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*Technical Specification*

## **3rd Generation Partnership Project; Technical Specification Group Radio Access Network; UMTS1500 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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# 1 Scope

This document is a technical report of the UMTS1500 work items. The purpose of these work items is to provide UMTS specification support for UTRA FDD in the 1500 MHz in Japan. In addition to the schedule and status of the work items, the report includes a description of the motivation, requirements, study results and specification recommendations.

This document is a 'living' document, periodically updated and presented at all TSG-RAN meetings until all related CRs are agreed and approved.

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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] RP-070078 "Work Item proposal for 1500 MHz band in Japan", RAN#35
- [2] "Report of technical conditions concerning effective use of 1.5 GHz band" (In Japanese, Dec. 21, 2006) [http://www.soumu.go.jp/joho\\_tsusin/policyreports/joho\\_tsusin/pdf/061221\\_2.pdf](http://www.soumu.go.jp/joho_tsusin/policyreports/joho_tsusin/pdf/061221_2.pdf)
- [3] R4-070024 "Technical conditions applied for UMTS1500 in Japan", RAN4#42
- [4] R4-070514 "Work plan proposal of the WI "UMTS1500"", RAN4#43
- [5] R4-030489: Defining UE performance requirements for different frequency variants, Nokia
- [6] R4-030740: Defining BS and UE demodulation performance requirements for UMTS 850, Lucent Technologies
- [7] ITU-R recommendation M.1545: "Measurement uncertainty as it applies to test limits for the terrestrial component of International Mobile Telecommunications -2000".
- [8] 3GPP TS 34.121: "Terminal conformance specification; Radio transmission and reception (FDD)".
- [9] 3GPP TS 25.141: "Base Station (BS) conformance testing (FDD)".
- [10] R4-071408 "Introduction of UMTS1500 requirements" (TS25.101), RAN4#44
- [11] R4-071409 "Introduction of UMTS1500 requirements" (TS25.104), RAN4#44
- [12] R4-071205 "Introduction of UMTS1500 requirements" (TS25.141), RAN4#44
- [13] R4-071207 "Introduction of UMTS1500 requirements" (TS25.133), RAN4#44
- [14] R4-071206 "Introduction of UMTS1500 requirements" (TS25.113), RAN4#44
- [15] R4-071208 "Introduction of UMTS1500 requirements" (TS34.124), RAN4#44
- [16] R2-073672-073677 "Introduction of Band XI" (TS25.307 R99-Re1-8), RAN2#59
- [17] R2-073678 "Introduction of Band XI" (TS25.331), RAN2#59
- [18] R3-071349 "Introduction of UMTS1500" (TS25.461), RAN3#57

- [19] R3-071350 "Introduction of UMTS1500 requirements" (TS25.466), RAN3#57
- [20] R5-072273 "Introduction of FDD Mode Test frequencies for Operating Band XI (UMTS1500)" (TS34.108), RAN5#36
- [21] R5-072274-072276, R5-072398 "Introduction of UMTS1500(Band XI) requirements" (TS34.121), RAN5#36
- [22] R5-072458, R5-072465 "Introduction of FDD Mode Test frequencies for Operating Band XI (UMTS1500)" (TS34.123), RAN5#36

## 3.1 Definitions

(void)

## 3.2 Symbols

(void)

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 and the following apply:

W-CDMA	Wideband Code Division Multiple Access
UMTS	Universal Mobile Telecommunications System, often used synonymously with WCDMA
UE	User Equipment
BS	Base station
UL	Uplink, the RF path from UE to BS
DL	Downlink, the RF path from BS to UE
TX	Transmitter
RX	Receiver

---

# 4 Introduction

A working group has been established under the Information and Communications Council of Japan to consider the technical condition of the frequency re-arrangement in 1500 MHz band in order to enhance frequency efficiency. Therefore, the proponents of this work item believe that there is high possibility that IMT-2000 would be introduced in Japan in the band near future.

It is suggested that the consideration of the evolution and migration to introduce DS-CDMA in the 1500 MHz band being studied in the working group under the Information and Communications Council of Japan could be used as the basis for this work, which would reduce the effort required within 3GPP.

## 4.1 Task Description

The purpose of this work item is to study of UMTS1500 for a potential deployment in Japan. The study includes co-existing studies with the following technologies: PDC system (ARIB standard RCR STD-27), DIGITAL MCA system (ARIB standard RCR STD-32), Radio astronomy systems, and Mobile satellite communication service, taking the frequency reframing plan in Japan into account.

The Work Item description for UMTS1500 was approved at RAN#35 [1].

## 4.2 Rationale for UMTS1500

This WI enables the introduction of W-CDMA radio interface to the 1427.9 - 1452.9 MHz (UL) and 1475.9 - 1500.9 MHz (DL) band.

## 5 Requirements

### 5.1 Co-existence with other technologies

As a result of the co-existing studies with the following technologies: PDC system (ARIB standard RCR STD-27), DIGITAL MCA system (ARIB standard RCR STD-32), Radio astronomy systems, and Mobile satellite communication service, technical condition of the required guard bands between each system was lead in Information and Communications Council of Japan as provided in [2].

### 5.2 Deployment Scenarios

Based on the required guard bands with other technologies, a new frequency arrangement discussed in Information and Communications Council of Japan is provided in [3].

### 5.3 National band

The frequency band of UMTS1500 (1427.9 - 1452.9 MHz (UL) and 1475.9 - 1500.9 MHz (DL)) is not included in IMT-2000 plan bands. [Therefore, a note such that this band is a national band, may be required in frequency bands of UE and BS specifications. ]

[Editor's note] RAN4#43 concluded that the note above might not be needed.

