

# 3GPP TR 25.822 V1.0.0 (2007-11)

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*Technical Report*

**3rd Generation Partnership Project;  
Technical Specification Group TSG RAN;  
UMTS 700 MHz Work Item Technical Report;  
(Release 8)**



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## Foreword

This Technical Report has been produced by the 3<sup>rd</sup> Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

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# 1 Scope

The present document is a technical report of the UMTS 700 MHz work item, which was approved to establish in TSG RAN#35. The purpose of the work item is to provide UMTS specification support for UTRA/FDD in the new band allocations on pairing

- 698-716 MHz UL with 728-746 MHz DL and
- 746-768 MHz DL with 776-798 MHz UL.

UMTS 700 MHz work item is covering also E-UTRA aspects, especially narrower BW options 1.4 MHz and 3.0 MHz. Because E-UTRA work is still ongoing, changes for new specifications will be covered under E-UTRA work item.

In addition to schedule and status of the work item, the report includes a description of the motivation of requirements and specification recommendations.

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# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.
  - 1) 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
  - 2) RP-070127, "UMTS in 700 MHz bands (FDD)", Work Item Description, TSG RAN#35.
  - 3) R4-070116, "Overview of 700 MHz bands in the US", Cingular Wireless/AT&T.
  - 4) 3GPP TR25.942 v.7.0.0 "RF System Scenarios"
  - 5) 3GPP TS 25.101 v.7.7.0 "UE Radio Transmission and Reception (FDD)"
  - 6) 3GPP TS 25.104 v.7.6.0 "BS Radio transmission and Reception (FDD)"
  - 7) Code of federal Regulations:47 Telecommunication, Chapter I-FCC, Subchapter B, Common Carrier Services.  
[http://ecfr.gpoaccess.gov/cgi/t/text/textid.x?sid=c6f487b373be4db941f1100da52a1709&c=ecfr&tpl=/ecfrbrowse/Title47/47cfrv2\\_02.tpl](http://ecfr.gpoaccess.gov/cgi/t/text/textid.x?sid=c6f487b373be4db941f1100da52a1709&c=ecfr&tpl=/ecfrbrowse/Title47/47cfrv2_02.tpl)
  - 8) FCC Report and Order and further Notice of Proposed Rulemaking, adopted 25 April 2007.  
[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-07-72A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-07-72A1.pdf)
  - 9) FCC Report and Order and further Notice of Proposed Rulemaking, adopted 31 July 2007.  
[http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-07-132A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-07-132A1.pdf).

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## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905.

### 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905.

- WCDMA – Wideband Code Division Multiple Access, a type of cellular system meeting ITU-2000 requirement
- UMTS – Universal Mobile Telecommunications System, often used synonymously with WCDMA
- GSM – Mobile cellular system (throughout this document, this acronym is generally to also mean the services GPRS and EDGE, both enhancements to GSM, unless not applicable to the discussion.)
- UE – User Equipment, also cellular terminal
- BS – Cellular system base station
- DL – Downlink, the RF path from BS to UE
- UL – Uplink, the RF path from UE to BS
- ACIR – Adjacent Channel Interference Rejection, can be translated to receiver selectivity when the emission mask of the interfering signal is accounted for.
- TX – Transmitter
- RX – Receiver

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## 4 Introduction

The 700 MHz band in the US is currently occupied by television broadcast systems. These systems will be moved to a lower portion of the VHF/UHF spectrum and will also be converted to digital technology. For commercial services, the 700 MHz band is split into two parts commonly referred to as the Lower 700 MHz band and the Upper 700 MHz band. At this time, a portion of the Lower 700 MHz band has already been auctioned and will be put into commercial service in the near future. It is anticipated that the commercial license blocks in the Upper 700 MHz band and the remaining license blocks in the Lower 700 MHz band will be auctioned in 4Q 2007.

In this WI the interference and operational issues should be considered. It was suggested in [3] that the changes made previously to include UMTS in the 850 MHz band could be used as the basis for this work which would reduce the effort required within 3GPP. In addition, it was noted that both the Lower 700 MHz band and the Upper 700 MHz band have already been added to the GSM specifications in TS 45.005 and are referred to as the GSM 710 band and the GSM 750 band.

### 4.1 Task description

The purpose of this work item is to generate necessary information of UMTS 700 MHz FDD system and update the UMTS specifications to include support for the 700 MHz bands in the US (ITU Region 2).

1. Generate a report summarizing a study of radio requirements for UTRA FDD in the Lower and Upper 700 MHz Bands (FDD) for potential deployment in ITU Region 2 as detailed below.

The Upper 700 MHz band includes the following spectrum blocks:

**C Block:** 746 MHz – 757 MHz: Down-link (Node B transmit, UE receive)

776 MHz - 787 MHz: Up-link (UE transmit, Node B receive)

**A Block:** 757 MHz – 758 MHz: Down-link (Node B transmit, UE receive)

787 MHz - 788 MHz: Up-link (UE transmit, Node B receive)

**D Block:** 758 MHz – 763 MHz: Down-link (Node B transmit, UE receive)

788 MHz – 793 MHz: Up-link (UE transmit, Node B receive)

**F Block:** 763 MHz – 768 MHz: Down-link (Node B transmit, UE receive)

793 MHz - 798 MHz: Up-link (UE transmit, Node B receive)

Note that in these blocks the Node-B will be transmitting in the lower frequency block as this convention has been mandated by the FCC for the public safety spectrum in the Upper 700 MHz band.

The Lower 700 MHz band includes the following spectrum blocks:

**A Block:** 698 MHz – 704 MHz: Up-link (UE transmit, Node B receive)

728 MHz - 734 MHz: Down-link (Node B transmit, UE receive)

**B Block:** 704 MHz – 710 MHz: Up-link (UE transmit, Node B receive)

734 MHz – 740 MHz: Down-link (Node B transmit, UE receive)

**C Block:** 710 MHz – 716 MHz: Up-link (UE transmit, Node B receive)

740 MHz – 746 MHz: Down-link (Node B transmit, UE receive)

Note that in these blocks the conventional duplexing is used with the Node-B transmitting in the upper frequency blocks as this should mitigate interference with base stations in the Upper 700 MHz band.

It should also be noted that the GSM specifications used a reversed duplexing direction in the Lower 700 MHz band (GSM 710 band) and this should be corrected in the GSM specifications.

2. Generate CR's to update the appropriate specifications.
3. TSG RAN WG2 - study any issues related to UMTS at 700 MHz FDD band-signalling aspects.
4. TSG RAN WG3 - study any possible interface impacts to UMTS networks.
5. Any additional related issues.



