

1. Method for checking at least one modified parameter and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network on the basis of at least one business rule comprising at least one operational requirement deduced from operational use of the radio network.
2. Method according to claim 1 wherein the at least one modified parameter and/or value is checked before implementation in the radio network comprising the steps of
 - copying to a database the at least one operational parameter and/or value from the radio network;
 - changing the at least one operational parameter and/or value to the at least one modified parameter and/or value;
 - checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.
3. Method according to claim 2 wherein a non-compliance signal is generated if the at least one modified parameter does not obey the at least one operational requirement.
4. Method according to claims 2 or 3 in which the at least one operational parameter is stored in a first part of the database and the at least one modified parameter is stored in a second part of the database.

5. Method according to claim 4 in which the first and second part of the database are separate databases.
- 5 6. Method according to any of the claims 2-5 in which at least one of the the at least one operational parameter or the at least one modified parameter is stored in the database using a compressed row technique.
- 10 7. Method according to any of the claims 2-5 in which the database comprises at least one hierarchy table to store and have access to the at least one operational parameter and the at least one modified parameter.
- 15 8. Method according to claim 7 in which the at least one hierarchy table is used for checking whether the at least one modified parameter obeys the at least one selected business rule.
- 20 9. Method according to any of the preceding claims in which the at least one modified parameter relates to at least one level of a GSM or DCS network hierarchy.
10. Method according to claim 9 in which the levels of the
25 GSM network hierarchy are MSC, OMC, BSC, BCF and/or BTS.
11. Method according to claim 9 or 10 in which the levels of the GSM network hierarchy are TRX, HO and/or CH.
- 30 12. Method according to any of the preceding claims in which the at least one modified parameter relates to at least one level of a GPRS hierarchy.

13. Method according to claim 12 in which the levels of the GPRS hierarchy are MSC, OMC, BSC, SGSN, BCF and/or BTS.

14. Method according to claim 13 in which the levels of
5 the GPRS hierarchy are TRX, HO and/or CH.

15. Method according any of the claims 9-14 in which the checking of the at least one modified parameter and/or value by verifying whether the at least one selected
10 business rule comprising at least one operational requirement has been obeyed is applied to at least one of the levels of the GSM, DCS or GPRS hierarchy.

16. Method according to any of claims 9-15 wherein
15 relationships are checked between different operational and/or modified parameters in the same or different hierarchical levels of the radio network.

17. Method according to any of the preceding claims in
20 which the at least one selected business rule is programmed by an operator or at least ordered or influenced by the operator of the radio network.

18. Method according to any of the preceding claims in
25 which the at least one operational practice requirement involves an administrative requirement.

19. Method according to claim 17 in which the operational practice requirement involves a technically preferable
30 requirement programmed, ordered and/or influenced by the operator of the radio network.

20. Method according to claim 3 in which the non-compliance signal is a file or message displayed to an operator.

5 21. Method according to claim 3 or 20 in which the non-compliance signal is programmable.

22. A system for checking at least one modified parameter and/or value obtained from changing at least one
10 operational parameter and/or value of at least one component of a radio network on the basis of at least one business rule comprising at least one operational requirement derived from operational use of the radio network.

15

23. System according to claim 22 for checking the at least one modified parameter and/or value before implementation in the radio network, comprising:

20 a first part of a database to store the at least one operational parameter and/or value from the radio network

a second part of a database to store the at least one modified parameter and/or value;

25 a business rule checker verifying whether the at least one modified parameter and/or value obeys the at least one operational requirement;

24. System according to claim 23 wherein a signal generator can generate a non-compliance signal if the at least one modified parameter does not obey the at least one
30 operational requirement.

25. System according to claims 23 or 24 further comprising scripting means in order to define business rules and/or error messages to be used by the business rule checker.

26. Radio network comprising at least one component comprising at least one operational parameter and/or value
5 that can be changed to at least one modified parameter and/or value wherein the at least one modified parameter and/or value can be checked on the basis of at least one business rule derived from operational use of the radio network.
- 10 27. Radio network according to claim 26 wherein the at least one operational parameter and the at least one modified parameter relate to at least one level of a GSM, DCS or GPRS hierarchy of the radio network.
- 15 28. Computer program for running on a computer system comprising software code portions for checking at least one modified parameter and/or value obtained from changing at least one operational parameter and/or value of an at least
20 one component of a radio network on the basis of at least one business rule comprising at least one operational requirement derived from operational use of the radio network.
- 25 29. Computer program for running on a computer system comprising software code portions for checking the at least one modified parameter and/or value before implementation in the radio network comprising the steps of
copying to a database the at least one
30 operational parameter and/or value from the radio network;
changing the at least one operational parameter and/or value to the at least one modified parameter and/or value;

checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.

5

30. Computer program according to claim 28 or 29 wherein at least one of the the at least one operational parameter or the at least one modified parameter is stored in a database using a compressed row technique.

10

31. Data carrier stored with data loadable in a computer memory said data representing a computer program for running on a computer system at least including software code portions for checking at least one modified parameter and/or value obtained from changing at least one operational parameter and/or value of an at least one component of a radio network on the basis of at least one business rule comprising at least one operational requirement derived from operational use of the radio network.

20

32. Data carrier according to claim 31 wherein software code portions are provided for checking the at least one modified parameter and/or value before implementation in

25

the radio network comprising the steps of

copying to a database the at least one operational parameter and/or value from the radio network;

changing the at least one operational parameter and/or value to the at least one modified

30

parameter and/or value;

checking the at least one modified parameter and/or value by verifying whether the at least one selected business rule comprising the at least one operational requirement has been obeyed.

33. Data carrier according to claims 31 or 32 wherein software code portions are provided for executing the method as claimed in any of the claims 3 - 21.

SYSTEM AND METHOD FOR CHECKING PARAMETER SETTINGS
OF RADIO NETWORKS

(25)

Field of the invention

5 The invention relates to a method and system for checking parameter settings of a radio network. More specifically the invention relates to a method and system for checking various parameters of components of a cellular radio networks on the basis of business rules.

10

Background

Fig. 1 shows a schematic representation of a contemporary cellular network 1. The architecture of these
15 cellular networks comprises a network subsystem 2, a base station subsystem 3 and a mobile station 4. Examples of these cellular networks are GSM and DCS and extensions of these networks such as GPRS, UMTS etc. The network subsystems main component involves the mobile switching
20 centre 20 (MSC) providing the interface of the cellular network and wire bound networks 5 (PSTN, ISDN, ADSL etc.) as well as roaming and call-routing facilities (Home Location Register 21, Visitor Location Register 22, Equipment Identity Register 23 and Authentication Centre
25 24).

The base station subsystem 3 consists of a number of base stations. The base station subsystem 3 constitutes the connection between a mobile station 4 and the MSC 20. The base station subsystem 3 may be
30 distinguished into two parts, the Base Transceiver Station 31 (BTS) and the Base Station Controller 30 (BSC). The BTS 31 houses radio transceivers that define a cell and handles the radio-link protocols with the mobile station 4. In a large urban area, there will potentially be a large number

of BTSs deployed. The BSC 30 manages the radio resources for one or more BTSs 31. It handles radio-channel set-up, frequency hopping, and handovers.

5 The mobile station 4 is the mobile equipment that enables a user to communicate with others through the cellular network. A mobile station 4 usually comprises mobile equipment 41 and a Subscriber Identity Module 42 (SIM).

As the complexity of cellular networks increases
10 flexible operation of these networks becomes more difficult. Configuration and reconfiguration of a cellular network is complex since the parametersettings of the different components of the cellular radio network affect eachother. United States Patent 5,343,798 of Ericsson
15 describes a reconfiguration method and apparatus in which the cell parameters of particular mobile switching centres in a network are copied to a database, and the copied parameters are stored. A set of proposed changes to the stored parameters are prepared and the consistency of the
20 prepared set of proposed changes is verified. Alterations to the set of proposed changes responsive to the verification are made and the verified set of proposed changes are copied to the concerned mobile switching centres. The verified set of proposed changes is then
25 introduced into the network. An up-to-date image of the cell parameters in the mobile switching centres in the network is maintained in a system parameter database.

Problem definition and aims of the invention

30 Typically a cellular radio network comprises several MSC's and a larger number of base stations. Operation of such cellular radio networks requires a high degree of flexibility in the sense that configuration and reconfiguration of the cellular network has to be possible

within a limited period of time and with a high degree of accuracy. Such a reconfiguration of a radio network can be permanent or temporarily. Reasons for such a reconfiguration are numerous, e.g. a temporary cell split
5 needed to deal with an expected increase in traffic due to an event or the permanent integration of new elements both affecting the settings of already existing elements in the radio network. Therefore sophisticated methods and systems are required that administrate the parameter settings of
10 the various components, e.g. the BTS or BSC, of the cellular radio network and change the parameter settings of said components. Examples of parameters that can be changed include cell type, cell designation, cell direction, signal strength, signal to noise ratio, etc. Moreover means have
15 to be provided in order to check the consistency of the proposed parameter changes before the changes are implemented in the cellular network.