### 5.4 Technical conditions for UMTS1500

The technical conditions for UMTS1500 were derived based on the requirements for 800MHz band (UMTS Band VI), 1.7GHz band (UMTS Band IX) and 2GHz (Band I). Necessary changes such as the frequency arrangement in the 1.5GHz band or spurious emission requirements were made. Those changes and its rationale are summarized in the following sub sections. Revised parts compared with requirements for Band IX are colored yellow and underlined>.

It should be noted that technical conditions in the following sections include test tolerances and the conditions are corresponding to "test requirements" specified in [8] or [9]. The way specified in the following sections is in line with what are recommended in [7] as "shared risk principle where the test limit is the core specification value that includes measurement uncertainty".

#### 5.4.1 Mandatory regulatory requirements:

Frequency arrangement:

The frequency band for UMTS 1500 in Japan is as follows:

UL: 1427.9MHz - 1452.9MHz

DL: 1475.9MHz - 1500.9MHz.

Tx-Rx frequency separation: 48MHz

NOTE: The band is a national band.

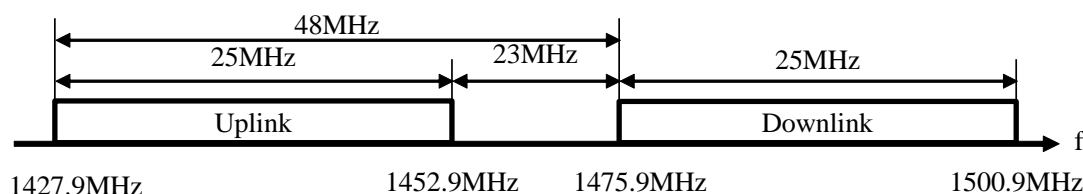


Figure 5.4.1.1: Frequency band for UMTS1500

(a) Frequency error:

Frequency error requirements for UMTS1500 are specified same as other Bands shown following;

BS: The modulated carrier frequency of the BS shall be accurate to within the accuracy range given in Table 5.4.1.1 observed over a period of one timeslot.

**Table 5.4.1.1: Frequency error minimum requirement**

BS maximum output power	BS class	Accuracy
> +38dBm	Wide Area BS	$\pm (0.05 \text{ ppm} + 12\text{Hz})$
$\leq +38\text{dBm}$	Medium Range BS Local Area BS	$\pm (0.1 \text{ ppm} + 12\text{Hz})$

UE: The UE modulated carrier frequency shall be accurate to within  $\pm (0.1 \text{ ppm} + 10\text{Hz})$  compared to the carrier frequency received from the Node B.

(b) Spurious emissions:

Spurious emissions requirements for UMTS1500 are specified as in Table 5.4.1.2.

**Table 5.4.1.2: Spurious emission requirements for UMTS1500**

Requirement		
BS	Table 5.4.1.2.1 Spurious emissions limits for <u>1.5GHz</u> band BS	
	Frequency range	
	9kHz - 150kHz	
	150kHz - 30MHz	
	30MHz - 1000MHz	
	1000MHz - 12.75GHz	
	The requirements are only applicable for frequencies, which are greater than 12.5 MHz away from the BS centre carrier frequency.	
	Table 5.4.1.2.2 Additional spurious emission limits for <u>1.5GHz</u> band BS	
	Frequency range	
	1884.5MHz - 1919.6MHz	
2010MHz - 2025MHz		
UE	The requirements below are only applicable for frequencies, which are greater than 12.5 MHz away from the UE centre carrier frequency	
	Table 5.4.1.2.3 Spurious emission limits for <u>1.5GHz</u> band UE	
	Frequency range	
	9kHz - 150kHz	
	150kHz - 30MHz	
	30MHz - 1000MHz	
	1000MHz - 12.75GHz	
	Table 5.4.1.2.4 Additional spurious emission limits for <u>1.5GHz</u> band UE	
	Frequency range	
	860MHz - 895MHz	
1844.9MHz - 1879.9MHz		
1884.5MHz - 1919.6MHz		
2110MHz - 2170MHz		

(c) Adjacent Channel Leakage power Ratio (ACLR):



Adjacent Channel Leakage power Ratio (ACLR) requirements for UMTS1500 are specified same as other Bands shown following;

**Table 5.4.1.3: Spurious emission requirements for UMTS1500**

Requirement	
BS	Table 5.4.1.3.1 ACLR for 1.5GHz band BS
	BS adjacent channel offset below the first or above the last carrier frequency used
	5 MHz
	10 MHz
Note: In certain regions, the adjacent channel power (the RRC filtered mean power centered on an adjacent channel frequency) shall be less than or equal to -7.2 dBm/3.84 MHz (for Band I, Band IX and Band [XI]) or +2.8dBm/3.84MHz (for Band VI) or as specified by the ACLR limit, whichever is the higher.	
UE	Table 5.4.1.3.2 ACLR for 1.5GHz band UE
	Adjacent channel frequency relative to assigned channel frequency
	+ 5 MHz or - 5 MHz
	+ 10 MHz or - 10 MHz

(d) Spectrum emission mask:

Spectrum emission mask for UMTS1500 are specified same as other Bands shown following;

BS: Not specified.

UE: Spectrum emission mask requirements for UMTS1500 are specified as in Table 5.4.1.4.

**Table 5.4.1.4: Spurious emission requirements for UMTS1500**

$\Delta f$ in MHz (Note)	Minimum requirement	Measurement bandwidth
$2.5 \leq \Delta f < 3.5$	$-33.5-15X( \Delta f -2.5)$ dBc	30 kHz
$3.5 \leq \Delta f < 7.5$	$-33.5-1X( \Delta f -3.5)$ dBc	1MHz
$7.5 \leq \Delta f < 8.5$	$-37.5-10X( \Delta f -7.5)$ dBc	1MHz
$8.5 \leq \Delta f < 12.5$	-47.5 dBc	1MHz

(e) Occupied bandwidth:

Occupied bandwidth for UMTS1500 are specified same as other Bands shown following;

BS: The occupied channel bandwidth shall be less than 5 MHz.