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## 5 Requirements

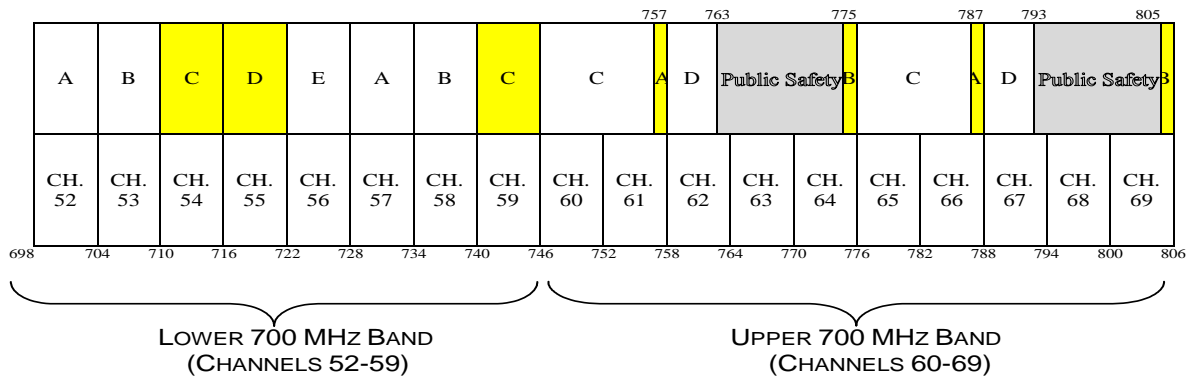
This section includes the high-level requirements for the UMTS 700 MHz work item.

### 5.1 Deployment Scenarios

#### 5.1.1 Upper 700 MHz band

The band plan for the Upper 700 MHz band is shown in Fig. 1. It is anticipated that UMTS/HSPA could be deployed in license blocks C, A, D and F which are paired blocks of 11 MHz, 1 MHz, 5 MHz and 5 MHz, respectively. As can be seen in the figure 1, the guard band A block is located between the upper C and D blocks and the guard band B block is placed above the public safety block to protect the public safety narrowband operations from potential interference. Guard band G block is located between the Public Safety broadband and narrowband blocks.

**Revised 700 MHz Band Plan For Commercial Services**



Block	Frequencies	Bandwidth	Pairing	Area Type	Licenses
A	698-704, 728-734	12 MHz	2 x 6 MHz	EA	176
B	704-710, 734-740	12 MHz	2 x 6 MHz	CMA	734
C	710-716, 740-746	12 MHz	2 x 6 MHz	CMA	734*
D	716-722	6 MHz	unpaired	EAG	6*
E	722-728	6 MHz	unpaired	EA	176
C	746-757, 776-787	22 MHz	2 x 11 MHz	REAG	12
D	758-763, 788-793	10 MHz	2 x 5 MHz	Nationwide	1***
A	757-758, 787-788	2 MHz	2 x 1 MHz	MEA	52**
B	775-776, 805-806	2 MHz	2 x 1 MHz	MEA	52**

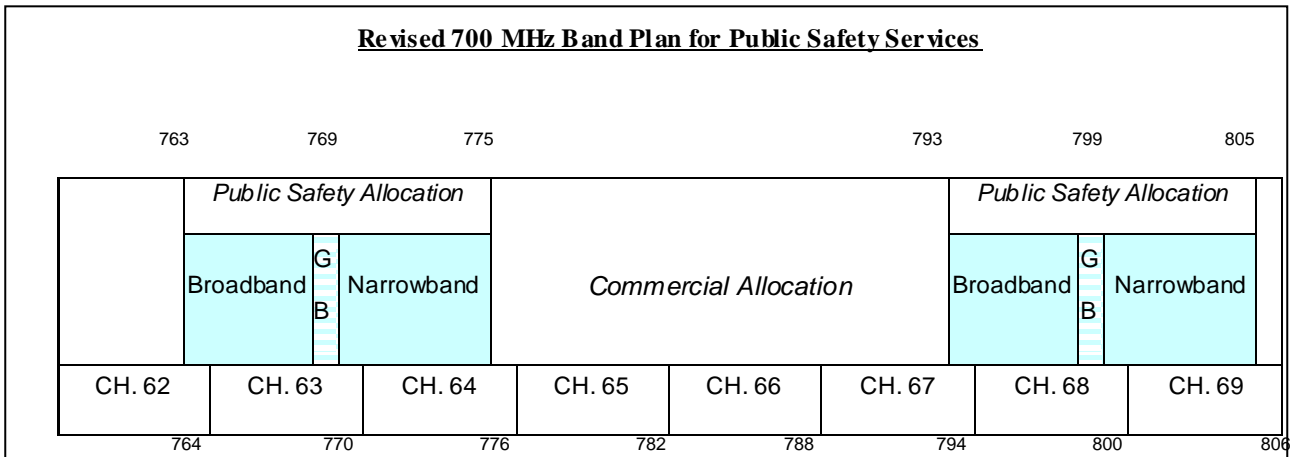
\* These Blocks have been auctioned.

\*\* These Guard Band Blocks have been auctioned, but are being relocated.

\*\*\* This Block is associated with the 700 MHz Public/Private Partnership.

Fig. 1. 700 MHz Band Plan for Commercial Services

Fig. 1. 700 MHz Band Plan for Commercial Services



NOTE: The Broadband part of the Public Safety Services is denoted as Block F

Fig. 2. 700 MHz Band Plan for Public Safety Services

### 5.1.2 Lower 700 MHz band

The band plan for the Lower 700 MHz band is shown in Fig. 1. The spectrum has been defined in 6 MHz blocks similar to what is used in the television channelization. Note that blocks A, B, and C are paired 6 MHz blocks while blocks D and E are unpaired. It is anticipated that UMTS/HSPA FDD could be accommodated in blocks A, B, and C. As mentioned above, an auction of the remaining license blocks (A, B, and E) will likely occur during 4Q 2007.

## 5.2 Co-existence with other technologies

In the upper 700 MHz band, the spectrum assigned to Public Safety systems, 763-775 MHz, is paired with another 12 MHz block at 793-805 MHz.

On July 31, 2007, the FCC adopted (released August 10) a ‘Second Report and Order’ [9] revising 700 MHz band plan and service rules to promote the creation of a nationwide interoperable broadband networks for public safety. Order establishes a framework for a 700 MHz Public Safety/Private Partnership between the licensee for one of the commercial spectrum blocks and the licensee for the public safety broadband spectrum. As part of the Partnership, the commercial licensee will build out a nationwide, interoperable broadband network for the use of public safety. This network will facilitate effective communications among first responders not just in emergencies, but as part of cooperative communications plans that will enable first responders from different disciplines, such as police and fire departments, and jurisdictions to work together in emergency preparedness and response. Under the Partnership, the Public Safety Broadband Licensee will have priority access to the commercial spectrum in times of emergency, and the commercial licensee will have preemptible, secondary access to the public safety broadband spectrum.

FCC determined that licensees for one of the spectrum blocks to be auctioned – the large, 2 x 11 MHz Upper 700 MHz C Block – will be required to provide a platform that is more open to devices and applications. These licensees will be required to allow customers, device manufacturers, third-party application developers, and others to use any device or application of their choice on their networks in this band, subject to certain conditions.

Upper D Block will be licensed on a nationwide basis and will become part of a 700 MHz Public Safety/Private Partnership.

In the lower 700 MHz band, blocks C and D have already been auctioned and the D block will be put into commercial service in the near future through the launch of MediaFLO, an audio/video broadcast for mobile devices.

