

「IMT - 2000

」

.

2002. 1. .

: ()

: ()

1. : IMT - 2000
 2. : 2001.01.01 2001.12.31
 3. :
 - 4.
- 가.

		1	2	3	4	5	6	7	8	9	10	11	12	
o IMT-2000														
o - Beyond IMT-2000 - ITU-R WP8F VISION - ITU-T SSG, 3GPP/3GPP2, APT IMT-2000 Forum														
o - - - o IMT-2000 WRC-2003 - Global harmonization TWIM(Terrestrial wireless interactive multimedia)														
o														
(%)		15			35			20			30			

.

1) IMT - 2000

2)

- o Beyond IMT - 2000

- o ITU-R WP8F VISION

- o ITU-T SSG, 3GPP/3GPP2, APT IMT - 2000 Forum

3)

- o

- o

- o

4) IMT - 2000 WRC - 2003

- o Global harmonization TWIM (Terrestrial wireless interactive multimedia)

5.

1) IMT - 2000

- o ITU-R WP8F IMT - 2000

2)

- o Beyond IMT - 2000

- o ITU-T SSG, 3GPP/3GPP2, APT IMT - 2000 Forum

3)

- o IMT - 2000

- o

- o

- TTA

.

4) IMT - 2000 WRC - 2003

- o Global harmonization TWIM (Terrestrial wireless interactive multimedia)
- ITU-R JTG 1-6-8-9

6.

- o IMT - 2000
- o
- o IMT - 2000 Global Circulation
- o update
- o
- o
- o WRC- 2000 IMT - 2000 , WRC- 2003
- o IMT - 2000

SUMMARY

3G is a term coined by the global cellular community to indicate the next generation of mobile service capabilities, e.g., higher capacity and enhanced network functionalities, which allow advanced services and applications, including multimedia.

IMT-2000 (International Mobile Telecommunications-2000) is the ITU globally coordinated definition of 3G covering key issues such as frequency spectrum use and technical standards .

Multiple radio technology options have been included in the IMT-2000 standard to allow seamless service evolution from the various 2G mobile standards that are extensively deployed around the world.

In this report, the results of the 5th and 6th ITU-R WP8F meeting were analyzed for preparing national standard. And the methods of IMT-2000 frequency channel arrangement were studied for more efficient use of existing and additional IMT-2000 frequency spectrum. The study results of IMT-2000 technical criteria may be provided to establish national IMT-2000 technical criteria. International activities on the definition of TTM (Terrestrial Wireless Interactive Multimedia) were considered as an agenda item of WRC-2003.

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1

IMT - 2000 ■ , , ■ 가
 ,
 ,
 .
 1999 ,
 3GPP 3GPP2 version up
 . 2000 IMT - 2000 IMT - 2000
 ITU-R Working Party
 8F가 . 2001 6 5 WP8F cdma2000 1x
 EV - DO(HDR) 가 , 10 6 IMT - 2000
 .
 , WRC- 2000 IMT - 2000 가 가 ,
 .
 , , 가 ,
 . WRC- 2000
 (TWIM) , 2000
 .
 IMT - 2000 , IMT - 2000
 , IMT - 2000 , Terrestrial Wireless Interactive Multimedia
 ITU-R .
 , 가 가
 .
 .

2 IMT - 2000

WP8F IMT - 2000 Vision Vision
Spectrum , upgrade R-TECH ,
IMT - 2000 가 Circulation ,
Developing , Satellite .

1 ITU - R WP8F 5

6 27 7 3 ITU-R WP8F
5 가 , IMT - 2000
, Beyond IMT - 2000 Vision, IMT - 2000 가
, IMT - 2000 Global Circulation

WP8F IMT - 2000 Vision Vision ,
Spectrum , Upgrade R-Tech ,
IMT - 2000 가 Circulation ,
Developing ,

1. Vision

IMT - 2000 Vision
, , 4
가 가 (2002 6).
, , ,
가 ,
가
IMT - 2000 3 ,
IMT - 2000 Upgrade

, beyond system vision ,
 3 가
 . 3
 beyond system ,
 beyond system downlink 50 100 Mbps
 .
 , IMT - 2000 , (, 3 가
 ,
 beyond system
 .
 ,
 가
 Vision ,
 beyond system
 ,
 (, 2001 10)
 , ,
 .

2.

WRC- 2000 IMT - 2000 가 가 1GHz 1.7- 2.2
 GHz , 2.5GHz ,
 plan ITU - R
 가 .
 2002 11 , preferred option

o Band 806 - 960 MHz:

- 1G 2G GSM AMPS/CDMA
- 2 3

- : 824- 849 MHz () paired with 869- 894 MHz ()
- 1 2, 3
- : 880- 915 MHz () paired with 925- 960 MHz ()
- o Band 1,710- 1,885 and 1,885- 2,025 together with 2,110- 2,200 MHz:
 - , 1,710 MHz, paired with 1,805 MHz, duplex separation of 95 MHz (GSM1800)
 - , 1,755 MHz, paired with 2,110 MHz, duplex separation of 355 MHz
 - , 1,920 MHz, paired with 2,110 MHz, duplex separation of 190 MHz
 - , 1,850 MHz, paired with 1,930 MHz, duplex separation of 80 MHz (PCS1900)
- o Band 2,500- 2,690 MHz:
 - FDD Up and Downlink, TDD
 - FDD Downlink
 - TDD
 - 가

, PCS CDMA2000 1x

IMT - 2000 가 ,

가 , PCS 90MHz

, 가 90MHz

, ITU 95MHz

가 .

3. R- Tech

2000 5 ITU-R RA IMT - 2000

, WP8F cdma2000 1x

EV - DO(HDR) 가 . 가

cdma2000 가 2.4Mbps ,

, (2001 10)

WCDMA 2001 10
 8Mbps
 (HSDPA)
 TTA 3GPP 3GPP2
 가 가
 ,
 2001 10
 3GPP 3GPP2
 ,
 2001 10
 , 1
 가 가
 .

4. Developing

IMT - 2000
 Handbook ,
 450MHz NMT450
 IMT - 2000 ,
 IMT - 2000 , 가
 ,
 450MHz IMT - 2000 가 .

5.

IMT - 2000
 , IMT - 2000 . Pre
 IMT - 2000 ,
 가 IMT - 2000
 . ICO
 ,

vision 2001 .

6. Circulation

IMT - 2000 가

M-commerce 가 , 가
가 , ,
가 , ITU-R
.

가가

, 3GPP 3GPP2가
 10 ,
가 .
 , IMT - 2000
' 가 , Operator가

IMEI(International Mobile station Equipment Identity)
가, ESN(Electronic Serial Number) 가
,
가

.
CDMA ESN
, ESN 가
.

2 ITU-R WP8F 6

'IMT - 2000 and Beyond IMT - 2000 System'

ITU-R WP8F 6 가 10 10 16
 . WRC-2000 (Identification)
 IMT - 2000 가 , IMT - 2000
 , IMT - 2000 가
 (PDNR)
 , WP8F SG8 가 11 5, 6
 , WP8F , WP
 .