The reconfiguration method and system as revealed by the '798 patent can be improved with regard to,
20 inter alia, the performed routine to check the consistency of proposed parameter changes.

More particularly an improvement relates to the hierarchical levels that can be checked. The method of the '798 patent checks the consistency of the proposed
25 parameters only with regard to cells and handovers. Thus only a very limited part of the network hierarchy is checked, resulting in a less reliable and efficient control of the radio network.

Another problem of the method described in
30 the '798 patent relates to the type of rules used in performing the consistency check. The rules used in performing this check originate solely from technical requirements derived from cellular network technology. There is no possibility to apply rules derived from

operational practice as well. Moreover it is not possible to deviate from the technically sufficient parameter setting requirements if operational practice experience reveals a different more preferable technical parameter
5 setting.

Still another problem of the method described in the '798 patent is that in performing the consistency check only pre-programmed rules are used. This limitation decreases the flexibility of the system for the operator
10 that exploits a cellular radio network. It may be that such an operator is not satisfied with the requirements for the various parameters defined by the supplier of the network. The operator may want to define the requirements, including the technical requirements, himself.

15 The present invention aims to provide a method and system to check the consistency of the proposed changes of parameters.

Summary

20 The present invention provides a method and system that improve the reliability, flexibility and accuracy required for operating cellular radio networks.

It is an object of the invention to be able to verify the proposed changes in the parameter settings in
25 all hierarchical levels of the radio network and of substantially every, i.e. any desired, relationship between parameters in the same or different hierarchical level of the radio network. By enabling verification on every hierarchical level the control and reliability of the
30 network is significantly improved if changes in the parameter setting are to be implemented.

It is another object of the invention to enable the use of rules developed from operational practice in the verification of the parameter settings in one or

more of the levels of the network hierarchy and relationship between elements in the cellular radio network. Hereafter the rules used to verify the parameter settings will be referred to as business rules. These
 5 business rules comprise rules relate to technically preferable requirements as well as rules derived from operational practice.

It is still another object of the invention to enable the use of programmable rules in the verification
 10 of the proposed changes of the parameter settings in one or more hierarchical levels and relationship of elements in the radio system. These rules may preferably be programmed by the operator of the radio network or at least being ordered or influenced by the operator of the radio network.
 15 Moreover also the error messages if the rules are not obeyed may be operator-programmable.

Short description of the drawings

Fig.1 shows an elementary representation of a
 20 GSM radionetwork;

Fig.2 shows examples of representations of different hierarchies the invention is able to handle;

Fig.3 shows a detailed scheme of the parameter management;

25 Fig.4A,B shows a flow-chart illustrating an example of the business rule checking process;

Fig.5 shows a table of operational examples of business rules;

Fig.6A-D shows a few business rule modules.
 30

Description of preferred embodiments of the invention

For the purpose of teaching the invention, preferred embodiments of the method and devices of the invention are described in the sequel. It will be apparent

to the person skilled in the art that other alternative and equivalent embodiments of the invention can be conceived and reduced to practice without departing from the true spirit of the invention, the scope of the invention being
 5 only limited by the claims as finally granted.

A radio network 1, as schematically shown in figure 1 may be represented alternatively by a network hierarchy 11,12 comprising different levels. These levels correspond to physical as well as non-physical parts of
 10 radio network 1. The hierarchies 11,12 may differ in their representation between several commercial suppliers of these kinds of radio networks 1. As an example figure 2 shows the network hierarchies of Ericsson 11 and Nokia 12 radio networks 1. It can be observed that the Ericsson and
 15 Nokia hierarchies 11 and 12 differ in some aspects, but are equivalent in other aspects.

The Ericsson hierarchy 11 comprises a MSC level 20. The MSC 20 is coupled to a transcoder 32 (TRC) and a BSC/TRC 33. The next level comprises the BSC 30. This
 20 BSC 30 may be linked to the TRC 32 or the BSC/TRC 33. In the case that a GPRS radio network should be represented an additional element Service GPRS Support Node 34 (SGSN) is introduced. The SGSN 34 may comprise different hierarchical levels itself. Next the Ericsson hierarchy 11 shows a Radio
 25 Base System 35 (RBS) level. The RBS may be linked to a BSC 30 or a BSC/TRC 33. Afterwards a handover 36 (HO) and the BTS 31 are shown. Finally the Ericsson hierarchy 11 exhibits a transceiver level 37 (TRX) and a channel level 38 (CH).

30 The Nokia hierarchy 12 differs from the Ericsson hierarchy in some aspects. Firstly the TRC 32 and BSC/TRC 33 level are replaced by an Operational Maintenance Centre 25 (OMC). Moreover whereas the Ericsson hierarchy 11 contains TRC and BSC/TRC levels, the Nokia hierarchy

implements the OMC-level 25. The Ericsson hierarchy 11 and the Nokia hierarchy 12 are equivalent below the RBS 35 and the BCF 39 respectively.

It is noticed that the network hierarchies of
5 Ericsson 11 and Nokia 12 are only examples. Other network suppliers might handle different network hierarchies. The method and system according to the invention are suited for these network hierarchies as well.

It is one of the objects of the invention to
10 provide a method and system to handle the parameter settings in these kind of hierarchies. More specifically a method and system are provided to supply operators of cellular radio networks with a control facility on each and every hierarchical level and on relationships between
15 elements of the radio network before changes in the parameter settings are implemented into the network.

Figure 3 shows an example of a process flow according to a preferred embodiment of the invention. The parameters and/or values uploaded from the radio network 1
20 may originate from each of the hierarchical levels shown in figure 2. E.g. in the case of the Nokia hierarchy 11 the parameters may be uploaded from the Nokia omc 25, whereas in case the Ericsson hierarchy 12 is applied parameters obtained from the Ericsson MSC 20 may be uploaded. The
25 database 62 can be distinguished into three parts indicated as omc 63, ref 64 and mut 65. The omc part contains the operational parameters and values as set for the radio network. The ref part 64 contains the preferred new or changed parameters and values to be implemented in the
30 radio network. The mut part 65 contains the parameters and values that are subject to a change proposal from user 69. A database with frequency plans 67 and a database with location data 68 can be present. A list of differences 66 can be generated containing the differences between the

actual radio network and its representation in the omc part of the database. The user 69 handles the list of differences and can choose to change some parameter values. A system administrator may add or delete parameters. All
5 these changes are made into the mut part 65 of the database 62. The mutated parameters are checked by the business rule checker 70 and put in the ref part 64 of the database 62 if the changed parameters obey the business rules applied to them or no business rule exists for the changed parameter
10 or value. A delta list 76 is generated holding the values of the parameters that differ from the original values. These parameter values are implemented in the radio network 1 by means of a command file generator 75 and a downloader 77. Both the business rule modules and the command file are
15 scripts as indicated by 72 and 73.

The method and system according to an aspect of the invention relate to the management and control of the various parameters in a cellular radio network. Therefore the various parameters and/or values can be
20 stored in a database, indicated by 62 in figure 3. This database might be a commercially available database such as MS Access or Oracle. The method and system according to an aspect of the invention for storing the parameters and/or values uses a technique which will be referred to as the
25 compressed row technique. One of the advantages of this technique is a simplification of manipulating data within a given database. Furthermore this technique limits the number of records to an acceptable level and new parameters may be added easily. Also differences between sets of
30 parameters can be obtained quickly by comparison between the relevant strings instead of comparing individual parameters.

Basically the compressed row technique involves a convenient database which is linked to a

descriptive database. Therefore a database applying compressed row techniques contains at least two separate parts. The first part may store the real data as strings, the second part may contain the descriptive information
 5 needed to process the real data from the first part. The second part will be referred to as the repository.

A preferable mechanism to apply the compressed row technique comprises the following steps. For every hierarchical level of the radio network 1 a parameter
 10 table is formed in the database 62. In this parameter table all the parameters of all elements in the radio network of that hierarchical level are stored. For each element the parameters are divided into parameter groups, each parameter group containing a string (compressed row)
 15 storing multiple parameters that may be divided by semi-colons. Each group of parameters has a number assigned that indicates the nature of the group. Finally each group of parameters includes an identifier corresponding to the element. In the repository table for each parameter the
 20 group and the field within that group for that parameter is stored. To find the relevant element corresponding to an element identifier a hierarchy table is used. Various level-tables link the element identifiers to the parameter strings.

25 A simple example will clarify the mechanism described. Suppose that the value of the parameter BS_TX_PWR_MAX of base station 8662 (the maximum transmission power of that particular base station) is being sought. The hierarchy table HIERARCHY_OMC_BTS contains a
 30 base station with identifier 8662. Next it is deduced from the repository that the parameter being sought is e.g. located in parameter group 2 in field 9. The repository indicates moreover that the value on this location is expressed in dBm. The level table BTS_OMC then indicates

that for this particular BTS a parameterstring for group 2 exists containing e.g. the string
1;8;1;4;1;8;1;1;0;15;1;0;0;2;0;0;0;0;::;. The 9th value in this string is 0 which probably indicates that the BTS with
5 identifier 8662 is not active.