### 5.3 Region 2 Requirements

The upper 700 MHz band. From the regulations in Part 27 (US Code of Federal Regulations Title 47 Part 27.50) for this band, base stations are limited to 1000 W ERP and portable (hand-held) devices are limited to 3 W ERP (note that mobile devices are allowed up to 30 W ERP). While the rules do not specify which blocks are to be used for mobile or

base transmission, it is recommended to use the upper block for mobile transmission and the lower block for base transmission although this is reversed from the typical duplex directions used for UMTS at higher frequencies. The convention of using the upper block for mobile transmission is also used in the 700 MHz public safety spectrum and this scheme has been followed for GSM/EDGE in TS 45.005. It should also be noted that the rules for commercial service in the Upper 700 MHz band include more stringent limits on out of band emissions that fall into the public safety spectrum. These limits are as follows (from Part 27.53):

- General limit outside of 746-763 MHz and 776-793 MHz: -13 dBm / 100 kHz
  - slightly relaxed within 100 kHz of block edge
- Base station emissions within 763-775 MHz and 793-805 MHz: -46 dBm / 6.25 kHz
  - approx. -34 dBm / 100 kHz
- Mobile station emissions within 763-775 MHz and 793-805 MHz: -35 dBm / 6.25 kHz
  - approx. -23 dBm / 100 kHz

Reduced limits also apply to emissions falling into the 1559-1610 MHz band (-40 dBm / 1 MHz and -50 dBm for narrowband emissions less than 700 Hz bandwidth).

**The lower 700 MHz band.** The technical regulations for the Lower 700 MHz band are similar to those given above for the Upper 700 MHz band with one important difference. While cellular-type systems in the Lower 700 MHz band can operate at conventional power levels up to 1 kW ERP the rules also allow for transmit power levels up to 50 kW ERP to accommodate wide-area broadcast services such as MediaFLO. In this case, a power flux density limit is also specified as 3000  $\mu\text{W}/\text{m}^2$  within 1 km of the transmitter site (Part 27.55(b)). It may be necessary to examine these issues more closely in terms of the possible impacts on UMTS adjacent channel selectivity, receiver blocking, etc.

### 5.3.1 Technical standards (subpart C)

The U.S. technical standards for commercial use of the 698–806 MHz frequency band are contained in Part 47 of the FCC Rules. The purpose of these rules is to allow shared use by different services, including the fixed, mobile and broadcasting services. Some technical rules differ by frequency band segment (lower, 698 – 746 MHz and upper, 746 – 806 MHz) and others differ in accordance with the types of operations employed within a given band segment.

The full text of the rules and other related material can be found at [7].

### 5.3.2 Power and Antenna Height Limits (§ 27.50 updated)

Power limits are specified as Effective Radiated Power (ERP) in watts per MHz as follows:

- Normal ERP limit of 1kW/MHz (average, rather than peak)
- 2kW/MHz in counties with population density of 100 or fewer persons per square mile (2.59 km<sup>2</sup>).
  - Where 1kW/MHz is exceeded, the station must not produce a power flux density (PFD) greater than 3 mW/m<sup>2</sup> on the ground within 1 km of the station antenna.
- ERP to be reduced for antenna heights >305m AAT, as per the tables
- In the lower part of the band, ERP up to a total of 50kW is allowed, provided PFD does not exceed 3mW/m<sup>2</sup> on the ground within 1 km of the station antenna.
- Control and mobile stations are limited to 30 watts ERP, and portable/hand-held devices are limited to 3 watts ERP

Limits are shown in Figure 3.

Table 3 – Permissible Power and Antenna Heights for Base and Fixed Stations in the 698-746 MHz, 747-762 MHz and 777-792 MHz Bands Transmitting a Signal with an Emission Bandwidth Greater than 1 MHz		Table 4 – Permissible Power and Antenna Heights for Base and Fixed Stations in the 698-746 MHz, 747-762 MHz and 777-792 MHz Bands Transmitting a Signal with an Emission Bandwidth Greater than 1 MHz	
Antenna height (AAT) in meters (feet)	Effective radiated power (ERP) per MHz (watts/MHz)	Antenna height (AAT) in meters (feet)	Effective radiated power (ERP) per MHz (watts/MHz)
Above 1372 (4500)	65	Above 1372 (4500)	130
Above 1220 (4000) To 1372 (4500)	70	Above 1220 (4000) To 1372 (4500)	140
Above 1067 (3500) To 1220 (4000)	75	Above 1067 (3500) To 1220 (4000)	150
Above 915 (3000) To 1067 (3500)	100	Above 915 (3000) To 1067 (3500)	200
Above 763 (2500) To 915 (3000)	140	Above 763 (2500) To 915 (3000)	280
Above 610 (2000) To 763 (2500)	200	Above 610 (2000) To 763 (2500)	400
Above 458 (1500) To 610 (2000)	350	Above 458 (1500) To 610 (2000)	700
Above 305 (1000) To 458 (1500)	600	Above 305 (1000) To 458 (1500)	1200
Up to 305 (1000)	1000	Up to 305 (1000)	2000

Fig. 3. Power and antenna height limits

### 5.3.3 Emission Limits (§ 27.53)

The following is a summary of the amended Service Rules in [9]. References are done using the re-numbering of the rules in [9].

#### 5.3.3.1 Lower Band Segment (§ 27.53(g))

The power of any emission outside the licensee's frequency block(s) shall be attenuated below the transmitter power (P, in Watts) by at least  $43 + 10 \log(P)$  dB. Resolution BW is to be 30 kHz for the adjacent 100 kHz and then RB=100 kHz thereafter.

#### 5.3.3.2 Upper Band Segment – Blocks C and A (§ 27.53(c) and (f))

The power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log(P)$  dB. Resolution bandwidth as per the lower band segment.

In order to protect public safety operations in the upper segment from interference, the following additional out-of-band emission requirements apply to Blocks C and A transmissions:

On all frequencies between 763 to 775 MHz and 793 to 805 MHz, attenuation shall be not less than  $76 + 10 \log(P)$  dB in a 6.25 kHz band segment, for base and fixed stations; and

On all frequencies between 763 to 775 MHz and 793 to 805 MHz, attenuation shall be not less than  $65 + 10 \log(P)$  dB in a 6.25 kHz band segment, for mobile and portable stations.

In order to protect operations in the 1559-1610 MHz band from interference, emissions from 746-763 MHz and 776-793 MHz operations that fall in the 1559-1610 MHz band, shall be limited to -70 dBW/MHz EIRP for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

#### 5.3.3.3 Upper Band Segment – Block D and F (§ 27.53(d) and (f))

The power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log(P)$  dB, on any frequency below 758 MHz, between 775 and 788 MHz and above 805 MHz. Resolution bandwidth as per the lower band segment.

In order to protect public safety operations in the upper segment from interference, the following additional out-of-band emission requirements apply to Blocks D and F transmissions:

On all frequencies between 769 and 775 MHz and 799 to 805 MHz, attenuation shall be not less than  $76 + 10 \log(P)$  dB in a 6.25 kHz band segment, for base and fixed stations; and

On all frequencies between 769 to 775 MHz and 799 to 805 MHz, attenuation shall be not less than  $65 + 10 \log(P)$  dB in a 6.25 kHz band segment, for mobile and portable stations.

In order to protect operations in the 1559-1610 MHz band from interference, emissions from 746-763 MHz and 776-793 MHz operations that fall in the 1559-1610 MHz band, shall be limited to -70 dBW/MHz EIRP for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

### 5.3.4 Signal Strength Limits (§ 27.55(a))

For licensees operating base and fixed stations in either the lower or the upper band segments, the predicted or measured median field strength of their transmissions at any location on the geographical border of their service area shall not exceed 40 dB $\mu$ V/m.