UE: The occupied channel bandwidth shall be less than 5 MHz.

(f) Maximum output power

Maximum output power for UMTS1500 are specified same as other Bands shown following;

BS: In normal conditions, the Base station maximum output power shall remain within +2.7dB and -2.7dB of the manufacturer's rated output power.

UE: The following Power Classes define the nominal maximum output power.

**Table 5.4.1.5: Power Class for UMTS1500 UE**

Power class	Power (dBm)	Tolerance (dB)
3	+24	+1.7/-3.7
4	+21	+2.7/-2.7

(g) Transmit OFF power

Transmit OFF power for UMTS1500 are specified same as other Bands shown following;

BS: Not specified.

UE: The requirement for transmit OFF power shall be less than -55dBm/3.84MHz.

(h) Transmit Intermodulation

Transmit Intermodulation for UMTS1500 are specified same as other Bands shown following;

BS: The transmit intermodulation level is the power of the intermodulation products when a WCDMA modulated interference signal is injected into the antenna connector at a mean power level of 30 dB lower than that of the mean power of the wanted signal. The frequency of the interference signal shall be +5 MHz, -5 MHz, +10 MHz, -10 MHz, +15 MHz and -15 MHz offset from the subject signal carrier frequency. The transmitter intermodulation level shall not exceed the out of band emission or the spurious emission requirements.

UE: Not specified.

(i) Receiver Spurious emissions:

Receiver Spurious emissions requirements for UMTS1500 are specified as in Table 5.4.1.6.

**Table 5.4.1.6: Receiver Spurious emission requirements for UMTS 1500**

Requirement							
BS	Table 5.4.1.6.1 Receiver spurious emission limits for 1.5GHz band BS						
	<table border="1"> <thead> <tr> <th>Frequency range</th> <th>Maximum level</th> </tr> </thead> <tbody> <tr> <td>30MHz - 1000MHz</td> <td>-57dBm/100kHz</td> </tr> <tr> <td>1GHz - 12.75GHz</td> <td>-47dBm/1MHz*</td> </tr> </tbody> </table>	Frequency range	Maximum level	30MHz - 1000MHz	-57dBm/100kHz	1GHz - 12.75GHz	-47dBm/1MHz*
	Frequency range	Maximum level					
	30MHz - 1000MHz	-57dBm/100kHz					
	1GHz - 12.75GHz	-47dBm/1MHz*					
*With the exception of frequencies between 12.5 MHz below the first carrier frequency and 12.5 MHz above the last carrier frequency used by the BS.							
Table 5.4.1.6.2 Additional spurious emission limits for 1.5GHz band BS							
<table border="1"> <thead> <tr> <th>Frequency range</th> <th>Maximum level</th> </tr> </thead> <tbody> <tr> <td>2010MHz - 2025MHz</td> <td>-52dBm/1MHz</td> </tr> </tbody> </table>	Frequency range	Maximum level	2010MHz - 2025MHz	-52dBm/1MHz			
Frequency range	Maximum level						
2010MHz - 2025MHz	-52dBm/1MHz						
UE	Table 5.4.1.6.3 Receiver spurious emissions limits for 1.5GHz band UE						
	<table border="1"> <thead> <tr> <th>Frequency range</th> <th>Maximum level</th> </tr> </thead> <tbody> <tr> <td>30MHz - 1000MHz</td> <td>-57dBm/100kHz</td> </tr> <tr> <td>1GHz - 12.75GHz</td> <td>-47dBm/1MHz</td> </tr> </tbody> </table>	Frequency range	Maximum level	30MHz - 1000MHz	-57dBm/100kHz	1GHz - 12.75GHz	-47dBm/1MHz
	Frequency range	Maximum level					
	30MHz - 1000MHz	-57dBm/100kHz					
	1GHz - 12.75GHz	-47dBm/1MHz					
Table 5.4.1.6.4 Additional Rx spurious emissions limits for 1.5GHz band UE							
<table border="1"> <thead> <tr> <th>Frequency range</th> <th>Maximum level</th> </tr> </thead> <tbody> <tr> <td>1427.9MHz - 1452.9MHz</td> <td>-60dBm/3.84MHz</td> </tr> <tr> <td>1475.9MHz - 1500.9MHz</td> <td>-60dBm/3.84MHz</td> </tr> </tbody> </table>	Frequency range	Maximum level	1427.9MHz - 1452.9MHz	-60dBm/3.84MHz	1475.9MHz - 1500.9MHz	-60dBm/3.84MHz	
Frequency range	Maximum level						
1427.9MHz - 1452.9MHz	-60dBm/3.84MHz						
1475.9MHz - 1500.9MHz	-60dBm/3.84MHz						

## 5.4.2 Other technical conditions referred in Japan's regulations:

a) Reference sensitivity level

## i) BS

The reference sensitivity levels are set as:

**Table 5.4.2.1: BS reference sensitivity levels**

BS Class	BS reference sensitivity level (dBm)
Wide Area BS	-121
Medium Range BS	-111
Local Area BS	-107

## ii) UE

The reference sensitivity level for UMTS 1500 is set as:

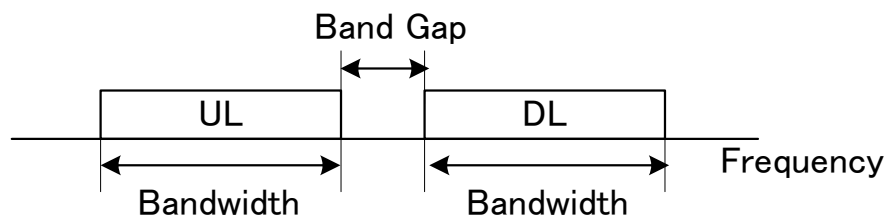
$$\text{DPCH\_Ec} = -115\text{dBm}/3.84\text{MHz [2]}.$$

The sensitivity level can be considered as a relaxed requirement by 2dB compared with that of band I. The rationale of this requirement is as follows.