The example above is a simplified case. There are values of parameters that can not be obtained in this direct way, but have to be obtained indirectly by means of a translate table. In that case the parameter has a
10 translate identifier in the repository. By means of a field identifier, uniquely defining the parameter, the value of the parameter can be obtained from the translate table.

The business rule checker 70 performs a control function before parameters and/or values are
15 implemented in the cellular radio network. In most cases there is a inter-dependency of the various parameters and values of parameters and therefore checking of new and modulated parameters and values before implementation in the network is preferable. However not only the bare
20 technical sufficient requirements set for the various parameters should be checked. Since contemporary cellular radio networks have reached an considerable amount of complexity several other non-technical requirements as e.g. administrative data should preferably be checked as well.
25 As e.g. the operators administration indicates all cells for 900 MHz GSM with a cell_id starting with #1 and all cells for 1800 MHz DCS with cell_id starting with #6, these requirements should be part of the business rule check as well before configuration or reconfiguration of the network
30 takes place.

Moreover it is preferable that the bare technical sufficient requirements can be altered according to rules obtained from daily operational use of the radio network. It can e.g. be technically sufficient to have a

channel distance of 20 Hz between different cells. All channel distances above this value then will pass the bcc/bcch consistency check. However, in practice it may be that a channel difference of 50 Hz between the cells
5 guarantees a more reliable operation. In that case, according to the invention, it is possible to use the preferred channel distance of 50 Hz as obtained from the operational practice as a business rule instead of the technically sufficient channel distance. Such a technical
10 requirement will hereinafter referred to as a preferred technical requirement.

The business rule checker 70 can use the hierarchy tables from the repository part of the database 62. The business rules may be formulated by the user and
15 implemented as a script.

Figures 4A and 4B show a flow chart to illustrate schematically the application of business rules to parameter changes for the radio network 1 as proposed by
20 the user 69. In the first step 81 a parameter group that is changed in mut 65 is read. Next the hierarchical level is determined from this parameter group at 82 and subsequently the parameter is found at 83. For this parameter it may be that no business rule has been defined or programmed. In
25 that case 84 the parameter is put directly into the ref part 64 of database 62 and is ready to be implemented in the radio network 1. If a business rule does exist for the particular parameter that business rule is read at 85. It is checked whether the parameter does obey the business
30 rule. If the parameter does not obey the business rule an error list is generated and the parameter and corresponding value are put on that list at 86. If the parameter does obey to the business rule defined or programmed for that parameter the next step is to find out whether other

parameters have been changed that belong to the parameter group under consideration. These parameters may run through the same series of steps as described above. If all the changed parameters have been put to the business rule test as described above, it is determined whether other parameter groups have been changed as well. The same series of steps as described above may be applied to the parameters belonging to that parameter group. Finally if all the parameter groups have been checked, the business rule checker 70 stops at step 87. As a result of the business rule checking process the parameters that obey the business rules defined or programmed for them are put in the ref part 64 of the database 62 at step 88 and are ready to be implemented in the radio network 1. If the parameters or values do not obey the business rules the parameters and corresponding values appear on the generated error list and after finalisation of the business rule checking of all the parameter groups this error list is put to the user. The user then has to correct the parameters, as shown at step 89. The corrected parameters or values then can be put to the ref part 64 of database 62 as well. Now the complete set of parameters and corresponding values does obey the business rules and is ready to be implemented to the cellular radio network 1. Although in figures 4A and B only individual parameters are checked whether or not they obey a business rule, also relations of parameters can be checked on a business rule (see e.g. figure 6A as discussed below).

Figure 5 shows a table of business rules defined for a particular type of cellular radio network 1. It is stressed that an almost infinite amount of these kind of business rules can be defined so the rules shown in figure 5 only give a few examples. The table shown in figure 5 shows columns defining a business rule

identification number BR_ID, the state of the business rule, the file name or module, the iteration level and the message to be shown when a parameter does not obey the business rule. Additional columns can include e.g. the
5 priority level, author of the business rule, date of modification, version number, remarks etc.

The state of a business rule establishes whether that business rule is taken into consideration when the business rule checking is performed. It is not
10 necessary that all the business rules have to be checked in a particular configuration or reconfiguration project with regard to the radio network. It may be up to the user to select the business rules he wants to apply. However it may be that some business rules have to be checked at all times
15 and therefore can not be put aside by the user. Business rules can e.g. be applied by running a main script calling the separate business rule modules selected by the user or imposed by the system.

The iteration level relates to the
20 hierarchical level of the elements of the cellular radio network to be checked. Generally, if the business rule is defined or programmed for another element at the same or a higher hierarchical level the iteration level will be higher than the highest of the hierarchical levels of all
25 the elements involved for that specific business rule. An example of such a business rule is shown in figure 5 and 6B as module bts013.br. If the business rule is defined for the element internally the iteration level and the hierarchical level are the same. An example of such a
30 business rule is shown in figure 5 and 6A as module bcf002.br.

The message relates to the messages shown to the user in the generated error list at 86 when a parameter or value does not obey the business rule applied to that

parameter or value. These error messages are operator-programmable as well. Different error levels can be distinguished, such as a blocking message (i.e. a serious error indicating that the proposed change may not be implemented in the radio network under any circumstances) or a warning message (i.e. an error indicating that the proposed change is not desirable, but does not do harm to the operation of the cellular radio network if implemented). Other error levels can be used as well, like e.g. engineering messages indicating that the change to be implemented does not achieve the optimal result.

The description column of the table in figure 5 defines the business rule in human language. In figure 6 the contents of some of the files used for the business rule check are displayed.

Figures 6A-D show a few examples of business rule modules that are also mentioned in the table of figure 5. Figure 6A shows the script of the business rule module bcf002.br, which is a business rule of the administrative kind as mentioned previously. It checks whether the requirement that a BCF 29 of type DE21 has more than 3 BTS's 31 connected according to e.g. the Nokia hierarchy 12 of figure 2. If it does, a blocking message appears on the error list indicating to the user 69 that that particular BCF does have more than 3 BTS's.

Figure 6B shows the script of the business rule module bts013.br. It states that one Access Grant Block (AGB) is required for each Basic Communication Channel. A blocking message appears if the business rule is not obeyed.

Figure 6C shows the script of the business rule module bts015.br, which is a business rule of the technical kind as mentioned above. This module checks the number of TRX's for each LABD-link. A LABD link basically

represents a direct or indirect physical link between two or more BSC's. For a bitrate of 16 respectively 64 a maximum of 12 resp. 10 TRX's is allowed for each LABD-link. If this requirement is not obeyed, a blocking message
5 appears on the error list.

Figure 6D shows the script of the business rule module ho006.br, which is a business rule of the technical kind as mentioned previously. This module checks whether a cell has neighbour BTS's with the same base
10 station communication channel BCCH. A warning message is generated on the error list if this happens to be the case.

It is explicitly stated that the examples and embodiments as described in this section do not limit
15 the scope of the invention in any way. Modifications of the examples and embodiments fall within the scope of this application. E.g. it may be advantageous to distribute the cellular radio network amongst several geographic regions each of these regions having an operator. Basically
20 the same system of network management, including the business rule checker, can be applied in this situation. Measures can be taken to avoid conflicts when more than one user 69 tries to change the parameter settings in his region, especially around the borderlines of the respective
25 regions. This possible conflict can be solved by allowing only one proposal to change the parameters. The system signals succeeding users trying to change the same parameters that an earlier proposal has already been made including the data of that particular user.

30 Another modification may be that proposals can be stored instead of being implemented immediately. This option is particularly relevant in the framework of more projects. Several projects can be identified, e.g. mass-updates involving future optimisation of large

numbers of parameters or the pre-integration of new network elements. More projects may be planned simultaneously based on the same set of data. In order to avoid conflicts between projects it is possible to establish a 'frozen
5 state' for a limited period.



Erfindernennung
Designation of inventor
Désignation de l'inventeur

(falls Anmelder nicht oder nicht allein der Erfinder ist) /
(where the applicant is not the inventor or is not the
sole inventor) / (si le demandeur n'est pas l'inventeur
ou l'unique inventeur)

Zeichen des Anmelders oder Vertreters:
Applicant's or representative's reference:
Référence du demandeur ou du mandataire :
(max. 15 Positionen / max. 15 spaces /
15 caractères au maximum)

402706EP

Nr. der Anmeldung oder, falls noch nicht bekannt, Bezeichnung der Erfindung:
Application No. or, if not yet known, title of the invention :
N° de la demande ou, s'il n'est pas encore connu, titre de l'invention:

System and method for checking parameter settings of radio networks

In Sachen der obenbezeichneten europäischen Patentanmeldung nennt (nennen) der (die) Unterzeichnete(n)¹

In respect of the above European patent application I (we), the undersigned¹

En ce qui concerne la demande de brevet européen susmentionnée, le(s) soussigné(s)¹

WUYTS Koenraad Maria

KONINKLIJKE KPN N.V.