### 5.3.5 International Coordination (§ 27.57)

Operation in the 698–763 MHz and 776–793 MHz frequency bands is subject to international agreements with Canada and Mexico. Unless these agreements are otherwise modified, licensees must not cause interference to, and must accept harmful interference from, television broadcasting stations in Canada and Mexico.

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## 6 Study Areas

Sections 6.1 – 6.3 are covering areas to be studied in TSG RAN WG4.

### 6.1. Frequency arrangements

UMTS 700 WI includes lower and upper bands. 3 new frequency bands are introduced in specifications.

- Lower 700 MHz band as Operating Band XII
  - UL Frequencies, UE transmit, Node B receive: 698-716 MHz
  - DL Frequencies, Node B transmit, UE receive: 728-746 MHz
- Upper 700 MHz band as Operating Band XIII
  - UL Frequencies, UE transmit, Node B receive: 776-788 MHz
  - DL Frequencies, Node B transmit, UE receive: 746-758 MHz
- Upper 700 MHz Public Safety/Private Partnership band as Operating Band XIV
  - UL Frequencies, UE transmit, Node B receive: 788-798 MHz
  - DL Frequencies, Node B transmit, UE receive: 758-768 MHz

#### 6.1.1. Channel arrangements

##### 6.1.1.1. Channel numbers

The carrier frequency is designated by the UTRA Absolute Radio Frequency Channel Number (UARFCN). For Band XII, Band XIII and Band XIV, the UARFCN values are defined as follows:

Uplink:  $N_U = 5 * (F_{UL} - F_{UL\_Offset})$ , for the carrier frequency range  $F_{UL\_low} \leq F_{UL} \leq F_{UL\_high}$

Downlink:  $N_D = 5 * (F_{DL} - F_{DL\_Offset})$ , for the carrier frequency range  $F_{DL\_low} \leq F_{DL} \leq F_{DL\_high}$

For Band XII, Band XIII and Band XIV,  $F_{UL\_Offset}$ ,  $F_{UL\_low}$ ,  $F_{UL\_high}$ ,  $F_{DL\_Offset}$ ,  $F_{DL\_low}$  and  $F_{DL\_high}$  are defined in Table 6.1 for the general UARFCN. For the additional UARFCN,  $F_{UL\_Offset}$ ,  $F_{DL\_Offset}$  and the specific  $F_{UL}$  and  $F_{DL}$  are defined in Table 6.1A.

**Table 6.1: UARFCN definition (general)**

Band	UPLINK (UL) UE transmit, Node B receive			DOWNLINK (DL) UE receive, Node B transmit		
	UARFCN formula offset $F_{UL\_Offset}$ [MHz]	Carrier frequency ( $F_{UL}$ ) range [MHz]		UARFCN formula offset $F_{DL\_Offset}$ [MHz]	Carrier frequency ( $F_{DL}$ ) range [MHz]	
		$F_{UL\_low}$	$F_{UL\_high}$		$F_{DL\_low}$	$F_{DL\_high}$
XII	-22	700.4	713.6	-37	730.4	743.6
XIII	20	778.4	785.6	-55	748.4	755.6
XIV	8	790.4	795.6	-67	760.4	765.6

**Table 6.1A: UARFCN definition (additional channels)**

Band	UPLINK (UL) UE transmit, Node B receive		DOWNLINK (DL) UE receive, Node B transmit	
	UARFCN formula offset $F_{UL\_Offset}$ [MHz]	Carrier frequency [ $F_{UL}$ ] [MHz]	UARFCN formula offset $F_{DL\_Offset}$ [MHz]	Carrier frequency [ $F_{DL}$ ] [MHz]
XII	-39.9	700.5, 701.5, 706.5, 707.5, 712.5, 713.5	-54.9	730.5, 731.5, 736.5, 737.5, 742.5, 743.5
XIII	3.1	778.5, 779.5, 780.5, 783.5, 784.5, 785.5	-71.9	748.5, 749.5, 750.5, 753.5, 754.5, 755.5
XIV	-1.9	790.5, 795.5	-76.9	760.5, 765.5

### 6.1.1.2. UARFCN

The following UARFCN range shall be supported for Band XII, Band XIII and Band XIV.

**Table 6.2: UTRA Absolute Radio Frequency Channel Number**

Band	Uplink (UL) UE transmit, Node B receive		Downlink (DL) UE receive, Node B transmit	
	General	Additional	General	Additional
XII	3612 to 3678	3702, 3707, 3732, 3737, 3762, 3767	3837 to 3903	3927, 3932, 3957, 3962, 3987, 3992
XIII	3792 to 3828	3852, 3857, 3862, 3877, 3882, 3887	4017 to 4053	4077, 4082, 4087, 4102, 4107, 4112
XIV	3912 to 3938	3962, 3987	4137 to 4163	4187, 4212

## 6.1.2. List of UARFCN used for 700 MHz bands

Table 6.3: UARFCN used for the 700 MHz bands

UTRA FDD Band	Band range [MHz]	Range res. [MHz]	Uplink UARFCN				Downlink UARFCN			
			Formula offset $F_{UL\_Offset}$ [MHz]	Assigned/Reserved	$N_U$	$F_{UL}$ [MHz]	Formula offset $F_{DL\_Offset}$ [MHz]	Assigned/Reserved	$N_D$	$F_{DL}$ [MHz]
XII	2x18	2x18	-22	Start res.	3600	698.0	-37	Start res.	3825	728.0
				<b>Min.</b>	<b>3612</b>	<b>700.4</b>		<b>Min.</b>	<b>3837</b>	<b>730.4</b>
				<b>Max.</b>	<b>3678</b>	<b>713.6</b>		<b>Max.</b>	<b>3903</b>	<b>743.6</b>
				End res.	3689	715.8		End res.	3914	745.8
XII (Add.)	2x18	2x18	-39.9	Start res.	3690	698.1	-54.9	Start res.	3915	728.1
				<b>Min.</b>	<b>3702</b>	<b>700.5</b>		<b>Min.</b>	<b>3927</b>	<b>730.5</b>
				<b>Max.</b>	<b>3767</b>	<b>713.5</b>		<b>Max.</b>	<b>3992</b>	<b>743.5</b>
				End res.	3779	715.9		End res.	4004	745.9
XIII	2x12	2x12	20	Start res.	3780	776.0	-55	Start res.	4005	746.0
				<b>Min.</b>	<b>3792</b>	<b>778.4</b>		<b>Min.</b>	<b>4017</b>	<b>748.4</b>
				<b>Max.</b>	<b>3828</b>	<b>785.6</b>		<b>Max.</b>	<b>4053</b>	<b>755.6</b>
				End res.	3839	787.8		End res.	4064	757.8
XIII (Add.)	2x12	2x12	8.1	Start res.	3840	776.1	-66.9	Start res.	4065	746.1
				<b>Min.</b>	<b>3852</b>	<b>778.5</b>		<b>Min.</b>	<b>4077</b>	<b>748.5</b>
				<b>Max.</b>	<b>3887</b>	<b>785.5</b>		<b>Max.</b>	<b>4112</b>	<b>755.5</b>
				End res.	3899	787.9		End res.	4124	757.9
XIV	2x10	2x10	8	Start res.	3900	788.0	-67	Start res.	4125	758.0
				<b>Min.</b>	<b>3912</b>	<b>790.4</b>		<b>Min.</b>	<b>4137</b>	<b>760.4</b>
				<b>Max.</b>	<b>3938</b>	<b>795.6</b>		<b>Max.</b>	<b>4163</b>	<b>765.6</b>
				End res.	3949	797.8		End res.	4174	767.8
XIV (Add.)	2x10	2x10	-1.9	Start res.	3950	788.1	-76.9	Start res.	4175	758.1
				<b>Min.</b>	<b>3962</b>	<b>790.5</b>		<b>Min.</b>	<b>4187</b>	<b>760.5</b>
				<b>Max.</b>	<b>3987</b>	<b>795.5</b>		<b>Max.</b>	<b>4212</b>	<b>765.5</b>
				End res.	3999	797.9		End res.	4224	767.9