As shown in Table 5.4.2.2, UMTS 1500 (denoted as Band [XI]) will have Tx-Rx band gap of 23MHz which is wider than that of Band II and III (20MHz) but narrower than 60MHz for Band IX. It can be understood that a reference sensitivity level requirement would be dominated by characteristics of RF receiver filters in UE. Relatively wider Tx-Rx frequency band gap allows lower path loss in pass-band with sharp attenuation in undesired band and vice versa. In the study of UMTS1500, such a characteristic was checked and as can be seen from the Table 5.4.2.2, the reference sensitivity level for UMTS1500 (Band [XI]) was considered to be tightened by 1dB from that of band III (-114dBm/3.84MHz) but not to be able to reach -116dBm/3.84MHz as in Band IX.

**Table 5.4.2.2: UTRA FDD frequency bands**

Operating Band	UL frequencies UE transmit, Node B receive	DL frequencies UE receive, Node B transmit	TX-RX frequency separation	TX/RX frequency bandwidth	TX-RX frequency band gap	DPCH_Ec <REFSENS> dBm/3.84MHz	<REF <sub>or</sub> > dBm/3.84 MHz
I	1920 - 1980 MHz	2110 - 2170 MHz	190 MHz	60 MHz	130 MHz	-117	-106.7
II	1850 - 1910 MHz	1930 - 1990 MHz	80 MHz.	60 MHz	20 MHz	-115	-104.7
III	1710 - 1785 MHz	1805 - 1880 MHz	95 MHz.	75 MHz	20 MHz	-114	-103.7
IX	1749.9 - 1784.9 MHz	1844.9 - 1879.9 MHz	95 MHz	35 MHz	60 MHz	-116	-105.7
[XI]	1427.9 - 1452.9MHz	1475.9 - 1500.9MHz	48 MHz	25 MHz	23 MHz	-115	-104.7



**Figure 5.4.2.1: UTRA FDD frequency bands**

## b) Adjacent Channel Selectivity (ACS)

## i) BS

With the conditions described in Table 5.4.2.3, the BER shall not exceed 0.1%.

**Table 5.4.2.3: Test conditions for Adjacent channel selectivity**

Parameter	BS maximum output power			Unit
	+38dBm	+38dBm	+24dBm	
Propagation condition	Static			-
Data rate	12.2	12.2	12.2	kbps
Wanted signal mean power	<REFSENS>+6			dBm
Interfering signal mean power	-52	-42	-38	dBm
Few offset (Modulated)	5	5	5	MHz

ii) UE

With the conditions described in Table 5.4.2.4, the BER shall not exceed 0.1%.

**Table 5.4.2.4: Test conditions for Adjacent Channel Selectivity**

Parameter	Unit	Parameters
Propagation condition	-	Static condition
Data rate	kbps	12.2
DPCH_Ec	dBm/3.84 MHz	<REFSENS> + 14 dB
I <sub>or</sub>	dBm/3.84 MHz	<REFI <sub>or</sub> > + 14 dB
I <sub>oac</sub> mean power (modulated)	dBm	-52
F <sub>uw</sub> (offset)	MHz	+5 or -5

c) Intermodulation characteristics

i) BS

With the conditions described in Table 5.4.2.5, the BER shall not exceed 0.1%.

**Table 5.4.2.5: Test conditions for Intermodulation characteristics**

Parameter	Parameters	Unit
Propagation condition	Static	-
Data rate	12.2	kbps
Wanted signal mean power	<REFSENS>+6	dBm
Interfering signal 1	Mean power	-48
	F <sub>uw</sub> offset (CW)	10
Interfering signal 2	Mean power	-48
	F <sub>uw</sub> offset (Modulated)	20

ii) UE

With the conditions described in Table 5.4.2.6, the BER shall not exceed 0.1%.

**Table 5.4.2.6: Test conditions for Intermodulation characteristics**

Parameter	Parameters	Unit
Propagation condition	Static	-
Data rate	12.2	kbps
Wanted signal mean power	<REFSENS>+3	dBm
Interfering signal 1	Mean power	-46
	F <sub>uw</sub> offset (CW)	10
Interfering signal 2	Mean power	-46
	F <sub>uw</sub> offset (Modulated)	20

d) Spurious response

i) BS

With the conditions described in Table 5.4.2.7, the BER shall not exceed 0.1%.

**Table 5.4.2.7: Test conditions for spurious response**

Parameter	Unit	Parameters	Remarks
Propagation condition	-	Static condition	
Data rate	kbps	12.2	
Wanted signal mean power	dBm/3.84 MHz	<REFSENS> + 6 dB	
Interfering signal mean power (CW)	dBm	-40	Maximum output power > +38dBm
		-35	Maximum output power □ +38dBm
		-30	Maximum output power □ +24dBm

ii) UE

With the conditions described in Table 5.4.2.8, the BER shall not exceed 0.1%.

**Table 5.4.2.8: Test conditions for spurious response**

Parameter	Unit	Parameters	Remarks
Propagation condition	-	Static condition	
Data rate	kbps	12.2	
Wanted signal mean power	dBm/3.84 MHz	<REFSENS> + 3 dB	
Interfering signal mean power (CW)	dBm	-44	

## 5.4.3 Propagation conditions for UMTS1500

### 5.4.3.1 Propagation Conditions for performance requirements

As discussed in [5] and [6], performance requirements for BS can be kept equal for different frequency bands by adjusting the UE velocity to set the channel conditions same effectively. Table 5.4.3.1 shows the adjustment of the UE velocity taking into account the carrier frequency ration between band I and band [XI]. Those adjusted UE speed can be used to define propagation conditions for receiver performance of UMTS1500.