P.O. Box 95321

2509 CH The Hague

The Netherlands

als Erfinder²:

do hereby designate as inventor(s)²:

désigne(nt) en tant qu'inventeur(s)²:

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The Netherlands



Weitere Erfinder sind auf einem gesonderten Blatt angegeben. / Additional inventors indicated on supplementary sheet. /
D' autres inventeurs sont mentionnés sur une feuille supplémentaire.

Der (Die) Anmelder hat (haben) das Recht auf das europäische Patent erlangt³

The applicant(s) has (have) acquired the right to the European patent³

Le(s) demandeur(s) a (ont) acquis le droit au brevet européen³



gemäß Vertrag vom
by an agreement dated
par contrat en date du



Als Arbeitgeber
as employer(s)
en qualité d'employeur(s)



durch Erbfolge
as successor(s) by inheritance
par transfert successoral

Ort/Place/Lieu : The Hague

Datum/Date : 28 Septembre 2001

Unterschrift(en) des (der) Anmelder(s) oder Vertreter(s):

Signature(s) of applicant(s) or representative(s):

Signature(s) du (des) demandeur(s) ou du (des) mandataire(s):

Name des (der) Unterzeichneten bitte in Druckschrift wiederholen. Bei juristischen Personen bitte die Stellung des (der) Unterzeichneten innerhalb der Gesellschaft in Druckschrift angeben. / Please print name(s) under signature(s). In the case of legal persons, the position of the signatory within the company should also be printed. / Le ou les noms des signataires doivent être indiqués en caractères d'imprimerie. S'il s'agit d'une personne morale, la position occupée au sein de celle-ci par le ou les signataires doit également être indiquée en caractères d'imprimerie.

Fußnoten siehe Rückseite. / Footnotes overleaf. / Le texte des renvois figure au verso.

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bitte wenden/ P.T.O. / T.S.V.P.

09.10.2001
EPO-DE 1

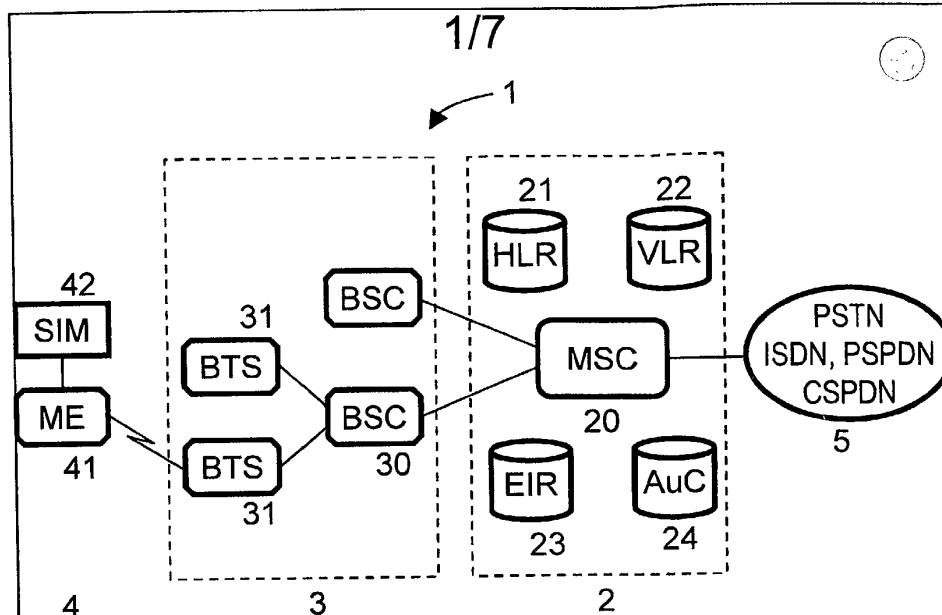


FIG. 1

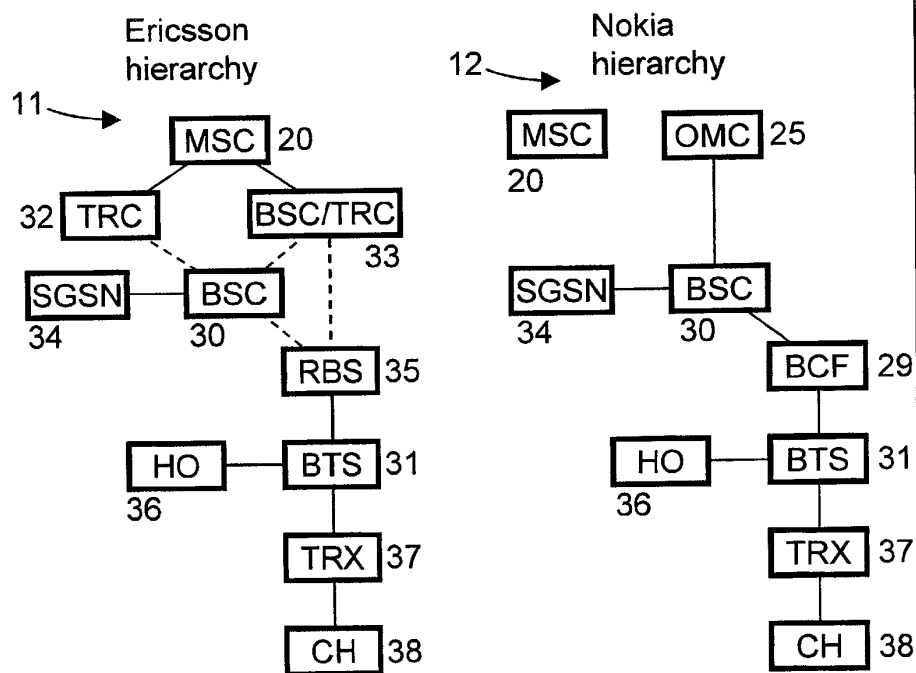
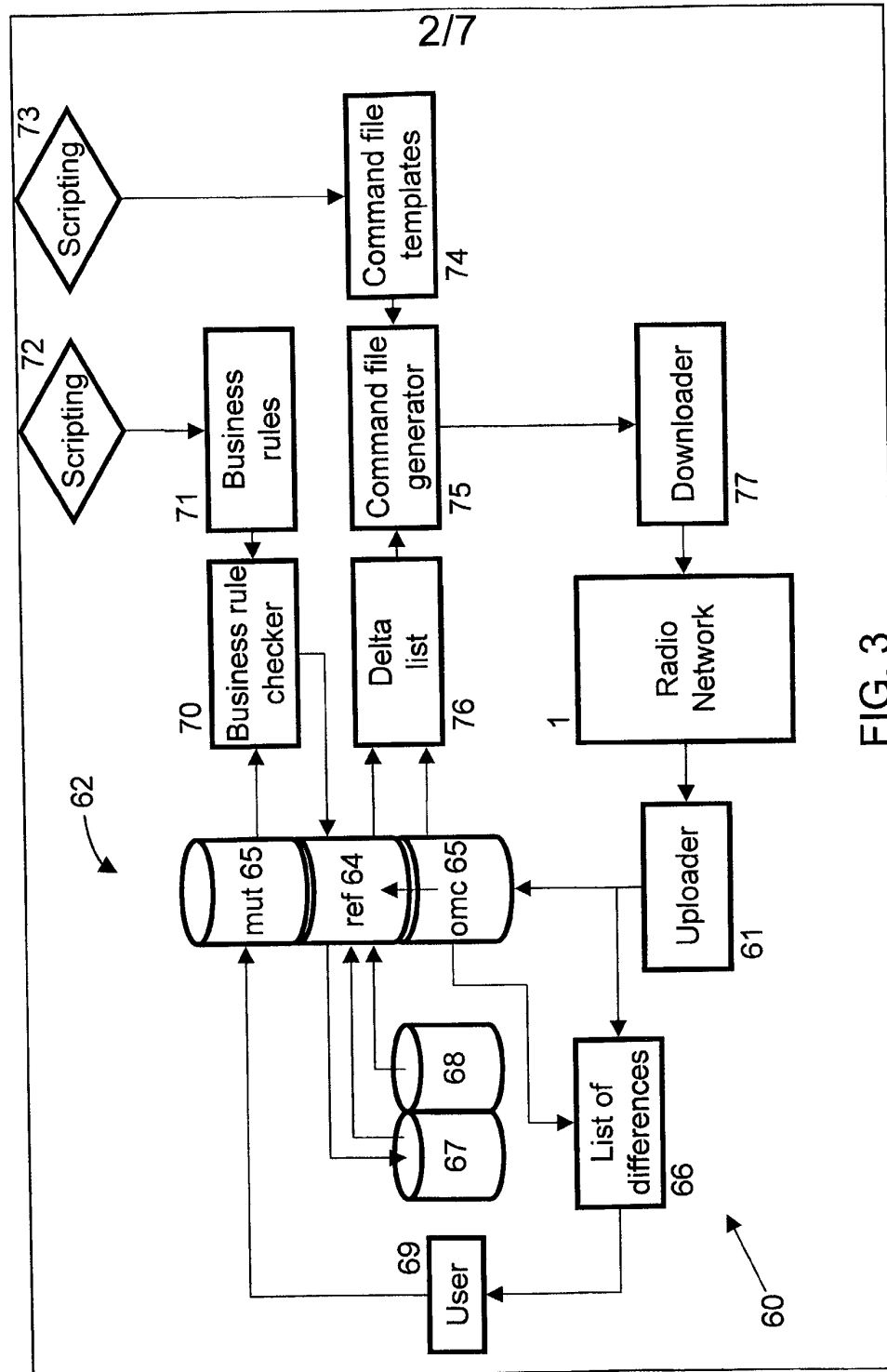
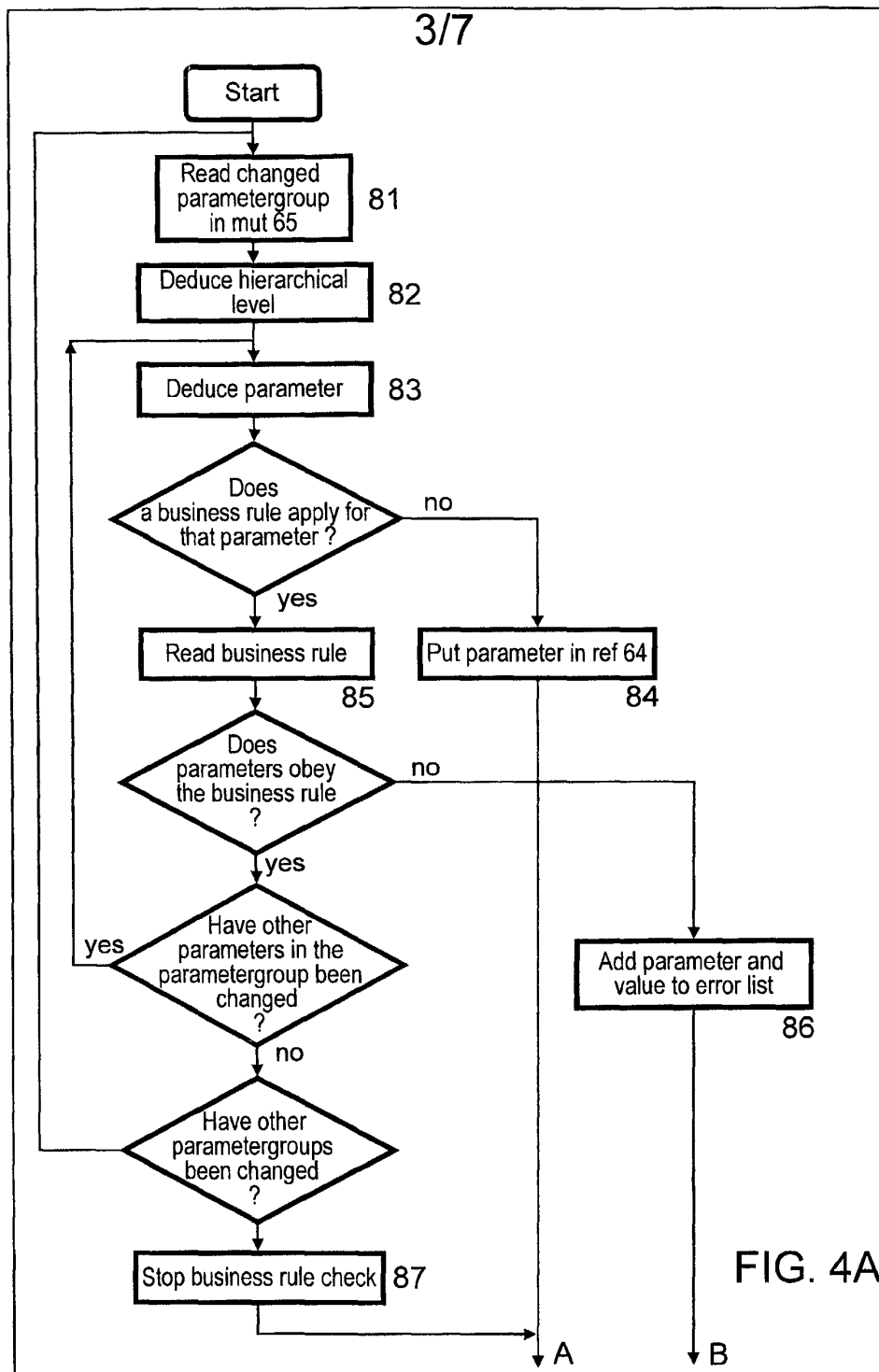