## 6.2. UE requirements

Required changes in specification TS 25.101 together with their currently assumed values are discussed in Table 6.4. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specifications.



**Table 6.4: Required Changes in TS 25.101 (V8.0.0)**

Section	Requirement	Discussion / Required Changes in TS 25.101 (V8.0.0)
5.2	Frequency bands	- New operating band 2x18 MHz, Band XII. 698-716 MHz: Up-link (UE transmit, Node B receive) 728-746 MHz: Down-link (Node B transmit, UE receive) - New operating band 2x12 MHz, Band XIII. 776-788 MHz: Up-link (UE transmit, Node B receive) 746-758 MHz: Down-link (Node B transmit, UE receive) - New operating band 2x10 MHz, Band XIV. 788-798 MHz: Up-link (UE transmit, Node B receive) 758-768 MHz: Down-link (Node B transmit, UE receive)
5.3	TX-RX frequency separation	Add 30 MHz for Bands XII, XIII and XIV
5.4.2	Channel raster	Additional channels are needed in in Band XII 730.5, 731.5, 736.5, 737.5, 742.5, 743.5 MHz for DL 700.5, 701.5, 706.5, 707.5, 712.5, 713.5 MHz for UL Additional channels are needed in Band XIII 748.5, 749.5, 750.5, 753.5, 754.5, 755.5 MHz for DL 778.5, 779.5, 780.5, 783.5, 784.5, 785.5 MHz for UL Additional channels are needed in Band XIV 760.5, 765.5 MHz for DL 790.5, 795.5 MHz for UL
5.4.3	Channel number	Modify general and additional UARFCN definitions for Bands XII, XIII and XIV.
5.4.4	UARFCN	Modify general and additional UARFCN definitions for Bands XII, XIII and XIV.
6.2.1	UE maximum output power	Add entries for Band XII, XIII and XIV
6.6.2.1	Spectrum emission mask	Add minimum and additional requirements for Bands XII, XIII and XIV taking into account FCC requirements for these bands.
6.6.3	TX spurious emissions	Add additional TX spurious emissions requirements for Bands XII, XIII and XIV taking into account FCC requirements for these bands.
7.3	Reference sensitivity level	Add entries for Band XII, XIII and XIV
7.6.1	Minimum requirement (In-band blocking)	Modify requirements for Bands XII, XIII and XIV
7.6.2	Minimum requirement (Out of-band blocking)	Modify requirements for Bands XII, XIII and XIV
7.6.3	Minimum requirement (Narrow band blocking)	Add narrow band blocking requirements for Bands XII, XIII and XIV
7.8.2	Intermodulation characteristics, Minimum requirement (Narrow band)	Add narrow band IM requirements for Bands XII, XIII and XIV
7.9.1	RX spurious emissions	Modify additional receiver spurious emission requirements for Bands XII, XIII and XIV
Annex B.2.2	Multi-path fading propagation conditions	Add requirements for Bands XII, XIII and XIV

## 6.2.1 Receiver requirements

## 6.2.2 Transmitter requirements

## 6.3. BS requirements

Required changes in specification TS 25.104 together with their currently assumed values are discussed in Table 6.5. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specifications.

Table 6.5: Required Changes in TS 25.104 (V8.0.0)

Section	Requirement	Discussion / Required Changes in TS 25.104 (V8.0.0)
5.2	Frequency bands	- New operating band 2x18 MHz, Band XII. 698-716 MHz: Up-link (UE transmit, Node B receive) 728-746 MHz: Down-link (Node B transmit, UE receive) - New operating band 2x12 MHz, Band XIII. 776-788 MHz: Up-link (UE transmit, Node B receive) 746-758 MHz: Down-link (Node B transmit, UE receive) - New operating band 2x10 MHz, Band XIV. 788-798 MHz: Up-link (UE transmit, Node B receive) 758-768 MHz: Down-link (Node B transmit, UE receive)
5.3	TX-RX frequency separation	Add 30 MHz for Bands XII, XIII and XIV
5.4.2	Channel raster	Additional channels are needed in in Band XII 730.5, 731.5, 736.5, 737.5, 742.5, 743.5 MHz for DL 700.5, 701.5, 706.5, 707.5, 712.5, 713.5 MHz for UL Additional channels are needed in in Band XIII 748.5, 749.5, 750.5, 753.5, 754.5, 755.5 MHz for DL 778.5, 779.5, 780.5, 783.5, 784.5, 785.5 MHz for UL Additional channels are needed in in Band XIV 760.5, 765.5 MHz for DL 790.5, 795.5 MHz for UL
5.4.3	Channel number	Modify general and additional UARFCN definitions for Bands XII, XIII and XIV
6.6.2.1	Spectrum emission mask	Add minimum requirement for all bands and additional FCC requirements for Bands XII, XIII and XIV taking into account FCC requirements for these bands.
6.6.3.1	TX Spurious emissions	Add Cat B spurious emissions requirements for Bands XII, XIII and XIV in Table 6.9A (bands below 1 GHz) taking into account FCC requirements for these bands.
6.6.3.2	Protection of BS receiver of own or different BS	Add requirements for Bands XII, XIII and XIV
6.6.3.3 – 6.6.3.4	Spurious emissions / Co-existence requirements	Add requirements for Bands XII, XIII and XIV
7.5	Blocking characteristics	Add minimum and narrowband requirements for Bands XII, XIII and XIV Example minimum requirement for Band XII WABs: 698-716 MHz: -40 dBm / WCDMA signal 678-698 MHz: -40 dBm / WCDMA signal 716-736 MHz: -40 dBm / WCDMA signal Otherwise –15 dBm with CW carrier
7.5.2	Blocking/Co-location	Add requirements for Bands XII, XIII and XIV
7.6.1	Intermodulation characteristics	Add narrowband intermodulation requirements for Bands XII, XIII and XIV
7.7.1	RX Spurious emissions	Add additional requirements for Bands XII, XIII and XIV
Annex B.2	Multi-path fading propagation conditions	Add requirements for Bands XII, XIII and XIV
Annex B.5	Multi-path fading propagation conditions	Add requirements for Bands XII, XIII and XIV

### 6.3.1 Receiver requirements

### 6.3.2 Transmitter requirements

## 6.4. Signalling issues

This section is covering findings in TSG RAN WG2.