**Table 5.4.3.1: Effective UE speed of Propagation Conditions for band [XI]**

Operating Band	Frequency	Speed for the propagation condition [km/h]				Remark
I	(a) 2 GHz	3	30	120	250	Wave length ratio (a/b) = 1.38
[XI]	(b) 1.45 GHz	4.1	41	166	345	

## 5.4.4 Channel arrangement for UMTS1500

### 5.4.4.1 Channel number

The carrier frequency is designated by the UTRA Absolute Radio Frequency Channel Number (UARFCN). For Band XI, 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 XI,  $F_{UL\_Offset}$ ,  $F_{UL\_low}$ ,  $F_{UL\_high}$ ,  $F_{DL\_Offset}$ ,  $F_{DL\_low}$  and □  $F_{DL\_high}$  are defined in Table 5.4.4.1 for the general UARFCN.

**Table 5.4.4.1: 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]	
		$F_{UL\_low}$	$F_{UL\_high}$		$F_{DL\_low}$	$F_{DL\_high}$
XI	733	1430.4	1450.4	736	1478.4	1498.4

The following UARFCN range shall be supported for Band XI:

**Table 5.4.4.2: UTRA Absolute Radio Frequency Channel Number**

Band	Uplink (UL) UE transmit, Node B receive	Downlink (DL) UE receive, Node B transmit
	General	General
XI	3487 to 3587	3712 to 3812

#### 5.4.4.2 List of UARFCN used for UTRA FDD

The UARFCN numbering scheme detailed the specification is summarized for information in Table 5.4.4.3. The table shows the UARFCN assigned to all UTRA FDD operating bands, starting with the lowest UARFCN and continuing up to the highest one assigned.

Each band may have two table entries, one for the "general" numbers and one for the "additional" ones. The entries in Table 5.4.4.3 are explained as follows:

**Band range:** The size of the frequency range for the UTRA FDD band specified.

**Range res.:** The size of the frequency range corresponding to the UARFCN range that has been "reserved" in 3GPP for possible future extensions of the band.

**Formula offset:** The offset parameter ( $F_{UL\_Offset}$  or  $F_{DL\_Offset}$ ) in the formula, used to calculate the UARFCN.

**Assigned/reserved:** Indicates the significance of the UARFCN and corresponding frequencies listed as follows:

**Start res.** Start of the UARFCN range reserved for the band.

**Min.** The lowest UARFCN assigned to the band.

**Max.** The highest UARFCN assigned to the band.

**End res.** End of the UARFCN range reserved for the band.

$N_U, N_D$ : Uplink and downlink UARFCN.

$F_{UL}, F_{DL}$ : Corresponding uplink and downlink frequencies.

**(Add.):** Refers to the additional UARFCN (on the 100 kHz raster).

Note that bands V and VI are shown with common entries in Table 5.4.4.3, since their UARFCN ranges are completely overlapping.

Table 5.4.4.3: UARFCN used for the UTRA FDD bands

UTRA FDD Band	Band range [MHz]	Range res. [MHz]	Uplink UARFCN				Downlink UARFCN			
			F <sub>UL</sub> _Offset [MHz]	Assigned/Reserved	N <sub>U</sub>	F <sub>UL</sub> [MHz]	F <sub>DL</sub> _Offset [MHz]	Assigned/Reserved	N <sub>D</sub>	F <sub>DL</sub> [MHz]
II (Add.)	2x60	2x60	1850.1	Start res.	0	1850.1	1850.1	Start res.	400	1930.1
				Min.	12	1852.5		Min.	412	1932.5
				Max.	287	1907.5		Max.	687	1987.5
				End res.	299	1909.9		End res.	699	1989.9
V and VI (Add.)	2x25 (V) 2x10 (VI)	2x45	670.1	Start res.	700	810.1	670.1	Start res.	925	855.1
				Min. (V)	782	826.5		Min. (V)	1007	871.5
				Min. (VI)	812	832.5		Min. (VI)	1037	877.5
				Max. (V)	837	837.5		Max. (VI)	1062	882.5
				Max. (VI)	862	842.5		Max. (V)	1087	887.5
				End res.	924	854.9		End res.	1149	899.9
III	2x75	2x75	1525	Start res.	925	1710.0	1575	Start res.	1150	1805.0
				Min.	937	1712.4		Min.	1162	1807.4
				Max.	1288	1782.6		Max.	1513	1877.6
				End res.	1299	1784.8		End res.	1524	1879.8
IV	2x45	2x70	1450	Start res.	1300	1710.0	1805	Start res.	1525	2110.0
				Min.	1312	1712.4		Min.	1537	2112.4
				Max.	1513	1752.6		Max.	1738	2152.6
				End res.	1649	1779.8		End res.	1874	2179.8
IV (Add.)	2x45	2x70	1380.1	Start res.	1650	1710.1	1735.1	Start res.	1875	2110.1
				Min.	1662	1712.5		Min.	1887	2112.5
				Max.	1862	1752.5		Max.	2087	2152.5
				End res.	1999	1779.9		End res.	2224	2179.9
VII	2x70	2x70	2100	Start res.	2000	2500.0	2175	Start res.	2225	2620.0
				Min.	2012	2502.4		Min.	2237	2622.4
				Max.	2338	2567.6		Max.	2563	2687.6
				End res.	2349	2569.8		End res.	2574	2689.8
VII (Add.)	2x70	2x70	2030.1	Start res.	2350	2500.1	2105.1	Start res.	2575	2620.1
				Min.	2362	2502.5		Min.	2587	2622.5
				Max.	2687	2567.5		Max.	2912	2687.5
				End res.	2699	2569.9		End res.	2924	2689.9
VIII	2x35	2x35	340	Start res.	2700	880.0	340	Start res.	2925	925.0
				Min.	2712	882.4		Min.	2937	927.4
				Max.	2863	912.6		Max.	3088	957.6
				End res.	2874	914.8		End res.	3099	959.8
X	2x60	2x60	1135	Start res.	2875	1710.0	1490	Start res.	3100	2110.0
				Min.	2887	1712.4		Min.	3112	2112.4
				Max.	3163	1767.6		Max.	3388	2167.6
				End res.	3174	1769.8		End res.	3399	2169.8
X (Add.)	2x60	2x60	1075.1	Start res.	3175	1710.1	1430.1	Start res.	3400	2110.1
				Min.	3187	1712.5		Min.	3412	2112.5
				Max.	3462	1767.5		Max.	3687	2167.5
				End res.	3474	1769.9		End res.	3699	2169.9
XI	2x25	2x25	733	Start res.	3475	1428.0	736	Start res.	3700	1476.0
				Min.	3487	1430.4		Min.	3712	1478.4
				Max.	3587	1450.4		Max.	3812	1498.4
				End res.	3599	1452.8		End res.	3824	1500.8
V and VI	2x25 (V) 2x10 (VI)	2x45	0	Start res.	4050	810.0	0	Start res.	4275	855.0
				Min. (V)	4132	826.4		Min. (V)	4357	871.4
				Min. (VI)	4162	832.4		Min. (VI)	4387	877.4
				Max. (VI)	4188	837.6		Max. (VI)	4413	882.6
				Max. (V)	4233	846.6		Max. (V)	4458	891.6
				End res.	4274	854.8		End res.	4499	899.8
IX	2x45	2x75	0	Start res.	8550	1710.0	0	Start res.	9025	1805.0
				Min.	8762	1752.4		Min.	9237	1847.4
				Max.	8912	1782.4		Max.	9387	1877.4
				End res.	8924	1784.8		End res.	9399	1879.8
II	2x60	2x60	0	Start res.	9250	1850.0	0	Start res.	9650	1930.0
				Min.	9262	1852.4		Min.	9662	1932.4
				Max.	9538	1907.6		Max.	9938	1987.6
				End res.	9549	1909.8		End res.	9949	1989.8