FIG. 2





4/7

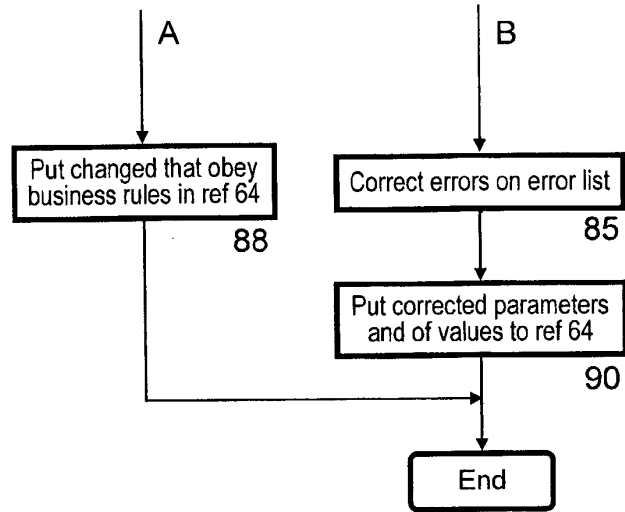


FIG. 4B

BR_ID	STATE	MODULE	DESCRIPTION	ITERATION LEVEL	MESSAGE
2	1	bctf002.br	A BCF of type DE21 has a maximum of 3 BTS's	BCF - BTS	BLOCKING
4	1	bctf004.br	A BCF of type DE45 has a maximum of 1 BTS	BCF - BTS	BLOCKING
5	1	bctf005.br	A BCF has a maximum of 12 TRX's	BCF - TRX	BLOCKING
27	3	bts012.br	A BTS having > 3 TRX's has a additional SDCCH-channel	BTS - TRX	WARNING
28	1	bts013.br	At a combined BCCH 0...2 "no blocks for access grant" have to be used	BTS - CH	BLOCKING
29	1	bts014.br	At a non-combined BCCH 0...7 "no blocks for access grant" have to be used	BTS - CH	BLOCKING
30	3	bts015.br	Check on number of TRX's per LABD-link	BCF - TRX	WARNING
62	1	ho006.br	Preferably a cell has no neighbours using the same BCCH	BTS - TRX	WARNING
63	0	ho009.br	Neighbours are basically bi-directional	BTS - HO	WARNING
64	3	ho010.br	The sum of handover margin pbgt Should be larger than 0	BTS - HO	WARNING
79	1	trx001.br	Frequency difference of at least 2 channels of TRX's on same site for different BTS's	BTS - TRX	BLOCKING
83	1	trx004.br	A TRX has a LABD-link	TRX	BLOCKING
85	0	trx009.br	A new TRX is assigned a dummy frequency	TRX	BLOCKING
104	1	ch004.br	The BCCH has to be defined on TRX ¹	BTS-TRX-CH	WARNING

Figure 5

```

Iterate1Start(BCF)
  ResetCounter1
  If [BCF.bcf_type] == "$DE21" Then
    Iterate2Start(BTS)
    IncrementCounter1
    Iterate2End
  EndIf
  If Counter1 > "3" Then
    logBlocking(BCF,BCF of type DE21 exceeds maximum of 3 BTS's)
  EndIf
Iterate1End

```

Fig. 6A (module bcf002.br)

```

Iterate1Start(BTS)
  If [BTS.no_of_blocks_for_access_grant1] > "2" Then
    Iterate2Start(CH)
    If [CH.channel_type] == table(chMode,"MBCCB") Then
      logWarning(BTS,To much AccessGrantBlocks have been defined)
    EndIf
    Iterate2End
  EndIf
Iterate1End

```

Fig. 6B (module bts013.br)

1 **ALLGEMEINE VOLLMACHT**
GENERAL AUTHORISATION
POUVOIR GENERAL

AV Nr. (bitte bei jeder Korrespondenz angeben)
GA No. (please quote in all correspondence)
PG n° (prérez de mentionner dans toute correspondance)

213 96 (rev)

2 Ich (Wir) / I (We) / Je (Nous)

KONINKLIJKE KPN N.V.