1. Vision (: ())

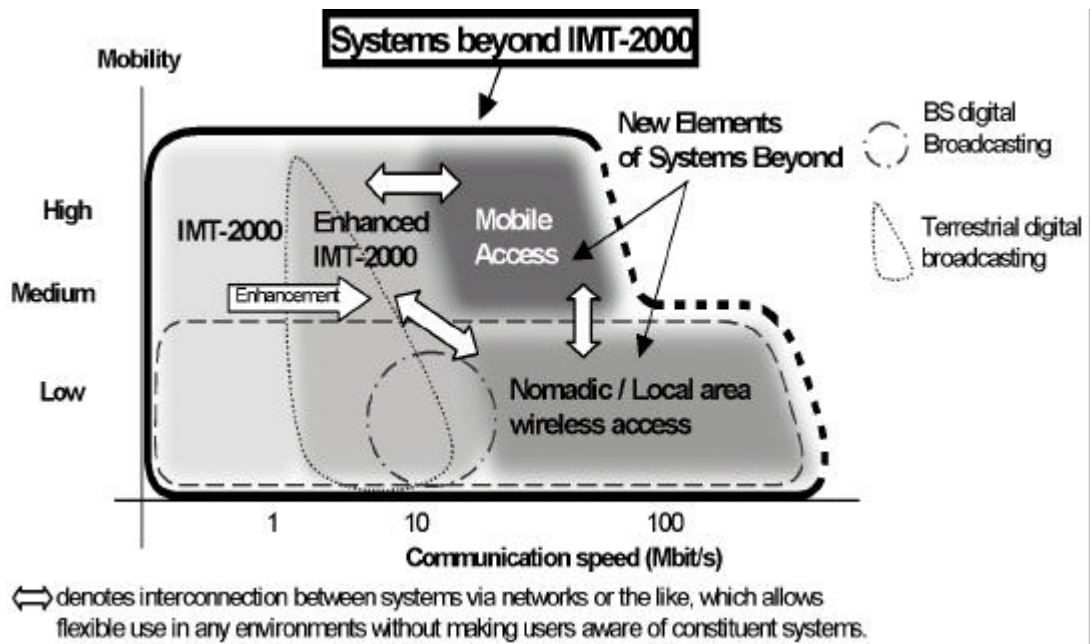
Vision IMT - 2000
 Vision , 4
 가 가 .
 4 가 .

- o Vision PDNR stablization
- o CPM
- o New PDNR
- o ITU-T

Vision PDNR(Doc. 8F/TEMP/205) WP8F 5

IMT - 2000 Systems Beyond IMT - 2000 capability
 Systems beyond IMT - 2000 4 Mobile Access

Nomatic/Local area wireless access , flexibility .

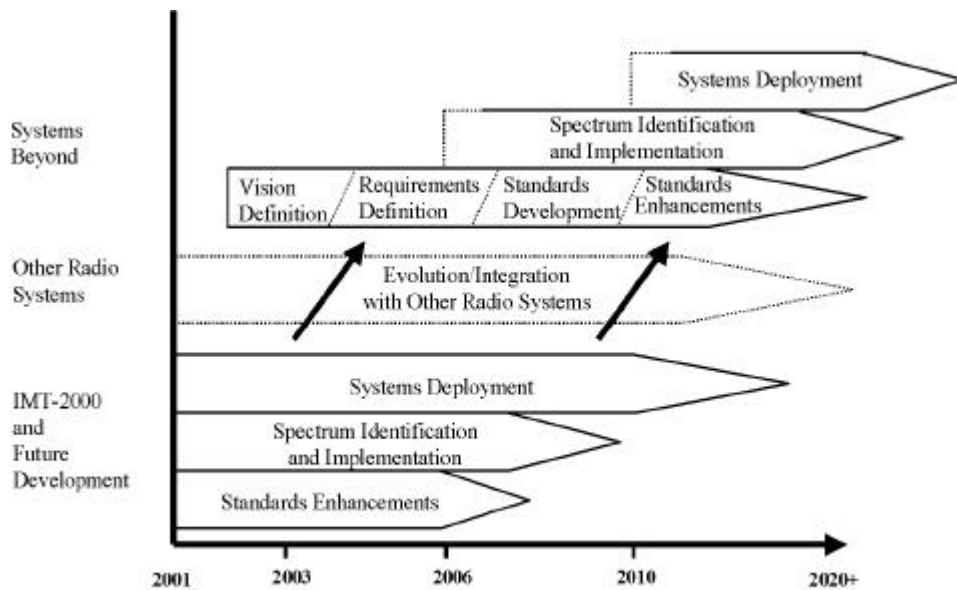


1 Illustration of Capabilities of IMT-2000 and Systems beyond

IMT - 2000 Systems Beyond timeline 3 4

Evolution/Integration with Other Radio Systems 4

3 .



2 Phases and expected timelines for future development of IMT-200 and systems beyond

- 1 : , ,
- 2 :
- 3 :

The future development of IMT-2000 and Systems beyond IMT-2000

The future development of IMT-2000 : In the context of this recommendation, the future development of IMT-2000 refers to the enhancements to its technical capabilities, range of available services and breadth of applications that will be progressively introduced during the lifetime of the system. Such enhancements will probably include inter-working with other radio systems with complementary capabilities.

Systems beyond IMT-2000 : Systems beyond IMT-2000 are those

future wireless telecommunications systems that, collectively, will provide the elements of a comprehensive telecommunications environment which includes cellular, fixed, wireless access, and nomadic access with capabilities that significantly exceed, but included, those anticipated for fully developed IMT-2000 systems and other radio systems with which they interwork.

o Vision PDNR(Vision, framework and overall objectives of the future development of IMT-2000 and of systems beyond IMT-2000) : 2002. 2.27~3.5()

o / (PDNR): PDNR [IMT-SERV], PDNR [IMT-SPEC], PDNR [IMT-SPEC], PDNR [IMT-INT], Report on Technology :

o WRC-03 CPM Text Framework : 2002. 2.27~3.5 ()

WRC-03 .

o WRC-03 1.3()

: WP8A IMT-2000 beyond IMT-2000 potential

o WRC-03 1.21 TWIM()
JTG 1-6-8-9

: JTG1-6-8-9 JRG8A/9B

o WRC-03 1.22(Future Development of IMT-2000 and Systems beyond IMT-2000)

: Vision PDNR , Vision PDNR

5 , CPM text 2

Approval

(Doc. 8F/TEMP/217)

ITU-R WP8F ITU-T SSG
R-Sector T-Sector

.

2.

가 IMT - 2000 3 (806- 960, 1710- 2200, 2500- 2690
MHz) (Frequency Arrangement) TDD

.

o TDD (8F/TEMP/ 195 Annex3)
o TDD (1800- 1920, 2010- 2025 MHz) (8F/TEMP/ 195
Annex1)

o 2.5 GHz FDD (8F/TEMP/ 195 Annex1)

o Rec. M.1036- 1

TDD/FDD 가

,

.

o BS-BS

, , , () Trade-off 가

o 1) , 2) Co-Planning, 3)

, 4) ,

o MS-BS, MS-MS

Deterministic 가 가

TDD/FDD 가 TDD

FDD , TDD/FDD

,

가

Issues IMT - 2000 HAPS ,

Preferred Option

o 806~960 MHz : 5 (2001. 6)

- : 824- 849 / 869- 894 MHz paired

- / : 880- 915 / 925- 960 MHz paired

o 1710 - 1885MHz 1885 - 2025, 2110 2200 MHz

- 1920 MHz(MS) paired with 2110 MHz(BS) (duplex
separation of 190 MHz : IMT - 2000)

- 1710 MHz(MS) paired with 1805 MHz(BS)(duplex
separation of 95 MHz : GSM1800)

- 1850 MHz(MS) paired with 1930 MHz(BS)(duplex
separation of 80 MHz : PCS1900)

- 1755 MHz(MS) paired with 2110 MHz(BS)(duplex
separation of 355 MHz : 가)

- 1710 MHz(MS) paired with 2110 MHz(BS)(duplex
separation of 400 MHz : 가)

o 2 500~2 690 MHz(A,B, C, D 4)

- FDD Up and Downlink(A, D), TDD (B, C)

- FDD Up and Downlink(A, D), FDD Downlink (B,C)

- FDD downlink(A, B), TDD (C, D)

- TDD (A,B,C,D)