UTRA FDD Band	Band range [MHz]	Range res. [MHz]	Uplink UARFCN			Downlink UARFCN				
			F <sub>UL</sub> _Offset [MHz]	Assigned/Reserved	N <sub>u</sub>	F <sub>UL</sub> [MHz]	F <sub>DL</sub> _Offset [MHz]	Assigned/Reserved	N <sub>D</sub>	F <sub>DL</sub> [MHz]
I	2x60	2x60	0	Start res.	9600	1920.0	0	Start res.	10550	2110.0
				Min.	9612	1922.4		Min.	10562	2112.4
				Max.	9888	1977.6		Max.	10838	2167.6
				End res.	9899	1979.8		End res.	10849	2169.8

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## 6 Methodology used in this technical report

- ARIB provided the following technical conditions and RAN4 checked them
  - Requirements for co-existence with other technologies in Japan
  - Mandatory regulatory requirements
    - Frequency arrangement
    - Tx and Rx Spurious emission requirements
  - Other technical conditions referred in Japan's regulations
    - UE reference sensitivity level
    - Necessary changes for the relevant specifications based on the information above
- Study and check necessary changes for the relevant specifications and collect appropriate information into a TR
- Generate CRs to update the appropriate specifications and other documents
- Study any signalling issues related to UMTS1500
- Study conformance test specification for FDD UE

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## 7 Study Areas

Technical conditions of spurious emissions requirements and UE reference sensitivity level discussed in Information and Communications Council of Japan is provided in [3].

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## 8 Summary of prior contributions to set requirements for change requests

### 8.1 UMTS1500 UE

Table 8.1.1 summarises changes required for TS25.101 [10].



**Table 8.1.1: Summary of Changes required for TS25.101 and their status**

Clause	Description	CR Status	Description of change
3	Definitions	No change is proposed.	
5.2	Frequency band	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Add a new row for Band XI.
5.3	TX-RX frequency separation	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Add a new row for Band XI.
5.4.2	Channel raster	No change is proposed.	
5.4.3	Channel number	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Additional channel numbers are not defined.
5.4.4	UARFCN	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Add channel numbering for Band XI.
6.2.1	Maximum Power	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Add requirement for Band XI which is same for Band I.
6.6.2.1.1	Spectrum emission Mask	No change is proposed.	
6.6.3.1	Tx Spurious	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Add requirement for Band XI.
7.3	Reference sensitivity	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Add requirement for Band XI.
7.6.1	In band blocking	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Add requirement for Band XI.
7.6.2	Out of band blocking	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Add requirement for Band XI.
7.6.3	Narrow band blocking	No change is proposed.	
7.7	Spurious response	No change is proposed.	
7.8.1	Intermodulation	No change is proposed.	
7.8.2	Narrowband intermodulation	No change is proposed.	
7.9	Rx spurious emission	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Add requirement for Band XI.
B.2	Propagation conditions	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Add requirement for Band XI.
E.2	List of UARFCN used for UTRA FDD bands	Proposed at RAN4#44 as CR0567 in Tdoc.R4-071408.	Add channel numbering for Band XI.

Table 8.1.2 summarises changes required for TS34.121 [21].