## 6.5. Impacts to UMTS networks

This section is covering findings in TSG RAN WG3.

## 7 Conclusions

## 8 Recommendations for specifications

### 8.1. Required changes to TS 25.101

Required changes in specification TS 25.101 together with their currently assumed values are discussed in Table 8.1. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specifications.

**Table 8.1: Required Changes in TS 25.101**

Section	Requirement	Discussion / Required Changes
5.2	Frequency bands	<ul style="list-style-type: none"> <li>- New operating band 2x18 MHz, Band XII. 698-716 MHz: Up-link (UE transmit, Node B receive) 728-746 MHz: Down-link (Node B transmit, UE receive)</li> <li>- New operating band 2x12 MHz, Band XIII. 776-788 MHz: Up-link (UE transmit, Node B receive) 746-758 MHz: Down-link (Node B transmit, UE receive)</li> <li>- New operating band 2x10 MHz, Band XIV. 788-798 MHz: Up-link (UE transmit, Node B receive) 758-768 MHz: Down-link (Node B transmit, UE receive)</li> </ul>
5.3	TX-RX frequency separation	Add 30 MHz for Bands XII, XIII and XIV
5.4.2	Channel raster	<p>Additional channels are needed in in Band XII 730.5, 731.5, 736.5, 737.5, 742.5, 743.5 MHz for DL 700.5, 701.5, 706.5, 707.5, 712.5, 713.5 MHz for UL</p> <p>Additional channels are needed in Band XIII 748.5, 749.5, 750.5, 753.5, 754.5, 755.5 MHz for DL 778.5, 779.5, 780.5, 783.5, 784.5, 785.5 MHz for UL</p> <p>Additional channels are needed in Band XIV 760.5, 765.5 MHz for DL 790.5, 795.5 MHz for UL</p>
5.4.3	Channel number	Modify general and additional UARFCN definitions for Bands XII, XIII and XIV.
5.4.4	UARFCN	Modify general and additional UARFCN definitions for Bands XII, XIII and XIV.
6.2.1	UE maximum output power	Add entries for Band XII, XIII and XIV
6.6.2.1	Spectrum emission mask	Add minimum and additional requirements for Bands XII, XIII and XIV taking into account FCC requirements for these bands.
6.6.3	TX spurious emissions	Add additional TX spurious emissions requirements for Bands XII, XIII and XIV taking into account FCC requirements for these bands.
7.3	Reference sensitivity level	Add entries for Band XII, XIII and XIV
7.6.1	Minimum requirement (In-band blocking)	Modify requirements for Bands XII, XIII and XIV
7.6.2	Minimum requirement (Out of-band blocking)	Modify requirements for Bands XII, XIII and XIV
7.6.3	Minimum requirement (Narrow band blocking)	Add narrow band blocking requirements for Bands XII, XIII and XIV
7.8.2	Intermodulation characteristics, Minimum requirement (Narrow band)	Add narrow band IM requirements for Bands XII, XIII and XIV
7.9.1	RX spurious emissions	Modify additional receiver spurious emission requirements for Bands XII, XIII and XIV
Annex B.2.2	Multi-path fading propagation conditions	Add requirements for Bands XII, XIII and XIV

## 8.2. Required changes to TS 25.104

Required changes in specification TS 25.104 together with their currently assumed values are discussed in Table 8.2. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specifications.

**Table 8.2: Required Changes in TS 25.104**

Section	Requirement	Discussion / Required Changes
5.2	Frequency bands	<ul style="list-style-type: none"> <li>- New operating band 2x18 MHz, Band XII. 698-716 MHz: Up-link (UE transmit, Node B receive) 728-746 MHz: Down-link (Node B transmit, UE receive)</li> <li>- New operating band 2x12 MHz, Band XIII. 776-788 MHz: Up-link (UE transmit, Node B receive) 746-758 MHz: Down-link (Node B transmit, UE receive)</li> <li>- New operating band 2x10 MHz, Band XIV. 788-798 MHz: Up-link (UE transmit, Node B receive) 758-768 MHz: Down-link (Node B transmit, UE receive)</li> </ul>
5.3	TX-RX frequency separation	Add 30 MHz for Bands XII, XIII and XIV
5.4.2	Channel raster	<p>Additional channels are needed in in Band XII 730.5, 731.5, 736.5, 737.5, 742.5, 743.5 MHz for DL 700.5, 701.5, 706.5, 707.5, 712.5, 713.5 MHz for UL</p> <p>Additional channels are needed in in Band XIII 748.5, 749.5, 750.5, 753.5, 754.5, 755.5 MHz for DL 778.5, 779.5, 780.5, 783.5, 784.5, 785.5 MHz for UL</p> <p>Additional channels are needed in in Band XIV 760.5, 765.5 MHz for DL 790.5, 795.5 MHz for UL</p>
5.4.3	Channel number	Modify general and additional UARFCN definitions for Bands XII, XIII and XIV
6.6.2.1	Spectrum emission mask	Add minimum requirement for all bands and additional FCC requirements for Bands XII, XIII and XIV taking into account FCC requirements for these bands.
6.6.3.1	TX Spurious emissions	Add Cat B spurious emissions requirements for Bands XII, XIII and XIV in Table 6.9A (bands below 1 GHz) taking into account FCC requirements for these bands.
6.6.3.2	Protection of BS receiver of own or different BS	Add requirements for Bands XII, XIII and XIV
6.6.3.3 – 6.6.3.4	Spurious emissions / Co-existence requirements	Add requirements for Bands XII, XIII and XIV
7.5	Blocking characteristics	<p>Add minimum and narrowband requirements for Bands XII, XIII and XIV</p> <p>Example minimum requirement for Band XII WA BS: 698-716 MHz: -40 dBm / WCDMA signal 678-698 MHz: -40 dBm / WCDMA signal 716-736 MHz: -40 dBm / WCDMA signal Otherwise -15 dBm with CW carrier</p>
7.5.2	Blocking/Co-location	Add requirements for Bands XII, XIII and XIV
7.6.1	Intermodulation characteristics	Add narrowband intermodulation requirements for Bands XII, XIII and XIV
7.7.1	RX Spurious emissions	Add additional requirements for Bands XII, XIII and XIV
Annex B.2	Multi-path fading propagation conditions	Add requirements for Bands XII, XIII and XIV
Annex B.5	Multi-path fading propagation conditions	Add requirements for Bands XII, XIII and XIV

## 8.3. Required changes to TS 25.113

Required changes in specification TS 25.113 are summarized in Table 8.3. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specification.

**Table 8.3: Required Changes to TS 25.113**

Section	Requirement	Discussion / Required Changes
4.5.2	Receiver exclusion band	Add receiver exclusion band for Bands XII, XIII and XIV.

## 8.4. Required changes to TS 25.133

Required changes in specification TS 25.133 are summarized in Table 8.4. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specification.