- FDD Downlink (A,B,C,D

- 1710-2200 MHz TDD

o 1880- 1920, 2010- 2025 MHz

- o 1910- 1930 MHz (PCS)
- FDD/TDD Frequency Arrangement가 , Rec. M.1036- 1 1 .
- IMT - 2000 (FDD TDD) 2002 2 , .
- o BS-BS 5 , , , () Trade-off 가
- o , Co-Planning, , ,
- o MS-BS, MS-MS Deterministic 가 가 (Sharing studies and related issues) .
- o IMT - 2000 (,) IMT - 2000 ()
- o PDNR on characteristics of terrestrial IMT-2000 systems for frequency sharing/interference analysis between IMT-2000 systems and other systems/services TD-SCDMA 가 가 (Doc. 8F/TEMP/ 177)
- o Draft Report on Compatibility Study between IMT - 2000(W - CDMA 1800 MHz) Downlink and GSM 1900 Uplink(Output: 8F/TEMP/ 174) : W - CDMA(1710- 1755/ 1800- 1845 MHz) PCS GSM- 1900(1850- 1910/ 1930- 1990 MHz) : 2002. 6
- o ITU- R WP9B ITU- T SSG IMT - 2000 IMT - 2000 backhaul (liaison) (Doc. 8F/TEMP/ 189) : IMT - 2000 (2500~2520,

2570~2590 MHz) WP8D 가

o HAPS (WRC- 2003 Agenda 1.33)

HAPS IMT - 2000 HAPS
(S5.588A) : IMT - 2000

HAPS ,
PDNR()

o WRC- 2000 3 2630~2655 MHz
() IMT - 2000
(WRC- 03 agenda 1.34) : JRG 6S- 9D WP8F

ITU- R F.1336- 1 IMT - 2000 BS

o CPM Text : WRC- 2003 가 IMT - 2000
1.22 1.33 CPM Text

3. R- TECH (Shumin Cao ())

3GPP Release 5 2002 3 , Release 5
SDO M.1457
4 1 5 31 .
IMT - 2000 DS HSDPA ,
IMT - 2000 MC 1xEVDO, 1xEVDV ,
11 SG8 .
(Adaptive Antenna) WG Vision
.

. Circulation (: Pekka Lansman())

IMT - 2000
Circulation PDNR IMT .[UNWANT]

IMT-[RCIRC] 2 , 3

SG8 .

- o (PDNR : ITU-R.M[IMT.UNWANT-MS]) IMT-2000
(Doc. 8F/TEMP/171(Rev.2))
- o (PDNR : ITU-R.M[IMT.UNWANT-BS]) IMT-2000
(Doc. 8F/TEMP/172(Rev.2))
- o (PDNR : ITU-R[IMT.RCIRC])IMT-2000
(Doc. 8F/TEMP/175(Rev.1))

3 ITU-R SG8

SG8 , ,
Study Group , Working Party
RA . 1 WP
WP
WP
가
, SG
SG8 4 WP 1 JRG 가 .

WPs		
8A	Land mobile service excluding IMT - 2000; amateur and amateur-satellite service	
8B	Maritime mobile service including Global Maritime Distress and Safety System (GMDSS); aeronautical mobile service and radiodetermination service	
8D	All mobile-satellite services and radiodetermination - satellite service	
8F	International Mobile Telecommunications-2000 and systems beyond IMT - 2000	
JRG8A - 9B	Wireless access systems	

1 ITU-R SG8

2001 SG8

1. SG

ITU-R 가 ,
가 , IP
, 가 SG8
SG9 5 WP . ITU
SG 가 2002 RAG
.

SG & WPs()		
SG x	Terrestrial Wireless Systems	
WP[1]	IMT -2000(and beyond) radio aspects	WP8F
WP[2]	Fixed wireless system	WP 8A - 9B , WP9A, 9B
WP[3]	Sharing studies in Terrestrial Systems	WP9D
WP[4]	HF systems, aeronautical and maritime mobile	W P 9 C , SG8
WP[5]	TICS (Transport Information and Control Systems), PMR (Public Mobile Radio), amateur, radiodetermination	WP8A, 8B
	JWP4-9S =>JWP4- [A], WP8D ->SG4	

2 SG8 SG9 SG

2. Working Party 8A

(Ultra Wide Band Technology)

Preliminary draft question

SG1

2002 5 WP8A

WP8A PDNR(Preliminary Draft New Recommendation)

- ITU-R M.[LMS.CHAR]:Typical values of land mobile radio system technical characteristics to be used for frequency sharing study in certain bands below 3 GHz
- ITU-R M.[LMS.MONT]: Interference protection of terrestrial mobile service systems using Mont Carlo simulation with application to frequency sharing
- Sharing studies
- Spectrum requirements and preferred frequency bands above 275 MHz for Amateur and Amateur-Satellite Services
- Adaptive Antennas for Mobile Systems
- Radiocommunication requirements of next generation intelligent

transportation systems radiocommunications

2 (Question) 가

Q.67- 1/8 Multi-transmitter radio systems using quasi-synchronous (simulcast) transmission in the land mobile service, Q.202/8 Technical and operational requirements for multimode mobile radio stations .

3. Working Party 8B

WP8B 5 , 10 2 125 , JT G4-7-8-9 , (DSC, Digital Selecting Calling), identities, , CPM . , , .

4. Working Party 8D

3 , 3 , 3 , MSS , WRC-02 CPM text 2002 5 .

5. Working Party 8F

WP8F 6 3 1 .

WP , 3 .

			WP	
1	Draft revision of Recommendation M.1457-1-Detailed specifications of the radio interfaces of International Mobile Telecommunications-2000	/	8F	Adopted
2	Draft revision of Recommendation ITU-R M.1450 Characteristics of Broadband Radio Local Area Networks(RLANs)	/	8A	Adopted
3	Draft new Recommendation ITU-R M.[IMT-RCIRC] Global circulation of IMT-2000 terminals	/	8F	Adopted
4	Draft new Recommendation ITU-R M.[IMT-UNWANT-BS] Generic unwanted emission characteristics of base stations using the terrestrial radio interfaces of IMT-2000	/	8F	Adopted
5	Draft new Recommendation ITU-R M.[IMT-UNWANT-MS] Generic unwanted emission characteristics of mobile stations using the terrestrial radio interfaces of IMT-2000	/	8F	Adopted
6	Draft Revision of Recommendation ITU-R M.1182-Integration of Terrestrial and Satellite Mobile Communication System	/	8A	W P 8 F
7	Draft revision of Recommendation ITU-R M.1453 Transport Information and Control Systems-Dedicated short range communications at 5.8GHz	/	8A	Adopted
8	Draft new Recommendation ITU-R M.[MLS-RNSS] Method for determining coordination distances, in the 5 GHz bands, between the international standard microwave landing system stations operating in the aeronautical radionavigation service and stations of the radionavigation satellite service(earth-to-space)	/	8D	Adopted
9	Draft revision of Recommendation ITU-R M.1089- Technical considerations for the coordination of mobile- satellite systems relating to the aeronautical mobile- satellite (R) service(AMS(R)S) in the bands 1545- 1555MHz and 1646.5- 1656.5MHz	/	8D	Adopted
10	Draft new Recommendation ITU-R M.[AAA]- Methodology for computation of separation distances between earth stations of the radionavigation-satellite service(earth-to-space) and radars of the radiolocation service and the aeronautical radionavigation service in the frequency band 1300- 1350 MHz	/	8D	Adopted
11	Draft new Recommendation ITU-R M.[Non-GSO/RA] Interference calculations between Non-GSO MSS or RNSS satellite systems and radio astronomy telescope sites	/	8D	Adopted

3 2001 SG8 .

			AAP		
new	Technical and operational characteristics for packet network transmission in MSS				
Q.205- 1/8	Transport Information and Control Systems(TICS)		no	S2	
Q. 110/8	Interference to the aeronautical mobile-satellite(R) service		AAP	S2	
Q. 211/8	Q. 211/8 - Interference criteria and calculation method for the mobile-satellite(R) service(MSS)		AAP	S1	
Q. 83-3/8	efficient use of the radio spectrum and frequency sharing within the mobile-satellite service(MSS)		AAP	C2	
Q.67- 1/8	Multi-transmitter radio systems using quasi-synchronous(simulcast) transmission in the land mobile service				
Q.202/8	Technical and operational requirements for multimode mobile radio stations				

4 2001 SG8 . .