Stationsplein 7

9726 AE GRONINGEN

The Netherlands

3 bevollmächtigte(n), hiermit / do hereby authorise / autorise (autorisons) par la présente :

WUYTS, Koenraad Maria (Professional Representative)

KRUK, Wiggert Johan (Professional Representative)

Mailing address: KONINKLIJKE KPN N.V.

Intellectual Property Group

P.O. Box 95321

2509 CH THE HAGUE

The Netherlands

4 mich (uns) in den durch das Europäische Patentübereinkommen geschaffenen Verfahren in allen meinen (unseren) Patentangelegenheiten zu vertreten, alle Handlungen für mich (uns) vorzunehmen und Zahlungen für mich (uns) in Empfang zu nehmen.
to represent me (us) in all proceedings established by the European Patent Convention and to act for me (us) in all patent transactions and to receive payments on my (our) behalf.
à me (nous) représenter pour ce qui concerne toutes mes (nos) affaires de brevet dans toute procédure instituée par la Convention sur le brevet européen et, à ce titre, à agir en mon (notre) nom et à recevoir des paiements pour mon (notre) compte.

☒ Die Vollmacht gilt auch für Verfahren nach dem Vertrag über die internationale Zusammenarbeit auf dem Gebiet des Patentwesens.
This authorisation shall also apply to the same extent to any proceedings established by the Patent Cooperation Treaty.
Ce pouvoir s'applique également à toute procédure instituée par le Traité de coopération en matière de brevets.

☐ Weitere Vertreter sind auf einem gesonderten Blatt angegeben. / Additional representatives indicated on supplementary sheet.
Les autres mandataires sont mentionnés sur une feuille supplémentaire.

5 ☒ Untervollmacht kann erteilt werden. / Sub-authorisation may be given. / Le pouvoir pourra être délégué.

6 ☒ Bitte die gelbe Kopie, ergänzt um die Nr. der allgemeinen Vollmacht, an den Vollmachtgeber zurücksenden.
Please return the yellow copy, supplemented by the General Authorisation No., to the authorisor.
Prérez de renvoyer la copie jaune au mandant, munie du n° du pouvoir général.

Ort / Place / Lieu The Hague

Datum / Date April 10, 2001

Unterschrift(en) / Signature(s)

7 WUYTS, Koenraad Maria (Professional Representative)

Das Formblatt muß vom (von den) Vollmachtgeber(n) (bei juristischen Personen vom Unterschriftsberechtigten) eigenhändig unterzeichnet sein. Nach der Unterschrift bitte den (die) Namen des (der) Unterzeichneten mit Schreibmaschine wiederholen (bei juristischen Personen die Stellung des Unterschriftsberechtigten innerhalb der Gesellschaft angeben).

The form must bear the personal signature(s) of the authorisor(s) (in the case of legal persons, that of the officer empowered to sign). After the signature, please type the name(s) of the signatory(ies) adding, in the case of legal persons, his (their) position within the company.

Le formulaire doit être signé de la propre main du (des) mandant(s) (dans le cas de personnes morales, de la personne ayant qualité pour signer). Veuillez ajouter à la machine, après la signature, le (les) nom(s) du (des) signataire(s) en mentionnant, dans le cas de personnes morales, ses (leurs) fonctions au sein de la société.



Antrag auf Erteilung eines europäischen Patents / Request for grant of a European patent / Requête en délivrance d'un brevet européen

1

Bestätigung einer bereits durch Telefax eingereichten Anmeldung / Confirmation of an application already filed by facsimile / Confirmation d'une demande déjà déposée par téléfax

Wenn ja, Datum der Übermittlung des Telefax und Name der Einreichungsbehörde / If yes, facsimile date and name of the authority with which the documents were filed / Si oui, date d'envoi du téléfax et nom de l'autorité de dépôt

☐ Ja / Yes / Oui

Datum / Date

Behörde / Authority / Autorité

Nur für amtlichen Gebrauch / For official use only / Cadre réservé à l'administration			
Anmeldenummer / Application No. / N° de la demande	MKEY	1	01203820.4
Tag des Eingangs (Regel 24(2)) / Date of receipt (Rule 24(2)) / Date de réception (règle 24(2))	DREC	2	09. 10. 01
Tag des Eingangs beim EPA (Regel 24(4)) / Date of receipt at EPO (Rule 24(4)) / Date de réception à l'OEB (règle 24(4))	RENA	3	
Anmeldetag / Date of filing / Date de dépôt		4	
Tabulatoren-Positionen / Tabulation marks / Arrêts de tabulation Es wird die Erteilung eines europäischen Patents und gemäß Artikel 94 die Prüfung der Anmeldung beantragt / Grant of a European patent, and examination of the application under Article 94, are hereby requested / Il est demandé la délivrance d'un brevet européen et, conformément à l'article 94 l'examen de la demande EXAM 4			
Zeichen des Anmelders oder Vertreters (max. 15 Positionen) / Applicant's or representative's reference (maximum 15 spaces) / Référence du demandeur ou du mandataire (max. 15 caractères ou espaces)	AREF	6	402706EP
Anmelder / Applicant / Demandeur Name / Nom Anschrift / Address / Adresse APPR 01 # 10661891013 # DEST #		7	KONINKLIJKE KPN N.V.
Zustellanschrift / Address for correspondence / Adresse pour la correspondance PADR		8	Stationsplein 7 9726 AE GRONINGEN The Netherlands
Staat des Wohnsitzes oder Sitzes / State of residence or of principal place of business / Etat du domicile ou du siège Staatsangehörigkeit / Nationality / Nationalité Telefon / Telephone / Téléphone Telex / Télex Telefax / Fax / Téléfax Weitere(r) Anmelder auf Zusatzblatt / Additional applicant(s) on additional sheet / Autre(s) demandeur(s) sur feuille additionnelle		9	KONINKLIJKE KPN N.V. Intellectual Property Group P.O. Box 95321 2509 CH THE HAGUE The Netherlands
Vertreter / Representative / Mandataire Name / Nom (Nur einen Vertreter angeben, der in das europäische Patentregister eingetragen ist und an den zugestellt wird / Name only one representative who is to be listed in the Register of European Patents and to whom notification is to be made / N'indiquer qu'un seul mandataire, qui sera inscrit au Registre européen des brevets et auquel signification sera faite) FREP 01 9329211 # # Geschäftsanschrift / Address of place of business / Adresse professionnelle Telefon / Telephone / Téléphone Telex / Télex Telefax / Fax / Téléfax Weitere(r) Vertreter auf Zusatzblatt / Additional representative(s) on additional sheet / Autre(s) mandataire(s) sur feuille additionnelle		10	The Netherlands
		11	The Netherlands
		12	+31 70 446 06 78
		13	+31 70 446 08 40
		14	
		15	WUYTS Koenraad Maria
		16	KONINKLIJKE KPN N.V. Intellectual Property Group P.O. Box 95321 2509 CH THE HAGUE The Netherlands
		17	+31 70 446 06 78
		18	+31 70 446 08 40
		19	
EPA/EPO/OEB Form 1001.1 07.99 wdot			402706EP

Raum für Zeichen des Anmelders / Space for applicant's reference / Espace réservé à la référence du demandeur

1

Vollmacht / Authorisation / Pouvoir ist beigefügt / is enclosed / joint		20	☒
ist registriert unter Nummer / has been registered under No. / a été enregistré sous le n°		21	GA 21396 0.8 Nummer Number Numéro
Erfinder / Inventor / Inventeur Anmelder ist (sind) alleinige(r) Erfinder / The applicant(s) is (are) the sole inventor(s) / Le(s) demandeur(s) est (sont) le (les) seul(s) inventeur(s) Erfindernennung in gesondertem Schriftstück / Designation of inventor attached / Voir la désignation de l'inventeur ci-jointe		22	☐
Bezeichnung der Erfindung / Title of invention / Titre de l'invention		23	☒
TIDE TIEN TIFR		24	System and method for checking parameter settings of radio networks
Prioritätserklärung / Declaration of priority / Déclaration de priorité		25	Staat / State / Etat Anmeldetag / Date of filing / Date de dépôt Aktenzeichen / Application No. / N° de la demande
01 # . . . # # 02 # . . . # # 03 # . . . # # 04 # . . . # # Weitere Prioritätserklärung(en) auf Zusatzblatt / Additional declaration(s) of priority on additional sheet / Autre(s) déclaration(s) de priorité sur feuille additionnelle		25a	1 2 3 4
Es wird hiermit erklärt, daß die Anmeldung eine vollständige Übersetzung der früheren Anmeldung ist (Regel 38(4)) / It is hereby declared that the application is a complete translation of the previous application (Rule 38(4)) / Il est déclaré par la présente que la demande est une traduction intégrale de la demande antérieure (règle 38(4))		25a	☐
Biologisches Material Biological material Die Erfindung bezieht sich auf bzw. verwendet biologisches Material, das nach Regel 28 hinterlegt worden ist.		26	Matière biologique L'invention concerne et/ou utilise de la matière biologique, déposée conformément à la règle 28.
Die Angaben nach Regel 28(1) c) (falls noch nicht bekannt, die Hinterlegungs- stelle und das (die) Bezugs- zeichen [Nummer, Symbole usw.] des Hinterlegers) sind in den technischen Anmeldungsunterlagen enthalten auf / The particulars referred to in Rule 28(1) c) (if not yet known, the depository institution and the identification reference(s) [number, symbols etc.] of the depositor) are given in the technical documents in the application on / Les indications visées à la règle 28(1)c) (si pas encore connues, l'autorité de dépôt et la (les) référence(s) d'identification [numéro ou symboles etc.] du déposant) figurent dans les pièces techniques de la demande à la / aux		27	Seite(n) / page(s) Zeile(n) / line(s) / ligne(s)
werden später mitgeteilt / will be submitted later / seront communiquées ultérieurement		27a	☐
Die Empfangsbescheinigung(en) der Hinterlegungsstelle ist (sind) beigefügt / The receipt(s) of deposit issued by the depository institution is (are) enclosed / Le(s) récépissé(s) de dépôt délivré(s) par l'autorité de dépôt est (sont) joint(s)		27b	☐
wird (werden) nachgereicht / will be filed later / sera (seront) produit(s) ultérieurement		27c	☐