**Table 8.1.2: Summary of Changes required for TS34.121-1, TS34.121-2, and their status**

Clause	Description	CR Status	Description of change
3	Definitions	No change is proposed.	
4.2	Frequency band	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Add a new row for Band XI.
4.3	TX-RX frequency separation	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Add a new row for Band XI.
4.4.2	Channel raster	No change is proposed.	
4.4.3	Channel number	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Additional channel numbers are not defined.
4.4.4	UARFCN	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Add channel numbering for Band XI.
5.2	Maximum Power	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Add requirement for Band XI which is same for Band I.
5.4	Output Power Dynamics in the Uplink	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Add test parameters for Band XI.
5.5	Transmit ON/OFF Power	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Add test parameters for Band XI.
5.9	Spectrum emission Mask	No change is proposed.	
5.9A	Spectrum emission Mask with HS-DPCCH	No change is proposed.	
5.11.2	Tx Spurious	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Add requirements for Band XI.
6.2	Reference sensitivity	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Add requirement for Band XI.
6.5.2.1	In band blocking	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Add requirement for Band XI.
6.5.2.2	Out of band blocking	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Add requirement for Band XI.
6.5.2.3	Narrow band blocking	No change is proposed.	
6.6	Spurious response	No change is proposed.	
6.7	Intermodulation	No change is proposed.	
	Narrowband intermodulation	No change is proposed.	
6.8	Rx spurious emission	Proposed at RAN5#36 as a CR in Tdoc.R5-072274.	Add requirement for Band XI.
8.7	Measurement Performance for UE	Proposed at RAN5#36 as a CR in Tdoc.R5-072275.	Add requirement for Band XI.
D.2.2	Propagation conditions	Proposed at RAN5#36 as a CR in Tdoc.R5-072276.	Add conditions for Band XI.
F.4.4	Requirements for support of RRM	Proposed at RAN5#36 as a CR in Tdoc.R5-072276.	Add requirement for Band XI.
Table A.6	FDD (DS) RF Baseline Implementation Capabilities	Proposed at RAN5#36 as a CR in Tdoc.R5-072398.	Add requirement for Band XI.

Table 8.1.3 summarises changes required for TS34.108 [20].

**Table 8.1.3: Summary of Changes required for TS34.108 and their status**

Clause	Description	CR Status	Description of change
5.1.1	FDD Mode Test frequencies	Proposed at RAN5#36 as a CR in Tdoc.R5-052273.	Add test frequencies for Band XI.

Table 8.1.4 summarises changes required for TS34.123 [22].

**Table 8.1.4: Summary of Changes required for TS34.123-1, TS34.123-2, and their status**

Clause	Description	CR Status	Description of change
Table 6.3	FDD Test frequencies	Proposed at RAN5#36 as a CR in Tdoc.R5-072458.	Add test frequencies for Band XI.
A.4.3.2	RF Baseline Implementation Capabilities	Proposed at RAN5#36 as a CR in Tdoc.R5-052465.	Add a new line for Band XI.

Table 8.1.5 summarises changes required for TS34.124 [15].

**Table 8.1.5: Summary of Changes required for TS34.124 and their status**

Clause	Description	CR Status	Description of change
4.4	Receiver exclusion band	Proposed at RAN4#44 as CR0027 in Tdoc.R4-071208.	Add a new line for Band XI.

## 8.2 UMTS1500 BS

Table 8.2.1 summarises changes required for TS25.104 [11].

**Table 8.2.1: Summary of Changes required for TS25.104 and their status**

Clause	Description	CR Status	Description of change
5.2	Frequency band	Proposed at RAN4#44 as CR0296 in Tdoc.R4-071409.	Add a new row for Band XI.
5.3	TX-RX frequency separation	Proposed at RAN4#44 as CR0296 in Tdoc.R4-071409.	Add a new row for Band XI.
5.4.2	Channel raster	No change is proposed.	
5.4.3	Channel number	Proposed at RAN4#44 as CR0296 in Tdoc.R4-071409.	Additional channel numbers are not defined.
6.6.2.1	Emission mask	No change is proposed.	
6.6.2.2	ACLR	Proposed at RAN4#44 as CR0296 in Tdoc.R4-071409.	Add a note for Band XI
6.6.3.1	Tx Spurious emissions	No change is proposed.	
6.6.3.2	Protection of BS receiver	Proposed at RAN4#44 as CR0296 in Tdoc.R4-071409.	Add requirement for Band XI which is same for Band I.
6.6.3.3-6.6.3.7	Co-existence requirements	Proposed at RAN4#44 as CR0296 in Tdoc.R4-071409.	Add requirement for Band XI.
7.5	Blocking	Proposed at RAN4#44 as CR0296 in Tdoc.R4-071409.	Add requirement for Band XI which is same for Band I.
7.6	Intermodulation characteristics	No change is proposed.	
7.7	Rx spurious emission	Proposed at RAN4#44 as CR0296 in Tdoc.R4-071409.	Add requirement for Band XI.
Annex B	Propagation conditions	Proposed at RAN4#44 as CR0296 in Tdoc.R4-071409.	Add requirement for Band XI.

Table 8.2.2 summarises changes required for TS25.141 [12].

**Table 8.2.2: Summary of Changes required for TS25.141 and their status**

Clause	Description	CR Status	Description of change
3.4.1	Frequency band	Proposed at RAN4#44 as CR0461 in Tdoc.R4-071205.	Add a new row for Band XI.
3.4.2	TX-RX frequency separation	Proposed at RAN4#44 as CR0461 in Tdoc.R4-071205.	Add a new row for Band XI.
3.5.2	Channel raster	No change is proposed.	
3.5.3	Channel number	Proposed at RAN4#44 as CR0461 in Tdoc.R4-071205.	Additional channel numbers are not defined.
6.5.2.1	Emission mask	No change is proposed.	
6.5.2.2	ACLR	Proposed at RAN4#44 as CR0461 in Tdoc.R4-071205.	Add a note for Band XI
6.5.3.7.1- 6.5.3.7.2	Tx Spurious emissions	No change is proposed.	
6.5.3.7.3	Protection of BS receiver	Proposed at RAN4#44 as CR0461 in Tdoc.R4-071205.	Add requirement for Band XI which is same for Band I.
6.5.3.7.4 - 6.5.3.7.8	Co-existence requirements	Proposed at RAN4#44 as CR0461 in Tdoc.R4-071205.	Add requirement for Band XI.
7.5	Blocking	Proposed at RAN4#44 as CR0461 in Tdoc.R4-071205.	Add requirement for Band XI which is same for Band I.
7.6	Intermodulation characteristics	No change is proposed.	
7.7	Rx spurious emission	Proposed at RAN4#44 as CR0461 in Tdoc.R4-071205.	Add requirement for Band XI.
Annex D	Propagation conditions	Proposed at RAN4#44 as CR0461 in Tdoc.R4-071205.	Add requirement for Band XI.