**Table 8.4: Required Changes to TS 25.133**

Section	Requirement	Discussion / Required Changes
9.1.1	CPICH RSCP	Add Band XII, XIII and XVI absolute and relative accuracy requirements for Intra and Inter frequency measurements.
9.1.2	CPICH Ec/Io	Add Band XII, XIII and XVI absolute and relative accuracy requirements for Intra and Inter frequency measurements.
9.1.3	UTRA Carrier RSSI	Add Band XII, XIII and XVI absolute and relative accuracy requirements.
9.1.7	SFN-CFN observed time difference	Add Band XII, XIII and XVI Intra and Inter frequency requirements.
9.1.8	SFN-SFN observed time difference	Add Band XII, XIII and XVI requirements for SFN-SFN observed time difference Type 1 and Type2.
9.1.9	UE Rx-Tx time difference	Add Band XII, XIII and XVI requirements for UE Rx-Tx time difference Type 1 and Type2.
A.9.1.1	CPICH RSCP	Add Band XII, XIII and XVI absolute and relative accuracy requirements for Intra and Inter frequency measurements.
A.9.1.2	CPICH Ec/Io	Add Band XII, XIII and XVI absolute and relative accuracy requirements for Intra and Inter frequency measurements.
A.9.1.3	UTRA Carrier RSSI	Add Band XII, XIII and XVI absolute and relative accuracy requirements.
A.9.1.4	SFN-CFN observed time difference	Add Band XII, XIII and XVI Intra and Inter frequency requirements.
A.9.1.5	SFN-SFN observed time difference	Add Band XII, XIII and XVI intra frequency requirements for SFN-SFN observed time difference Type 1 and Type2.
A.9.1.6	UE Rx-Tx time difference	Add Band XII, XIII and XVI intra frequency requirements for UE Rx-Tx time difference Type 1 and Type2.

## 8.5. Required changes to TS 25.141

Required changes in specification TS 25.141 together with their currently assumed values are discussed in Table 8.5. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specifications.

Table 8.5: Required Changes to TS 25.141

Section	Requirement	Discussion / Required Changes
3.4.1	Frequency bands	- New operating band 2x18 MHz, Band XII. 698-716 MHz: Up-link (UE transmit, Node B receive) 728-746 MHz: Down-link (Node B transmit, UE receive) - New operating band 2x12 MHz, Band XIII. 776-788 MHz: Up-link (UE transmit, Node B receive) 746-758 MHz: Down-link (Node B transmit, UE receive) - New operating band 2x10 MHz, Band XIV. 788-798 MHz: Up-link (UE transmit, Node B receive) 758-768 MHz: Down-link (Node B transmit, UE receive)
3.4.2	TX-RX frequency separation	Add 30 MHz for Bands XII, XIII and XIV
3.5.2	Channel raster	Additional channels are needed in in Band XII 730.5, 731.5, 736.5, 737.5, 742.5, 743.5 MHz for DL 700.5, 701.5, 706.5, 707.5, 712.5, 713.5 MHz for UL Additional channels are needed in in Band XIII 748.5, 749.5, 750.5, 753.5, 754.5, 755.5 MHz for DL 778.5, 779.5, 780.5, 783.5, 784.5, 785.5 MHz for UL Additional channels are needed in in Band XIV 760.5, 765.5 MHz for DL 790.5, 795.5 MHz for UL
3.5.3	Channel number	Add general and additional UARFCN definitions for Bands XII, XIII and XIV
6.5.2.1	Spectrum emission mask	Add minimum requirement for all bands and additional FCC requirements for Bands XII, XIII and XIV taking into account FCC regulation for these bands.
6.5.3	TX Spurious emissions	Add Cat B spurious emissions requirements for Bands XII, XIII and XIV in Table 6.9A (bands below 1 GHz) taking into account FCC requirements for these bands.
6.5.3.7.3	Protection of BS receiver of own or different BS	Add requirements for Bands XII, XIII and XIV
6.5.3.7.4 – 6.5.3.7.5	Spurious emissions / Co-existence requirements	Add requirements for Bands XII, XIII and XIV
7.5.5	Blocking characteristics	Add minimum and narrowband requirements for Bands XII, XIII and XIV Example minimum requirement for Band XII WA BS: 698-716 MHz: -40 dBm / WCDMA signal 678-698 MHz: -40 dBm / WCDMA signal 716-736 MHz: -40 dBm / WCDMA signal Otherwise –15 dBm with CW carrier
7.5.5	Blocking/Co-location	Add requirements for Bands XII, XIII and XIV
7.6.5	Intermodulation characteristics	Add narrowband intermodulation requirements for Bands XII, XIII and XIV
7.7.5	RX Spurious emissions	Add additional requirements for Bands XII, XIII and XIV
Annex D.2	Multi-path fading propagation conditions	Add requirements for Bands XII, XIII and XIV
Annex D.5	Multi-path fading propagation conditions for E-DPDCH and E-DPCCH	Add requirements for Bands XII, XIII and XIV

## 8.6. Required changes to TS 25.306

The possible UE radio access capability parameter settings in TS25.306 contain several instances of a parameter "Radio frequency bands" that defines the uplink and downlink frequency bands supported by the UE. The parameter is defined only by direct references TS 25.101 [5].

No update of TS 25.306 will thus be needed for the introduction of Bands XII, XIII and XIV.

## 8.7. Required changes to TS 25.307

Required changes in specification TS 25.307 are summarized in Table 8.6. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specification.

**Table 8.6: Required Changes to TS 25.307**

Section	Requirement	Discussion / Required Changes
x	Band XII, XIII and XIV Independent of Release	New sections for Bands XII, XIII and XIV

## 8.8. Required changes to TS 25.331

Required changes in specification TS 25.331 are summarized in Table 8.7. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specification.

**Table 8.7: Required Changes to TS 25.331**

Section	Requirement	Discussion / Required Changes
10.3.3.21a	Measurement capability extension	A new reference for the FDD Frequency band 2 (Bands XII, XIII and XIV)
10.3.3.42a	UE radio access capability extension	A new reference for the Frequency band 2 (Bands XII, XIII and XIV)
10.3.6.35c	Frequency band indicator 2	No changes needed. Extension indicators up to Band XXII exist already.

## 8.9. Required changes to TS 25.423

In TS 25.423, the operating band number is used in the "Frequency Band Indicator" IE for the "Neighbouring FDD Cell Information" IE in RNSAP. The current coding in RNSAP allows indication of bands between I and XXII. The specification references TS 25.104 [6] for UARFCN and operating band definitions.

No update of TS 25.423 will thus be needed for the introduction of Bands XII, XIII and XIV.

## 8.10. Required changes to TS 25.461

Required changes in specification TS 25.461 are summarized in Table 8.8. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specification.

**Table 8.8: Required Changes to TS 25.461**

Section	Requirement	Discussion / Required Changes
4.3.7	Operating bands	Add operating band for Bands XII, XIII and XIV

## 8.11. Required changes to TS 25.463

Required changes in specification TS 25.463 are summarized in Table 8.9. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specification.

**Table 8.9: Required Changes to TS 25.463**

Section	Requirement	Discussion / Required Changes
Annex B	Assigned fields for additional data	Define new bit fields for Bands XII, XIII and XIV

## 8.12. Required changes to TS 34.108

Required changes in specification TS 34.108 are summarized in Table 8.10. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specification.

**Table 8.10: Required Changes to TS 34.108**

Section	Requirement	Discussion / Required Changes
5.1.1	FDD Mode Test frequencies	Add FDD reference test frequencies for Operating Bands XII, XIII and XIV

## 8.13. Required changes to TS 34.121

Required changes in specification TS 34.121 are summarized in Table 8.11. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specification.