3 IMT - 2000

IMT - 2000 , 가
 IMT - 2000 , IMT - 2000
 , IMT - 2000
 TDD FDD .
 PCS
 PCS 가
 . PCS가 ITU
 Migration
 .
 ITU 2001. 10 IMT - 2000
 PCS
 가 Spurious level . ITU
 IMT - 2000
 가 . IMT - 2000
 PCS IMT - 2000
 .
 ITU
 IMT - 2000 TDD FDD
 가 가 .

1 IMT - 2000

WARC-92 230 MHz
 2010 IMT - 2000
 가 WRC-2000 .
 , ITU-R

1. IMT - 2000

가.

Doc 8F/TEMP/104

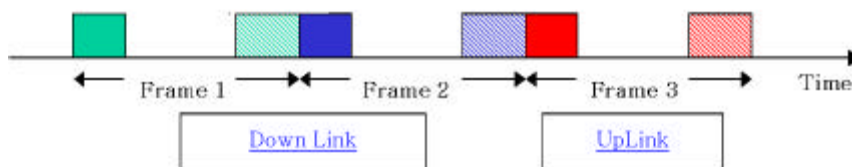
(1)

가 IMT - 2000 Uplink
Downlink , 가

(가) TDD Asymmetry

가 TDD

Down Link Frame 1 2
Uplink Frame 3 Frame

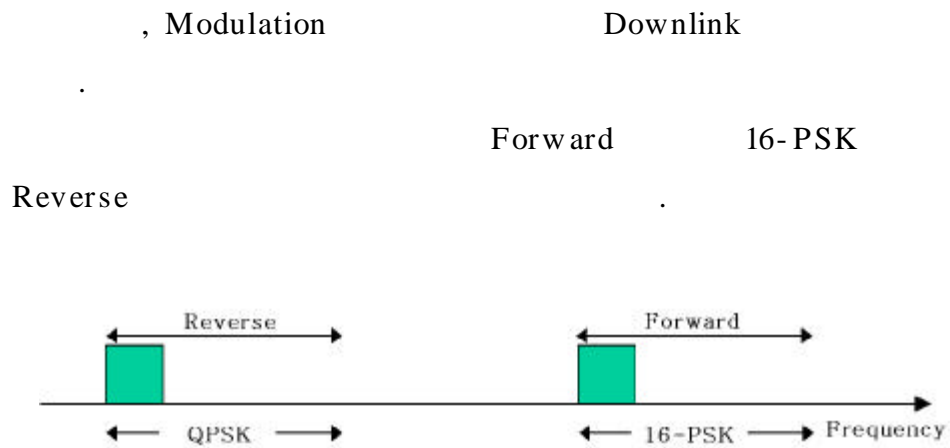


3 TDD Asymmetry

() Modulation Asymmetry

FDD

Forward/Reverse

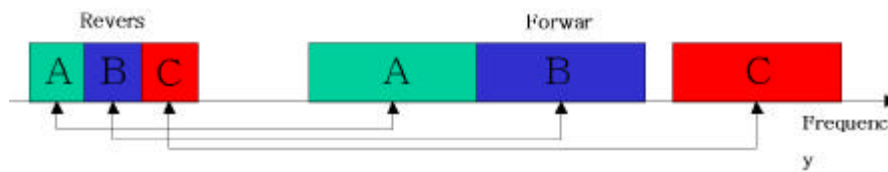


4 Modulation asymmetry

() Block Asymmetry

Downlink

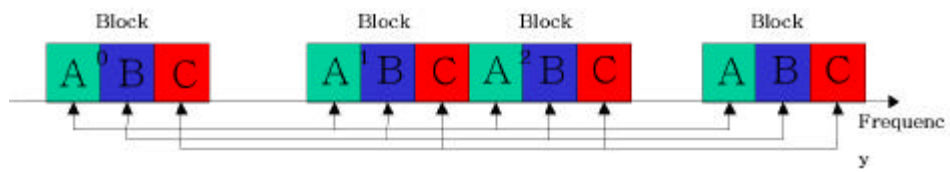
(i) 1



5 Block Asymmetry - 1

A/B/C FDD Separation (Duplexing)
가가

(ii) 2



6 Block Asymmetry - 2

A/B/C FDD Separation, 가
Near-Far 가 .

(2) Duplex Direction

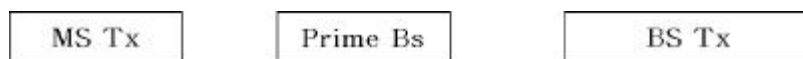
, IMT - 2000
PCS ,
가 가 . FDD
Uplink
가

Duplex Direction .

FDD
Block Asymmetry

(3) Duplex Separation and Transmit/Receive band separation

Duplex Separation 가
가
가 가
.



BS/MS , 가 가

가 가 .

(4)

가

.

,

가

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가

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(5) Evolution from 2nd Generation

WRC- 2000

IMT - 2000

가

2

가

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2

WP8F

,

IMT - 2000

가

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(6)

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가

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가

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WP8F(WG SPEC)

TG8/1

WP8F

Spectrum Working Group

가

가

FDD

TDD

9

,

WP8F

Document	WP 8F Meeting			
	6th 10/ 10/ 01- 16/ 10/ 01	7th 27/ 02/ 02- 05/ 03/ 02	8th 29/ 05/ 02- 4/ 06/ 02	9th 25/ 09/ 02- 01/ 10/ 02
Questions / Answers				
Frequency arrangement (Rec. M.1036)				
Rec. M.1036- 1				
FDD/TDD (Draft Report).				

5

(1) /
2 ,
, Duplex TDD
가 , 1036 Document가 FDD
, , (Array.com),
TDD 가
.
1036 TDD
TDD 가 . TDD
IMT - 2000 FDD
,
. TDD TDD
가 .

(2)
WRC- 2000 IMT - 2000 3

preferred Option 5 6 .

(가) 806 - 960 MHz

: 824-849 / 869-894 MHz paired

/ : 880-915 / 925-960 MHz paired

() 1710 - 1885 and 1885 - 2025, 2110-2200 MHz

1920 MHz(MS) paired with 2110 MHz(BS)

(duplex separation of 190 MHz : IMT - 2000)

1710 MHz(MS) paired with 1805 MHz(BS)

(duplex separation of 95 MHz : GSM1800)

1850 MHz(MS) paired with 1930 MHz(BS)

(duplex separation of 80 MHz : PCS1900)

1755 MHz(MS) paired with 2110 MHz(BS)

(duplex separation of 355 MHz : 가)

1710 MHz(MS) paired with 2110 MHz(BS)

(duplex separation of 400 MHz : 가)

, 가

() 2500-2 690 MHz (A,B, C, D 4)

FDD Up and Downlink(A, D), TDD (B, C)

FDD Up and Downlink(A, D), FDD Downlink (B,C)

FDD downlink(A, B), TDD (C, D)

TDD (A,B,C,D)

FDD Downlink (A,B,C,D

() 1710-2200 MHz TDD

1880- 1920, 2010-2025 MHz

1910- 1930 MHz (PCS)

PCS

WP8F

Preferred Option

가

가 . Variable Duplex 가 .