Falls das biologische Material nicht vom Anmelder, sondern von einem Dritten hinterlegt wurde: / Where the biological material has been deposited by a person other than the applicant: / Lorsque la matière biologique a été déposée par une personne autre que le demandeur: Ermächtigung nach Regel 28(1)d) / Authorisation under Rule 28(1)(d) / L'autorisation en vertu de la règle 28(1)d) Ist beigelegt / is enclosed / est jointe wird nachgereicht / will be filed later / sera produite ultérieurement	28 Name und Anschrift des Hinterlegers / Name and address of depositor / Nom et adresse du déposant : 28a ☐ 28b ☐
Verzicht auf die Verpflichtung des Antragstellers nach Regel 28(3) in gesondertem Schriftstück / Waiver of the right to an undertaking from the requester pursuant to Rule 28(3) attached	29 ☐ Renonciation, sur document distinct, à l'engagement du requérant au titre de la règle 28(3)
Gemäß Regel 28(4) wird hiermit mitgeteilt, daß der Zugang zu dem in den Feldern 26 und 27 genannten biologischen Material nur durch Herausgabe einer Probe an einen Sachverständigen hergestellt wird/ It is hereby declared under Rule 28(4) that the availability of the biological material referred to in Sections 26 and 27 shall be effected only by the issue of a sample to an expert BIOM 3	30 ☐ Conformément à la règle 28(4) il est déclaré par la présente que l'accessibilité à la matière biologique mentionnée aux rubriques 26 et 27 ne peut réalisée que par la remise d'un échantillon à un expert
Nucleotid- und Aminosäuresequenzen / Nucleotide and amino acid sequences / Séquences de nucléotides et d'acides aminés Die Beschreibung enthält ein Sequenzprotokoll nach Regel 27a(1) / The description contains a sequence listing in accordance with Rule 27a(1) / La description contient une liste de séquences selon la règle 27bis(1) Der vorgeschriebene Datenträger ist beigelegt / The prescribed data carrier is enclosed / Le support de données prescrit est joint Es wird hiermit erklärt, daß die auf dem Datenträger gespeicherte Information mit dem schriftlichen Sequenzprotokoll übereinstimmt (Regel 27a(2)) / It is hereby stated that the information recorded on the data carrier is identical to the written sequence listing (Rule 27a(2)) / Il est déclaré par la présente que l'information figurant sur le support de données est identique à celle que contient la liste de séquences écrite (règle 27bis (2)) SEQL1	31 ☐ ☐ ☐
Benennung der Vertragsstaaten und Erklärungen hierzu Designation of contracting states and associated declarations DEST 1. Hiermit werden sämtliche Vertragsstaaten des EPÜ benannt, die diese bei Einreichung dieser Anmeldung angehören*. Mit der Zahlung des siebenfachen Betrags einer Benennungsgebühr gelten die Benennungsgebühren für alle Vertragsstaaten als entrichtet (Art. 2 Nr. 3 GebO). 2. Es ist derzeit beabsichtigt, weniger als sieben Benennungsgebühren für folgende Vertragsstaaten zu entrichten (bitte Ländercodes und Vertragsstaaten angeben *): (1) ☐ (2) ☐ (3) ☐ Es wird beantragt, für die unter Nr. 2 nicht aufgeführten Vertragsstaaten von der Zustellung von Mitteilungen nach Regel 85a(1) und Regel 69(1) abzusehen. 3. Wird ein automatischer Abbuchungsauftrag erteilt (Feld 43), so wird das EPA beauftrag, bei Ablauf der Grundfrist nach Artikel 79(2) den siebenfachen Betrag einer Benennungsgebühr abzubuchen. Ist eine Erklärung unter Nr.2 abgegeben worden, so sollen die Benennungsgebühren nur für die dort angegebenen Vertragsstaaten abgebucht werden, sofern dem EPA nicht bis zum Ablauf der Grundfrist ein anderslautender Auftrag zugeht.	32 Désignation d'Etats contractants et déclarations à ce propos ☒ 1. Sont désignés tous les Etats qui sont des Etats contractants de la CBE à la date du dépôt de la présente demande*. Les taxes de désignation sont réputées acquittées pour tous les Etats contractants dès lors qu'un montant correspondant à sept fois la taxe de désignation a été acquitté (art. 2, point 3 du RRT). ☐ 2. Il est actuellement envisagé de payer moins de sept taxes de désignation pour les Etats contractants suivants (prière d'indiquer codes de pays et Etats contractants *): (4) ☐ (5) ☐ (6) ☐ ☒ 3. Si un ordre de prélèvement automatique est donné (rubrique 43), il est demandé à l'OEB de prélever, à l'expiration du délai normal visé à l'article 79(2), un montant correspondant à sept fois la taxe de désignation. Si une déclaration a été faite au n° 2, les taxes de désignation ne sont prélevées que pour les Etats contractants qui y sont indiqués, sauf instruction contraire reçue par l'OEB avant l'expiration du délai normal.

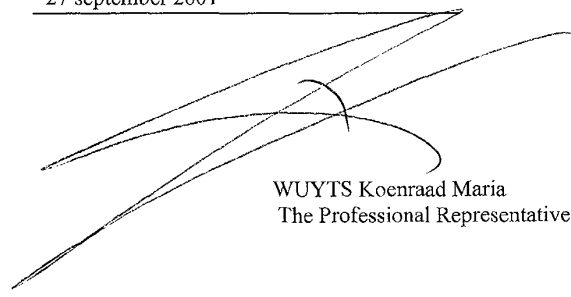
* Stand bei Drucklegung: 19 Vertragsstaaten, und zwar: / Status when this form was printed: 19 contracting states, namely / Situation à la date d'impression: 19 Etats contractants, à savoir: AT Österreich / Austria / Autriche, BE Belgien / Belgium / Belgique, CH/LI Schweiz und Liechtenstein / Switzerland and Liechtenstein / Suisse et Liechtenstein, CY Zypern / Cyprus / Chypre, DE Deutschland / Germany / Allemagne, DK Dänemark / Denmark / Danemark, ES Spanien / Spain / Espagne, FI Finnland / Finland / Finlande, FR Frankreich / France / France, GB Vereinigtes Königreich / United Kingdom / Royaume-Uni, GR Griechenland / Greece / Grèce, IE Irland / Ireland / Irlande, IT Italien / Italy / Italie, LU Luxemburg / Luxembourg / Luxembourg, MC Monaco / Monaco, NL Niederlande / Netherlands / Pays-Bas, PT Portugal / Portugal / Portugal, SE Schweden / Sweden / Suède

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402706EP

Raum für Zeichen des Anmelders / Space for applicant's reference / Espace réservé à la référence du demandeur

Raum für Zeichen des Anmelders / Space for applicant's reference / Espace réservé à la référence du demandeur