**Table 8.11: Required Changes to TS 34.121**

Section	Requirement	Discussion / Required Changes
4.2	Frequency bands	<ul style="list-style-type: none"> <li>- New operating band 2x18 MHz, Band XII. 698-716 MHz: Up-link (UE transmit, Node B receive) 728-746 MHz: Down-link (Node B transmit, UE receive)</li> <li>- New operating band 2x12 MHz, Band XIII. 776-788 MHz: Up-link (UE transmit, Node B receive) 746-758 MHz: Down-link (Node B transmit, UE receive)</li> <li>- New operating band 2x10 MHz, Band XIV. 788-798 MHz: Up-link (UE transmit, Node B receive) 758-768 MHz: Down-link (Node B transmit, UE receive)</li> </ul>
4.3	TX-RX frequency separation	Add 30 MHz for Bands XII, XIII and XIV
4.4.2	Channel raster	<p>Additional channels are needed in in Band XII 730.5, 731.5, 736.5, 737.5, 742.5, 743.5 MHz for DL 700.5, 701.5, 706.5, 707.5, 712.5, 713.5 MHz for UL</p> <p>Additional channels are needed in Band XIII 748.5, 749.5, 750.5, 753.5, 754.5, 755.5 MHz for DL 778.5, 779.5, 780.5, 783.5, 784.5, 785.5 MHz for UL</p> <p>Additional channels are needed in Band XIV 760.5, 765.5 MHz for DL 790.5, 795.5 MHz for UL</p>
4.4.3	Channel number	Modify general and additional UARFCN definitions for Bands XII, XIII and XIV.
4.4.4	UARFCN	Modify general and additional UARFCN definitions for Bands XII, XIII and XIV.
5.2	UE maximum output power	Add entries for Band XII, XIII and XIV
5.9	Spectrum emission mask	Add minimum and additional requirements for Bands XII, XIII and XIV taking into account FCC requirements for these bands.
5.11	TX spurious emissions	Add additional TX spurious emissions requirements for Bands XII, XIII and XIV taking into account FCC requirements for these bands.
6.2	Reference sensitivity level	Add entries for Band XII, XIII and XIV
6.5.2.1	Minimum requirement (In-band blocking)	Modify requirements for Bands XII, XIII and XIV
6.5.2.2	Minimum requirement (Out of-band blocking)	Modify requirements for Bands XII, XIII and XIV
6.5.2.3	Minimum requirement (Narrow band blocking)	Add narrow band blocking requirements for Bands XII, XIII and XIV
6.7	Intermodulation characteristics, Minimum requirement (Narrow band)	Add narrow band IM requirements for Bands XII, XIII and XIV
6.8	RX spurious emissions	Modify additional receiver spurious emission requirements for Bands XII, XIII and XIV
Annex D.2.2	Multi-path fading propagation conditions	Add requirements for Bands XII, XIII and XIV



## 8.14. Required changes to TS 34.124

Required changes in specification TS 34.124 are summarized in Table 8.12. Requirements which are not shown are applicable to Bands XII, XIII and XIV without any modifications from the existing specification.

**Table 8.12: Required Changes to TS 34.124**

Section	Requirement	Discussion / Required Changes
4.4	Receiver exclusion band	Add receiver exclusion band for Bands XII, XIII and XIV

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# 9 Project Plan

## 9.1 Schedule

Date	Meeting	[expected] Input	[expected]Output
7 <sup>th</sup> -11 <sup>th</sup> of May, 2007	TSG RAN WG4#43	- UMTS 700 MHz TR created - Work plan proposal	- Approved - Work plan agreed
29 <sup>th</sup> of May -1 <sup>st</sup> of June, 2007	TSG RAN #36	- Status report	-
20 <sup>th</sup> -24 <sup>th</sup> of Aug, 2007	TSG RAN WG4#44	- Frequency arrangements - UL and DL requirement proposals	- Channel numbers - Agreement on performance issues
11 <sup>th</sup> -14 <sup>th</sup> of Sep, 2007	TSG RAN #37	- Status report	-

5 <sup>th</sup> -9 <sup>th</sup> of Nov, 2007	TSG RAN WG4#45	<ul style="list-style-type: none"> <li>- TR 25.822 for UMTS 700 MHz for approval</li> <li>- CR proposals for specifications</li> <li>- TS 25.101</li> <li>- TS 25.104</li> <li>- TS 25.113</li> <li>- TS 25.133</li> <li>- TS 25.141</li> <li>- TS 25.307</li> <li>- TS 25.331</li> <li>- TS 25.461</li> <li>- TS 25.463</li> <li>- TS 34.108</li> <li>- TS 34.121</li> <li>- TS 34.124</li> </ul>	<ul style="list-style-type: none"> <li>- TR 25.822 for UMTS 700 MHz approved.</li> <li>- CR's approved</li> </ul>
27 <sup>th</sup> -30 <sup>th</sup> of Nov, 2007	TSG RAN #38	<ul style="list-style-type: none"> <li>- TR 25.822 for UMTS 700 MHz for approval</li> <li>- CR's for approval</li> </ul>	<ul style="list-style-type: none"> <li>- TR 25.822 for UMTS 700 MHz approved.</li> <li>- CR's approved</li> <li>- WI closed</li> </ul>

## 9.2 Work Task Status

	Planned Date	Milestone	Status
1.	TSG RAN #36	UMTS 700 MHz TR approved	Ready
2.	TSG RAN #36	Work plan agreed	Ready
3.	TSG RAN #37	Channels numbers agreed	Ready
4.	TSG RAN #37	Performance issues agreed	
5.	TSG RAN #38	TR 25.822 for UMTS 700 MHz approved.	
6.	TSG RAN #38	UMTS 700 MHz CRs approved.	
7.	TSG RAN #38	UMTS 700 MHz Work Item closed.	
8.			

## 10 Open Issues

This section lists all open issues which has not reached agreement yet.

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Annex A:  
<Annex title>

## Annex B: Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2007-05	RAN4 # 43	R4-070482			Document created, Baseline document for UMTS 700 MHz WI TR		0.0.1
2007-05	RAN4 # 43	R4-070483			Introduction of UMTS 700 MHz WI	0.0.1	0.1.0
2007-05	RAN4 # 43	R4-070839			Band Rules for the FCC 700MHz band	0.0.1	0.1.0
2007-08	RAN4 # 44	R4-071219			E-UTRA included in the scope section. TR number added.	0.1.0	0.2.0
2007-08	RAN4 # 44	R4-071210			Channel arrangement for UMTS700 based on the FCC revised band plan	0.2.0	0.3.0
2007-08	RAN4 # 44	R4-071472			Revised 700 MHz band plan	0.2.0	0.3.0
2007-10	RAN4# 44bis	R4-071770			Revised 700 MHz frequency arrangements	0.3.0	0.4.0
2007-11	RAN4# 45	R4-071853			UMTS 700 MHz changes in specifications	0.4.0	0.5.0
2007-11	RAN4# 45	R4-071971			TR 25.822: TP for Required changes to TS 25.141	0.4.0	0.5.0
2007-11	RAN4# 45	R4-071972			TR 25.822: TP for Required changes to TS 25.133	0.4.0	0.5.0