2 IMT - 2000

가.Unwanted Spurious Emission ITU-R

(1) Mobile Station

6

가. Unwanted Spurious Emission에 대한 ITU-R 권고안

(1) Mobile Station

CDMA DS (UTRA FDD)		CDMA2000 Multi-Carrier						CDMA TDD (UTRA TDD)		
Spectrum Emission Mask		Spectrum Emission Mask			Spectrum Emission Mask			Spectrum Emission Mask		
Δf		Δf (SR 1)			Δf (SR 3)			Δf (3.84Mcps TDD Option)		
2.5~3.5MHz	-33.5 - 15×(Δf -2.5)dBc/30kHz	1.25~1.98MHz		-42dBc/30kHz or -54dBm/1.23MHz	2.5~2.7MHz	-14dBm/30kHz		2.5~3.5MHz	-33.5 - 15×(Δf -2.5)dBc/30kHz	
	-33.5 ~-48.5dBc/30kHz								-33.5 ~-48.5dB/30kHz	
3.5~7.5MHz	-33.5 - 1×(Δf -3.5)dBc/1 MHz	1.98~2.25MHz		-50dBc/30kHz or -54dBm/1.23MHz	2.7~3.5MHz	-[14 + 15×(Δf -2.7)dBm/30kHz		3.5~7.5MHz	-33.5 - 1×(Δf -3.5)dBc/1 MHz	
	-33.5 ~-37.5dBc/1 MHz					-14 ~-26dBm/30kHz			-33.5 ~-37.5dB/1 MHz	
7.5~8.5MHz	-37.5 - 10×(Δf -7.5)dBc/1 MHz	2.25~4MHz		-[13+1×(Δf -2.25)dBm/1 MHz	3.08MHz	-33dBc/3.84MHz		7.5~8.5MHz	-37.5 - 10×(Δf -7.5)dBc/1 MHz	
	-37.5 ~-47.5dBc/1 MHz			-13 ~-14.75dBm/1 MHz					3.5~7.5MHz	-[13 + 1×(Δf -3.5)dBm/1 MHz
8.5~12.5MHz	-47.5dBc/1 MHz	>4MHz	9kHz< f < 150 kHz	-36dBm/1 kHz		-13 ~-17dBm/1 MHz		8.5~12.5MHz	-47.5dBc/1 MHz	
ACLR			150kHz< f < 30MHz	-36dBm/10kHz	7.5~8.5MHz	-[17 + 10×(Δf -7.5)dBm/1 MHz		>12.5MHz	9kHz< f < 150 kHz	-36dBm/1 kHz
5MHz	32.2dB		30MHz< f < 1 GHz	-36dBm/100kHz		-17 ~-27dBm/1 MHz			150kHz< f < 30MHz	-36dBm/10kHz
10MHz	42.2dB		1GHz< f < 12.5GHz	-30dBm/1 MHz	8.08MHz	-43dBc/3.84MHz			30MHz< f < 1 GHz	-36dBm/100kHz
Spurious Emissions						8.5~12.5MHz	-27dBm/1 MHz			1GHz< f < 12.5GHz
9kHz≤ f < 150 kHz	-36dBm/1 kHz				>12.5MHz	9kHz< f < 150 kHz	-36dBm/1 kHz			
150kHz≤ f < 30MHz	-36dBm/10kHz					150kHz< f < 30MHz	-36dBm/10kHz	ACLR		
30MHz≤ f < 1 GHz	-36dBm/100kHz					30MHz< f < 1 GHz	-36dBm/100kHz	5MHz	32.2dB	

1GHz≤f<12.75GHz	-30dBm/1MHz					1GHz<f<12.5GHz	-30dBm/1MHz	10MHz	42.2dB	
Additional Spurious Emissions		Additional Spurious Emissions			Additional Spurious Emissions			Additional Spurious Emissions		
1893.5MHz<f<1919.6MHz	-41dBm/300kHz	1893.5MHz<f<1919.6MHz	-41dBm/300kHz		1893.5MHz<f<1919.6MHz	-41dBm/300kHz		925MHz≤f≤935MHz	-67dBm/100kHz	
925MHz≤f≤935MHz	-67dBm/100kHz	925MHz≤f≤935MHz	-67dBm/100kHz		925MHz≤f≤935MHz	-67dBm/100kHz		935MHz<f≤960MHz	-79dBm/100kHz	
935MHz<f≤960MHz	-79dBm/100kHz	935MHz<f≤960MHz	-79dBm/100kHz		935MHz<f≤960MHz	-79dBm/100kHz		1805MHz≤f≤1880MHz	-71dBm/100kHz	
1805MHz≤f≤1880MHz	-71dBm/100kHz	1805MHz≤f≤1880MHz	-71dBm/100kHz		1805MHz≤f≤1880MHz	-71dBm/100kHz				

표 6 Unwanted Spurious Emission에 대한 ITU-R 권고안 - Mobile Station

나. Base Station

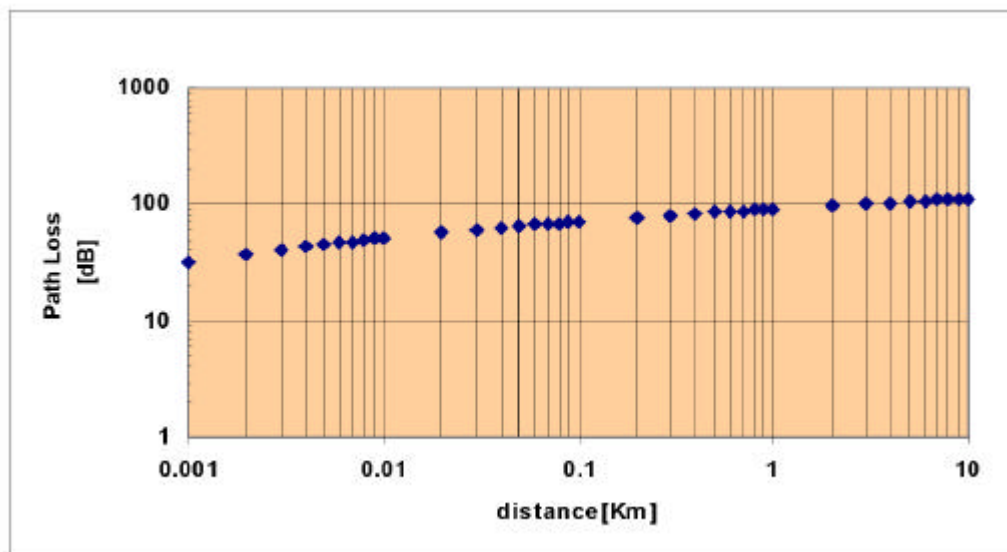
CDMA DS (UTRA FDD)						CDMA2000 Multi-Carrier		CDMA TDD (UTRA TDD)					
Spectrum Emission Mask						Spectrum Emission Mask		Spectrum Emission Mask					
Δf	F_offset	P≥43dBm	39≤P<43	31≤P<39	P<31	Δf		f_offset	P≥43dBm	39≤P<43	31≤P<39	P<31	
2.5~2.7MHz	2.515~2.715MHz	-	작동	P-51.5dBm/30kHz	-20.5dBm/30kHz	885kHz~1.25MHz	-45dBc/30kHz	2.515~2.715MHz	-	작동	P-51.5dBm/30kHz	-20.5dBm/30kHz	
2.7~3.5MHz	2.715~3.515MHz	-12.5dBm/30kHz	작동	P-51.5dBm/30kHz	-20.5dBm/30kHz	1.25~1.45MHz	-13dBm/30kHz	2.715~3.515MHz	-12.5dBm/30kHz	작동	P-51.5dBm/30kHz	-20.5dBm/30kHz	
		-12.5~24.5dBm/30kHz		P-51.5dBm/30kHz	-20.5~32.5dBm/30kHz	1.45~2.25MHz	-[13-17×(Δf-1.45)]dBc/30kHz		-12.5~24.5dBm/30kHz		P-51.5dBm/30kHz	-20.5~32.5dBm/30kHz	
3.5~7.5MHz	3.515~4MHz	-24.5dBm/30kHz	작동	P-63.5dBm/30kHz	-32.5dBm/30kHz		-13~-26.6dBm/30kHz	3.515~4MHz	-24.5dBm/30kHz	작동	P-63.5dBm/30kHz	-32.5dBm/30kHz	
		-		P-	-	2.25~4MHz	-13dBm/1MHz		-		P-	-	
	4~8MHz	-	작동	P-	-			4~8MHz	-	작동	P-	-	