Zusätzliche Abschrift(en) der im europäischen Recherchenbericht angeführten Schriftstücke wird (werden) beantragt / Additional copy(ies) of the documents cited in the European search report is (are) requested / Prière de fournir une (des) copie(s) supplémentaire(s) des documents cités dans le rapport de recherche européenne	40	Anzahl der zusätzlichen Sätze von Abschriften Number of additional sets of copies Nombre de jeux supplémentaires de copies
Es wird die Rückerstattung der Recherchegebühr gemäß Art. 10 GebO beantragt / Refund of the search fee is requested pursuant to Article 10 of the Rules relating to Fees / Le remboursement de la taxe de recherche est demandé en vertu de l'article 10 du règlement relatif aux taxes Eine Kopie des Recherchenberichts ist beigelegt / A copy of the search report is attached / Une copie du rapport de recherche est jointe	41 42	
Automatischer Abbuchungsauftrag <i>(nur möglich für Inhaber von beim EPA geführten laufenden Konten)</i> Das EPA wird hiermit beauftrag, fällig werdende Gebühren und Auslagen nach Maßgabe der Vorschriften über das automatische Abbuchungsverfahren vom nebenstehenden laufenden Konto abzubuchen. In Bezug auf die Benennungsgebühren wird auf Feld 32.3 verwiesen. Das EPA wird ferner beauftrag, die Erstreckungsgebühren für jeden in Feld 34 angekreuzten »Erstreckungsstaat« bei Ablauf der Grundfrist zu Zahlung abzubuchen, sofern ihm nicht bis dahin ein anderslautender Auftrag zugeht. Automatic debit order <i>(For EPO deposit account holders only)</i> The EPO is hereby authorised, under the Arrangements for the automatic debiting procedure, to debit from the deposit account opposite any fees and costs falling due. With regard to designation fees reference is made to Section 32.3. The EPO is also authorized, on expiry of the basic period for its payment, to debit the extension fee for each of the "extension states" marked with a cross in Section 34, unless it is instructed to do otherwise before expiry of this period. Für automatischen Abbuchungsauftrag: For automatic debit order: Pour l'ordre de prélèvement automatique DECA	43	Ordre de prélèvement automatique <i>(possibilité offerte uniquement aux titulaires de comptes courants ouverts auprès de l'OEB)</i> Par la présente, il est demandé à l'OEB de prélever du compte courant ci-dessous les taxes et frais venant à échéance, conformément à la réglementation relative à la procédure prélèvement automatique. Pour les taxes de désignation , se reporter à la rubrique 32.3. Il est en outre demandé à l'OEB de prélever, à l'expiration du délai normal prévu pour leur paiement, les taxes d'extension pour chaque «Etat autorisant l'extension» coché à la rubrique 34, sauf instruction contraire reçue avant l'expiration de ce délai. Nummer des laufenden Kontos / Deposit account number / Numéro du compte courant
Eventuelle Rückzahlungen auf das nebenstehende beim EPA geführte laufende Konto / Reimbursement , if any, to EPO deposit account opposite / Remboursements éventuels à effectuer sur le compte courant ci-contre ouvert auprès de l'OEB	44	Name des Kontoinhabers / Account holder's name / Nom du titulaire du compte
Die vorgeschriebene Liste über die diesem Antrag beigelegten Unterlagen ergibt sich aus der vorbereiteten Empfangsbescheinigung (Seite 6 dieses Antrages) The prescribed list of documents enclosed with this request is shown on the prepared receipt (page 6 of this request)	45	Nummer des laufenden Kontos / Deposit account number / Numéro du compte courant
Unterschrift(en) des (der) Anmelders(s) oder Vertreter(s) / Signature(s) of applicant(s) or representative(s) / Signature(s) du (des) demandeur(s) ou du (des) mandataire(s) Ort / Place / Lieu <u>The Hague</u>	46	Für Angestellte nach Artikel 133(3) Satz 1 mit allgemeiner Vollmacht / For employees under Article 133(3), 1st sentence, having a general authorisation / Pour les employés mentionnés à l'article 133(3), 1 ^{re} phrase, munis d'un pouvoir général Nr. No. / n°:
Datum / Date <u>27 september 2001</u>  WUYTS Koenraad Maria The Professional Representative		

Empfangsbescheinigung / Receipt for documents / Récépissé de documents 6

(Liste der diesem Antrag beigefügten Unterlagen)

(Checklist of enclosed documents)

(Liste des documents annexés à la présente requête)

Es wird hiermit der Empfang der unten bezeichneten Dokumente bescheinigt / Receipt of the documents indicated below is hereby acknowledged / Nous attestons le dépôt des documents désignés ci-dessous

Wird im Falle der Einreichung der europäischen Patentanmeldung bei einer nationalen Behörde diese Empfangsbescheinigung vom Europäischen Patentamt übersandt, so ist sie als Mitteilung gemäß Regel 24(4) anzusehen (siehe Feld RENA). Nach Erhalt der Mitteilung nach Regel 24(4) sind alle weiteren Unterlagen, die die Anmeldung betreffen, nur noch unmittelbar beim EPA einzureichen. / If this receipt is issued by the European Patent Office and the European patent application was filed with a national authority it serves as a communication under Rule 24(4) (see Section RENA). Once the communication under Rule 24(4) has been received, all further documents relating to the application must be sent directly to the European Patent Office. / Si, en cas de dépôt de la demande de brevet européen auprès d'un service national, l'Office européen des brevets délivre le présent récépissé de documents, ce récépissé est réputé être la notification visée à la règle 24(4) (cf. rubrique RENA). Dès que la notification visée à la règle 24(4) a été reçue, tous les autres documents relatifs à la demande doivent être adressés directement à l'OEB.

KONINKLIJKE KPN N.V.

P.O. BOX 95321

2509 CH THE HAGUE

The Netherlands

EPO - DG 1

09. 10. 2001



Nur für amtlichen Gebrauch / For official use only / Cadre réservé à l'administration

Datum / Date

10. 10. 01



Unterschrift

Signature / Cachet officiel

Anmeldenummer / Application No. / N° de à demande		01203820.4	
Tag des Eingangs (Regel 24(2)) / Date of receipt (Rule 24(2)) / Date de réception (règle 24(2))	DREC	09. 10. 01	
Zeichen des Anmelders/Vertreters / Applicant's / Representative's ref. / Référence du demandeur ou du mandataire	AREF		
Nur nach Einreichung der Anmeldung bei einer nationalen Behörde: / Only after filing of the application with a national authority: / Seulement après le dépôt de la demande auprès d'un service national:			
Tag des Eingangs beim EPA (Regel 24(4)) / Date of receipt at EPO (Rule 24(4)) / Date de réception à l'OEB (règle 24(4))	RENA		
A. Anmeldeunterlagen und Prioritätsbeleg(e) / Application documents and priority document(s) / Pièces de la demande et document(s) de priorité	47	Stückzahl / Number of copies / Nombre d'exemplaires	Blattzahl* eines Stücks / Number of sheets* in each copy / Nombre de feuilles* par exemplaire
1. Beschreibung (ohne Sequenzprotokollteil) / Description (excluding sequence listing part) / Description (sauf partie réservée au listage des séquences)		3	16
2. Patentansprüche / Claim(s) / Revendication(s)		3	7
3. Zeichnung(en) / Drawing(s) / Dessin(s)	DRAW 1 #	3	6
4. Sequenzprotokollteil der Beschreibung / Sequence listing part of description / Partie de la description réservée au listage des séquences			
5. Zusammenfassung / Abstract / Abrégé		3	1
6. Übersetzung der Anmeldeunterlagen / Translation of the application documents / Traduction des pièces de la demande			
7. Prioritätsbeleg(e) / Priority document(s) / Document(s) de priorité			
8. Übersetzung des (der) Prioritätsbelegs(belege) / Translation of priority document(s) / Traduction du (des) document(s) de priorité			
B. Der Anmeldung in der eingereichten Fassung liegen folgende Unterlagen bei: / This application as filed is accompanied by the items below: / A la présente demande sont annexées les pièces suivantes:	48		
1. Einzelvollmacht / Specific authorisation / Pouvoir particulier	☐		
2. Allgemeine Vollmacht / General authorisation / Pouvoir général	☒		
3. Erfindernennung / Designation of inventor / Désignation de l'inventeur	☒		
4. Früherer Recherchenbericht / Earlier search report / Rapport de recherche antérieure	☐		
5. Gebührenzahlungsvordruck (EPA Form 1010) / Voucher for the settlement of fees (EPO Form 1010) / Bordereau de règlement de taxes (OEB Form 1010)	☐		
6. Scheck (ausgeschlossen bei Einreichung bei den nationalen Behörden) / Cheque (not when filing with national authorities) / Chèque (pas de chèque en cas de dépôt auprès des services nationaux)	☐		
7. Datenträger für Sequenzprotokoll / Data carrier for sequence listing / Support de données pour liste de séquences	☐		
8. Zusatzblatt / Additional sheet / Feuille additionnelle	☐		
9. Sonstige Unterlagen (bitte hier spezifizieren) / Other documents (please specify here) / Autres documents (veuillez préciser)	☐		
C. Kopien dieser Empfangsbescheinigung / Copies of this receipt for documents / Copies du présent récépissé de documents	49	2	Anzahl der Kopien / Number of copies / Nombre de copies

* Die Richtigkeit der Angabe der Blattzahl und der Gesamtzahl der Abbildungen wurde bei Eingang nicht geprüft / No check was made on receipt that the number of sheets and the total number of figures indicated was correct / L'exactitude du nombre de feuilles et du nombre total de figures n'a pas été contrôlée lors du dépôt

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Raum für Zeichen des Anmelders / Space for applicant's reference / Espace réservé à la référence du demandeur

6