Table 8.2.3 summarises changes required for TS25.113 [14].

**Table 8.2.3: Summary of Changes required for TS25.113 and their status**

Clause	Description	CR Status	Description of change
4.5.2	Receiver exclusion band	Proposed at RAN4#44 as CR0036 in Tdoc.R4-071206.	Add a new line for Band XI.

## 8.3 Radio Resource Management

Table 8.3.1 summarises changes required for TS25.133 [13].

**Table 8.3.1: Summary of Changes required for TS25.133 and their status**

Clause	Description	CR Status	Description of change
9.1	Measurement Performance for UE	Proposed at RAN4#44 as CR0916 in Tdoc.R4-071207.	Add requirement for Band XI.
A9.1	Measurement Performance for UE (Normative Annex for Test cases)	Proposed at RAN4#44 as CR0916 in Tdoc.R4-071207.	Add requirement for Band XI.

## 8.4 Requirements on UEs supporting a release-independent frequency band

Table 8.4.1 summarises changes required for TS25.307 [16].

**Table 8.4.1: Summary of Changes required for TS25.307 (Rel.99/4/5/6/7/8) and their status**

Clause	Description	CR Status	Description of change
X.1.1	RF requirements	Proposed at RAN2#59 as CR0061 through 0066 in Tdoc.R2-073672 through R2-073677.	A new section for Band XI.
X.1.2	Signalling Requirements	Proposed at RAN2#59 as CR0061 through 0066 in Tdoc.R2-073672 through R2-073677.	A new section for Band XI.

## 8.5 Radio Resource Control (RRC) protocol

Table 8.5.1 summarises changes required for TS25.331 [17].

**Table 8.5.1: Summary of Changes required for TS25.331 and their status**

Clause	Description	CR Status	Description of change
10.3.3.21a	Measurement capability extension	Proposed at RAN2#59 as CR3069 in Tdoc.R2-073678.	A new reference for the FDD Frequency band (Band XI).
10.3.3.42a	UE radio access capability extension	Proposed at RAN2#59 as CR3069 in Tdoc.R2-073678.	A new reference for the Frequency band (Band XI).
10.3.6.35c	Frequency band indicator 2	Proposed at RAN2#59 as CR3069 in Tdoc.R2-073678.	Semantics description is changed.

## 8.6 UTRAN Iuant interface

Table 8.6.1 summarises changes required for TS25.461 [18].

**Table 8.6.1: Summary of Changes required for TS25.461 and their status**

Clause	Description	CR Status	Description of change
4.3.7	Operating bands	Proposed at RAN3#57 as CR0048 in Tdoc.R3-071349.	Add a new line for Band XI.

Table 8.6.2 summarises changes required for TS25.466 [19].

**Table 8.6.2: Summary of Changes required for TS25.466 and their status**

Clause	Description	CR Status	Description of change
Annex B	Assigned fields for additional data	Proposed at RAN3#57 as CR0013 in Tdoc.R3-071350.	Define new bit fields for Band XI

## 9 Project Plan

### 9.1 Schedule

Table 9.1.1 summarises the schedule plan for UMTS 1500.

**Table 9.1.1: Schedule plan [3]**

Item#	Effort Required	Responsibility	Schedule
1	Provide deployment scenarios for 1500 MHz DS-CDMA in Japan	ARIB <sup>*1</sup>	RAN4#42
2	Provide requirements for co-existence with other technologies in Japan	ARIB <sup>*1</sup>	RAN4#42
3	Propose necessary changes for the relevant specifications based on the information provided in #3.	ARIB <sup>*2</sup>	RAN4#43
4.1	Study and check necessary changes for the relevant specifications and collect appropriate information into a TR	RAN4	RAN4#43 - #44
4.2	Generate CRs to update the appropriate specifications and other documents.	RAN4	RAN4#43 - #44
5	Study any signalling issues related to UMTS1500	RAN2	RAN2#59
6	Study regarding conformance test specification for FDD UE	RAN5	RAN5#36 - #37

*\*1: ARIB provided RAN4 outcomes from the Information and Communications Council of Japan.*

*\*2: Individual member of ARIB may provide appropriate information or proposals based on studies at the Information and national Communications Council of Japan.*

### 9.2 Work Task Status

Table 9.2.1 summarises the work task status for UMTS 1500.

**Table 9.2.1: Work task status**

Item#	Effort Required	Responsibility	Status
1	Provide deployment scenarios for 1500 MHz DS-CDMA in Japan	ARIB <sup>*1</sup>	Completed
2	Provide requirements for co-existence with other technologies in Japan	ARIB <sup>*1</sup>	Completed
3	Propose necessary changes for the relevant specifications based on the information provided in #3.	ARIB <sup>*2</sup>	Completed
4.1	Study and check necessary changes for the relevant specifications and collect appropriate information into a TR	RAN4	Completed
4.2	Generate CRs to update the appropriate specifications and other documents.	RAN4	Completed
5	Study any signalling issues related to UMTS1500	RAN2	Completed
6	Study regarding conformance test specification for FDD UE	RAN5	Completed

*\*1: ARIB provided RAN4 outcomes from the Information and Communications Council of Japan.*

*\*2: Individual member of ARIB may provide appropriate information or proposals based on studies at the Information and national Communications Council of Japan.*

## 10 Open Issues

None.

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## Annex A (informative): Change History

**Table A.1: Change History**

<b>TSG</b>	<b>Doc</b>	<b>CR</b>	<b>R</b>	<b>Title</b>	<b>Cat</b>	<b>Curr</b>	<b>New</b>	<b>Work Item</b>
RP-37				Rel-8 version created (first published release)			8.0.0	