		11.5dBm/1MHz		50.5dBm/1MHz	19.5dBm/1MHz				11.5dBm/1MHz		50.5dBm/1MHz	19.5dBm/1MHz	
7.5MHz~	8MHz~12.5MHz or UMTS Tx Edge	-11.5dBm/1MHz	P-54.5dBm/1MHz	P-54.5dBm/1MHz	-23.5dBm/1MHz	>4MMz (ITU Category A/Category B)			8MHz~12.5MHz or UMTS Tx Edge	-11.5dBm/1MHz	P-54.5dBm/1MHz	P-54.5dBm/1MHz	-23.5dBm/1MHz
						9kHz<f<150kHz	-13/-36dBm/1kHz				ACLR (3.84Mcps TDD Option)		
Spurious Emissions (Category A)		PHS		ACLR		150kHz<f<30MHz	-13/-36dBm/10kHz	Spurious Emissions (Category A)			5MHz	44.2dBc	
9kHz<f<150kHz	-36dBm/1kHz	1893.5~1919.6MHz		5MHz	44.2dBc	30MHz<f<1GHz	-13/-36dBm/100kHz	9kHz<f<150kHz	-36dBm/1kHz		10MHz	54.2dBc	
150kHz<f<30MHz	-36dBm/10kHz	-41dBm/300kHz		10MHz	49.2dBc	1GHz<f<12.5GHz	-13/-30dBm/1MHz	150kHz<f<30MHz	-36dBm/10kHz		ACLR (1.28Mcps TDD Option)		
30MHz<f<1GHz	-36dBm/100kHz					1.885MHz	-45dBc/1.23MHz	30MHz<f<1GHz	-36dBm/100kHz		1.6MHz	39.2dBc	
1GHz<f<12.5GHz	-30dBm/1MHz					3.135MHz	-50dBc/1.23MHz	1GHz<f<12.5GHz	-30dBm/1MHz		3.2MHz	49.2dBc	
Spurious Emissions (Category B)		GSM900	DCS1800	Adjacent Band	UTRA TDD	Additional Emission (Category B)		Spurious Emissions (3.84Mcps, Category B)		GSM900	DCS1800	Adjacent Band	UTRA TDD
9kHz≤f<150kHz	-36dBm/1kHz	921~960MHz	1805~1880MHz	2100~2105MHz	1900~1920MHz	921~960MHz	-57dBm/100kHz	9kHz≤f<150kHz	-36dBm/1kHz	921~960MHz	1805~1880MHz	2100~2105MHz	1900~1920MHz
150kHz≤f<30MHz	-36dBm/10kHz	-57dBm/100kHz	47dBm/100kHz	-30+3.4(f-2100)dBm/1MHz	-52dBm/1MHz	1805~1880MHz	-47dBm/100kHz	150kHz≤f<30MHz	-36dBm/10kHz	-57dBm/100kHz	47dBm/100kHz	-30+3.4(f-2100)dBm/1MHz	-52dBm/1MHz
30MHz≤f<1GHz	-36dBm/100kHz			-30~-47dBm/1MHz		1900~1920MHz	-52dBm/1MHz	30MHz≤f<1GHz	-36dBm/100kHz			-30~-47dBm/1MHz	
1GHz≤f<F _c 1-60MHz or 2.1GHz	-30dBm/1MHz					2010~2025MHz	-52dBm/1MHz	1GHz≤f<F _c 1-60 or F _c -10MHz	-30dBm/1MHz				

. Unwanted Spurious Emission

IMT Cellular/PCS
 , ITU-R IMT - Unwanted Spurious Emission
 Cellular(800MHz) PCS(1.8GHz)
 IMT 가 Cellular PCS 가
 . , MS - 30dBm/ 1MHz,
 BS - 13dBm/ 1MHz Noise IMT Cellular
 PCS .
 , IMT / Cellular PCS
 Spurious Cellular PCS
 IMT Spurious
 가 .
 (가)IMT / 가 Cellular, PCS /
 가 , 가
 3m/ 10m 가 Free-space Loss
 .
 () Cellular PCS / ,
 Cellular PCS /
 (Noise) .
 () Link Budget IMT /
 Cellular PCS /
 .
 가.

$$L=32.44+20\text{Log}(f/\text{MHz})+20\text{Log}(d) \quad d=\text{km}$$



7

IMT / 가 Cellular, PCS /
가 가 .
IMT Cellular/PCS , , IMT - 2000
Cellular/PCS 10m 가
, IMT Cellular/PCS 3m
가 .
.

		Path Loss (dB)
800 MHz (Cellular)	3m	40 dB
	10m	50 dB
1.8 GHz (PCS)	3m	47 dB
	10m	57 dB

8 IMT-2000 Cellular/PCS ,

(2) Cellular PCS

가 Noise

Coverage Capacity

$$\frac{E_b}{N_t} = \frac{\frac{p}{R}}{N_o N F B + \frac{A}{W} + \frac{(N-1)(1/F)vp}{W}}$$

E_b :

N_t :

p : (W)

R : Data Rate

N_o :

N :

W : Chip Rate

v :

NF_B : Noise Figure

A : Noise Injection Level

가 Noise

Capacity

8

Parameter

$E_b/N_t = 6\text{dB}$

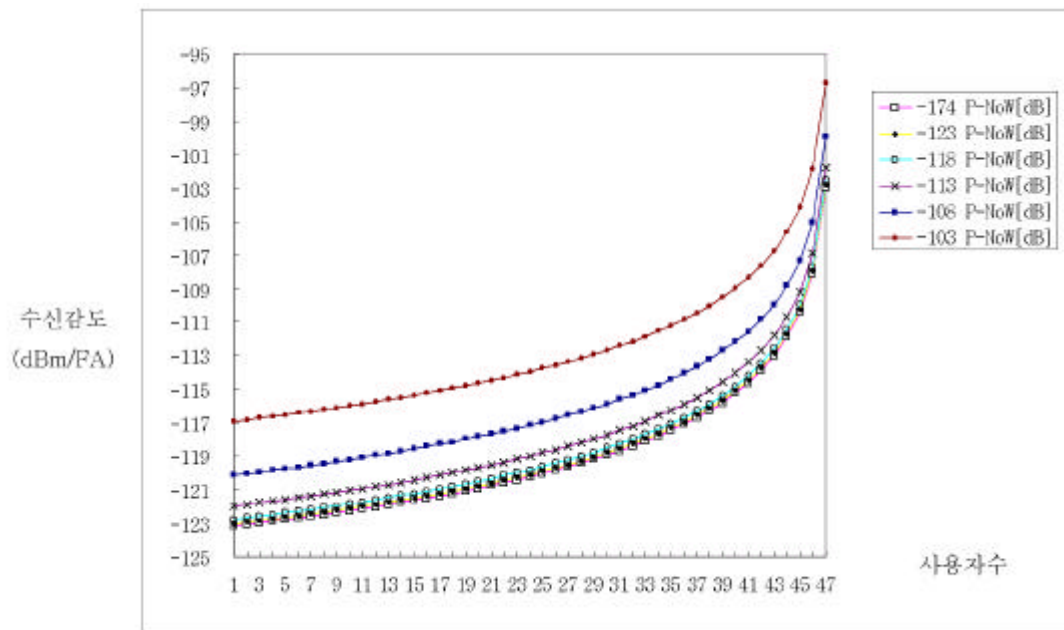
$R = 9600 \text{ bps}$

$N_o : -113.1\text{dBm}/1.23\text{MHz}$

$W = 1.2288\text{Mcps}$

$v = 0.45$

$NF_B = 5\text{dB}$



8 가 Noise capacity

(가 Noise
 = -174dBm /FA) -123dBm/FA (가 = 1)
 , Noise가 가 가
 . , 가 Noise가 -118dBm/FA
 1dB -108dBm/FA 3dB
 .
 , 가 Noise
 .
 Cell 5 가 가 가 ,
 가
 Parameter .

#of user		5
the bandwidth	Hz	1228800
frequency reuse factor		0.65
the channel voice activity factor		0.45
the bit rate of the traffic channel	bps	9600.00
the bit rate of the reverse traffic channel	bps	9600.00
the bit rate of the paging channel	bps	9600.00
the bit rate of the sync channel	bps	1200.00
the total base station ERP	dBm	46.56386862
the ERP of all traffic channels	dBm	41.41485089
the ERP of the traffic channel	dBm	36.64363834
the ERP of the pilot channel	dBm	43.33271337
the ERP of the sync channel	dBm	33.2938166
the ERP of the paging channel	dBm	38.92250539
propagation path loss	dB	- 140
lognormal shadow loss	dB	- 6.2
the total mobile received power	dBm	- 102.6361314
the received power of traffic channel	dBm	- 112.5563617
the received power of the pilot channel	dBm	- 105.8672866
the received power of the sync channel	dBm	- 115.9061834
the received power of the paging channel	dBm	- 110.2774946
Traffic Eb/Nt	dB	8.249067178
Pilot Ec/Io	dB	- 6.469451691
Sync Eb/Nt	dB	13.74656933
Paging Eb/Nt	dB	10.7755268
Reverse Traffic Eb/Nt	dB	12.70913698

9 5 가

9 5 가 가 Cell , 가
- 102dBm/FA , CH Eb/Nt
. Noise가 가
가 (CH Eb/Nt)
10 .
10 가 Noise가 (Cell 5 가
) CH Eb/Nt - 100dBm/FA 가 Noise
가 3dB .

Noise Injection	Traffic Eb/Nt	Pilot Ec/Io	Sync Eb/Nt	Paging Eb/Nt
Without Noise	8.25	- 6.46	13.75	10.78
- 113dBm/FA	8.05	- 6.65	13.56	10.57
- 110dBm/FA	7.87	- 6.82	13.38	10.37
- 107dBm/FA	7.52	- 7.15	13.04	10.01
- 104dBm/FA	6.9	- 7.73	12.44	9.36
- 101dBm/FA	5.87	- 8.7	11.44	8.29
- 100dBm/FA	5.42	- 9.1	11	7.83
- 98dBm/FA	4.35	- 10.1	9.95	6.73

10 9 Noise 가 가

(3) IMT /

'Cellular PCS /
IMT
Cellular/PCS Spurious Emission Level
, IMT 가 Cellular/PCS
IMT 가 Cellular/PCS
IMT Cellular/PCS
가Noise ,
IMT /

$$P_t = P_r - G_t - G_r - (Path Loss)$$

Pt : IMT ,

Pr : Cellular/PCS , (가Noise)

Gt : IMT ,

Gr : Cellular/PCS ,

Path Loss :

(Tx Band Rx Band)	Pr	Path Loss	Gt	Gr	Pt (1.23MHz)
IMT BS Cellular BS	- 108dBm	- 50dB	15dB	15dB	- 88dBm
IMT BS Cellular MS	- 100dBm	- 50dB	15dB	0dB	- 65dBm
IMT MS Cellular BS	- 108dBm	- 50dB	0dB	15dB	- 73dBm
IMT MS Cellular MS	- 100dBm	- 40dB	0dB	0dB	- 60dBm
IMT BS PCS BS	- 108dBm	- 57dB	15dB	15dB	- 81dBm
IMT BS PCS MS	- 100dBm	- 57dB	15dB	0dB	- 58dBm
IMT MS PCS BS	- 108dBm	- 57dB	0dB	15dB	- 66dBm
IMT MS PCS MS	- 100dBm	- 47dB	0dB	0dB	- 53dBm

11 IMT-2000 /

, 3.2.1 IMT Cellular/PCS 10m 가 , IMT Cellular/PCS 3m 가 . , Cellular/PCS 3dB 가 Noise (Pr) , Cellular/PCS 5 가 가 CH Eb/Nt 3dB (Pr) (3.2.2), Cellular PCS , IMT 가 Cellular/PCS Noise . Path Loss 가 , 가 .

Unwanted

, IMT

Spurious Emission ITU-R

, Cellular PCS

ITU-R

	Measurement Frequency	Emission Level	Measurement Bandwidth	Victim Band
Base Station	824- 849MHz	- 89dBm	1MHz	Cellular BS Receive Band
	869- 894MHz	- 66dBm	1MHz	Cellular MS Receive Band
	1750- 1780MHz	- 82dBm	1MHz	PCS 1800 BS Receive Band
	1840- 1870MHz	- 59dBm	1MHz	PCS 1800 MS Receive Band
Mobile Station	824- 849MHz	- 74dBm	1MHz	Cellular BS Receive Band
	869- 894MHz	- 61dBm	1MHz	Cellular MS Receive Band
	1750- 1780MHz	- 67dBm	1MHz	PCS 1800 BS Receive Band
	1860- 1870MHz	- 54dBm	1MHz	PCS 1800 MS Receive Band

12 Cellular/PCS

IMT- 2000

/

IMT

Cellular PCS

가

, , Cellular PCS

IMT - 2000

가

Cellular PCS

cdma20001x, 1xEVDO 1xEVDV

가

(4) Global Circulation ITU-R

Global Circulation IMT - 2000

4 TWIM (Terrestrial wireless interactive multimedia)

2000 5 WRC-2000 , ,
 ■ (TWIM : Terrestrial
 Wireless Interactive Multimedia) " 가
 WRC-2003 (1.21)¹⁾ .
 CPM2003- 1(2000.6) ITU-R (SG1,
 SG6, SG8, SG9) Joint Task Group 1-6-8-9
 .
 2000 10 1 JT G 1-6-8-9 ,
 2001 10 2 .

1 1 (2000.10)

2000 10 1 JT G 1-6-8-9 WRC-2003
 1.21 TWIM CPM 7.1 , TWIM
 9

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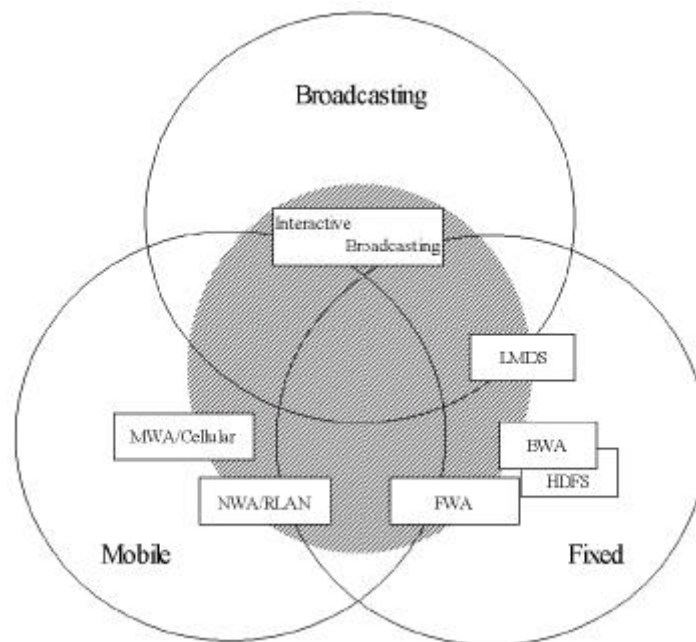
7

ITU-R

.

1. TWIM ?
2. TWIM , ?
3. TWIM ?

1) WRC-2003 1.21 /
 ITU-R (to consider the progress of the ITU-R studies concerning
 the technical and regulatory requirements of terrestrial wireless interactive multimedia
 application in accordance with Res. 737(WRC-2000), with a view to facilitating global
 harmonization)



LMDS: Local multipoint distribution system RLAN: Radio local area network
 FWA: Fixed wireless access NWA: Nomadic wireless access
 BWA: Broadband fixed wireless access MWA: Mobile wireless access
 HDFS: High density applications in the fixed service

9 TWIM

4. TWIM TWIM
?
5. TWIM ?
6. TWIM ?
7. 5-10 TWIM ?

2 2 (2001.10)

WRC- 2003 1.21 CPM

TWIM (CPM 7.1.3.1, 1),
 TWIM (CPM 7.1.3.2, 2,3),
 CPM .

1. TWIM

TWIM .

TWIM , ,
 , ,
 (Systems that operate in one or more
 of the Mobile, Fixed and Broadcasting Services and are capable of
 supporting bi-directional exchange of information of more than one
 type(video, image, data, voice, sound, graphics) between users or
 between users and hosts) , interactivity
 가 .

TWIM acronym "TWIMS(system)" , "TWIM"
 가 , TWIM application
 TWIM .

"Interactive Service"

,
 TWIM 가 . Radio
 Regulation RR
 .

2. TWIM (CPM 7.1.3.2, 2.3) TWIM 가

(RR) .

TWIM (Normadic Service), , , TWIM , .

3. TWIM (CPM 7.1.3.3, 4)

TWIM , 66GHz .

, TWIM 가 , TWIM 가 , TWIM 가 , ITU 5-20GHz 가 FWA , FWA 70GHz , FWA 1GHz . , NWA 5GHz WRC-2003 .

4. TWIM (CPM 7.1.3.4, 5)

TWIM 가 , , TWIM 가 (high density) (HDFWA) .

TWIM

, TWIM

.

5. 5- 10

TWIM

(CPM

7.1.3.5,

7)

가

(readily access on-demand)

가

TWIM

가

(interactive)

가

5- 10

가

.

(content)

(developer)

(provider)

(merge)

(alliance),

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가

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가,

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(IP

application)

가

가

가

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TWIM

가

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가 가

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(

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1GHz

가

- hot - spot

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RLAN

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IP

(IP- centric)

packet

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TWIM

가

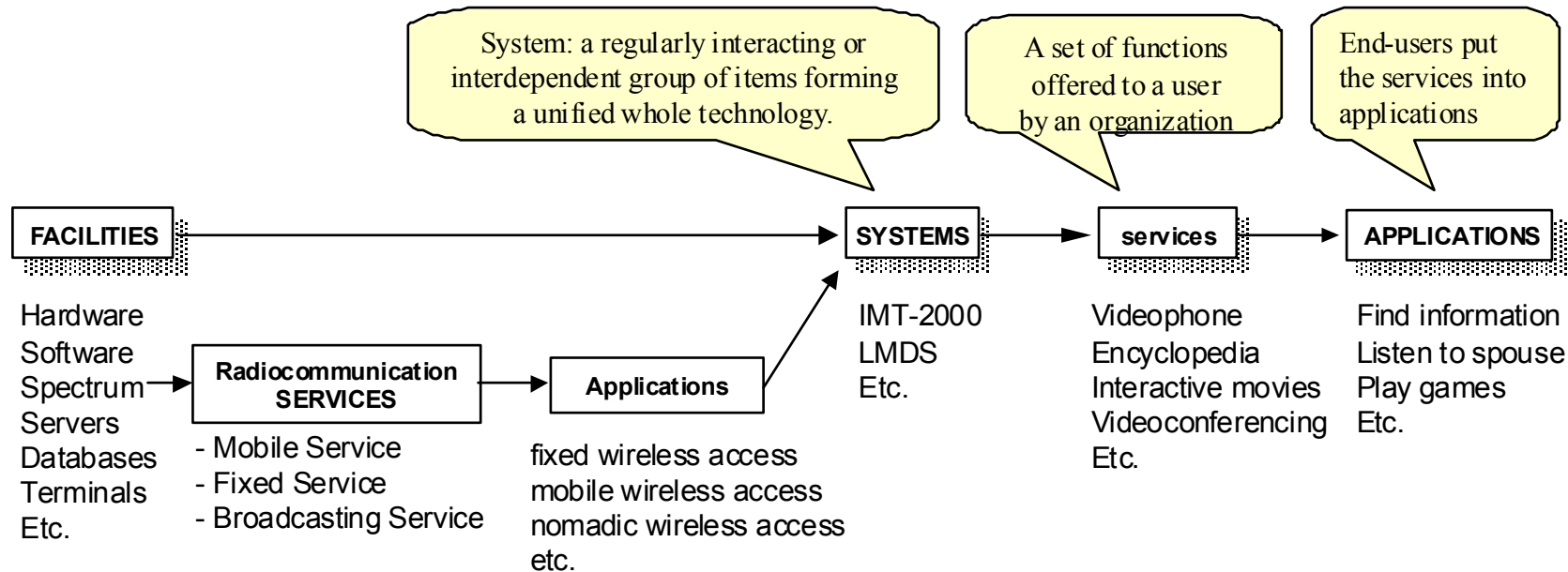
- , SDR(software defined radio)

6. WRC- 2003 1.21 CPM
CPM 7 TWIM

- 7.1.1 WRC- 2003 Agenda 1.21
- 7.1.2 Summanry of technical and operation studies
 - 7.1.2.1 Terms related to the studies
 - 7.1.2.2 Summary of technical studies
 - 7.1.2.3 Summary of operational studies
- 7.1.3 Analysis of the results of studies
 - 7.1.3.1 Scope of terrestrial wireless interactive multimedia systems(based on the answer to Question 1)
 - 7.1.3.2 General characteristics(technical and operaitonal), various applications and technologies(based on the answers to Question 2 and 3)
 - 7.1.3.3 Current situation of spectrum use and sharing scenario(based on the answer to Questions 4 and 5)
 - 7.1.3.4 Trends in the next 5- 10 years(based on the answer to Question 7)
- 7.1.4 Method to satisfy the Agenda item for consideration by the WRC
- 7.1.5 Regulatory and procedural considerations(based on the answer to Question 6)

CPM

Terrestrial Wireless Interactive Multimedia Systems: Terminology Context



Systems that operate in one or more of the Mobile, Fixed, and Broadcasting Services and are capable of supporting bi-directional exchange of information of more than one type (e.g. video, data, voice, graphics) between users or between users and hosts.

그림 10 TWIM에서 사용되는 용어의 연계성

5

IMT - 2000 beyond system , IMT - 2000
, TWIM .

가 TDD IMT - 2000
FDD ,
()
(PCS)가 Preferred Option
Migration 가 (Duplex 5MHz).
, IMT - 2000 (TDD FDD) 2GHz
가 IMT - 2000 .

IMT - 2000 (FDD
) 2GHz 가 IMT - 2000 .

2
IMT - 2000 (Doc.WP8F/TEMP/ 131)
(Doc. WP8F/TEMP/ 130)
IMT - 2000
가 가 가 .
IMT - 2000 가
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, IMT - 2000
IMT - 2000 .

IMT - 2000 가

가 . , IMT - 2000

IMT - 2000

ITU-R M.1457

reference, certification

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3GPP

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reference

2002

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3GPP2

2002

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IMT - 2000

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IMT - 2000

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IMT - 2000

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Vision

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IMT - 2000

Vision

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(TWIM)

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TWIM
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 2002 3 JTG 1-6-8-9 ,
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 가 3 , , 가
 , TWIM 가
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 가 .
 , cell
 planning (information document)
 가 .
 (WRC-2006)
 가 .

(Wee, Kyu-Jin)

:

: , IM-2000

(Lee, Keoung-Hee)

:

: , IM-2000