

「IMT - 2000

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2000. 12. 31.

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1. : IMT - 2000
2. : 2000. 3. 2 2000. 12. 31.
3. :

4.
가.

		3	4	5	6	7	8	9	10	11	12		
○ITU-R TG8/1													
- Web site													
- ITU-R 328 3 29													
○													
-													
-													
○3GPP/3GPP2 Test Specification													
- 3GPP													
- 3GPP2													
○Guard Band													
- 3GPP/3GPP2가													
○													
(%)		10	40		70		100						

.

1) ITU_R TG/1

- (3GPP, 3GPP2, ETSI)

2) unwanted emission level

- ITU-R SM328-9 SM329-7

unwanted emission level

- unwanted emission level ,

3) 3GPP/3GPP2 test specification

- WCDMA
- cdma2000
- IMT - 2000

Band

Guard

5.

IMT - 2000

.

1) ITU-R SM. 328-9

.

2) ITU-R SM. 329-7

3) ETSI “UMTS Intra-Service Guard Band” Draft Version
2 가

● IMT - 2000

- WCDMA

가	5MHz
	5MHz
	4.4 ~ 4.8MHz

- cdma2000

가	5MHz
	3.75MHz

- WCDMA cdma2000

가	5MHz

(WCDMA) (cdma2000 3X),
() 5MHz
,

4) cdma2000 WCDMA RF

(Harmonized Standards)
RF
cdma2000 WCDMA

5) IMT - 2000 가 (Global Roaming)

- 5MHz ()

	$P_{OOB} \text{ (dBm) } / d \text{ (m)}$	
	WCDMA	cdma2000
WCDMA	- 2.1/ 338.3	- 11.7/ 255
cdma2000	- 3.04/ 322	- 12/ 253

- 5MHz ()

	$P_{OOB} \text{ (dBm) } / d \text{ (m)}$	
	WCDMA	cdma2000
WCDMA	- 0.67/ 298	- 2.37/ 269
cdma2000	- 2.5/ 267	- 2.88/ 261

가 , ,
가 .
가
,
.
가 .

6.

IMT - 2000

가

IMT - 2000

RF

3GPP 3GPP2
ETSI TFES

ITU - R 2001 6
TFES

WCDMA cdma2000

2002

IMT - 2000

IMT - 2000 (cdma2000)
(WCDMA) 가

IMT - 2000

IMT - 2000 가

가

ITU

가

7.

.						
	Pentium II	4	WEB Simulation			

8.

○ITU-R WP8F 2 3 IMT - 2000

○ () 2000 8 ITU-R
WP8F 2 , ITU
IMT - 2000

. ITU

○ 2
() 2001 TFES
ITU-R
가 .

SUMMARY

In this study, we investigated the trends of the technical requirements for IMT-2000 user equipment and base station. The results are as follows.

The technical requirements of emissions for IMT-2000 are closely related to the global roaming of IMT-2000 terminals. Accordingly ITU is scheduled to make recommendations of its technical requirement commonly applicable to every country.

Also this study investigated the methods to use efficiently domestic IMT-2000 bands planned to commercialize in 2002. Since IMT-2000 aims to provide global roaming service, the related technical solutions should be examined .

The authorities of every country are drafting the serveral recommendations in ITU WP8F to establish acceptable technical requirements, and such internationally common technical requirements will be completed until June 2001. If every government accepts those technical requirements, the terminals of one country could be used in other countries without any problem.

By using these technical requirements based on results obtained from this study, it is expected to provide the basis to establish the systems to be able to use type-approved and registered terminals in other countries.

Additionally, we should consider the measurement uncertainty of equipment in measurement results, since the measurement value might differ according to the quality of equipment to

measure such RF spurious emissions.

These issues are currently under discussion by ITU WP8F, which drafted the recommendation [IMT.UNCERTAINTY].

In this study as an approach to optimize frequency efficiency in IMT-2000 bands in our country, the minimum coupling loss was obtained to calculate guard bands for IMT-2000 systems, by which the minimum separation distance was also calculated.

The results showed that when both cdma2000 and WCDMA in adjacent bands have frequency offset of 5MHz from carrier frequency, high frequency efficiency is obtained while minimizing the interference.

The document based on the results was presented to the 2nd meeting of ITU-R WP8F in August 2000 and ITU decided to accept this proposal as the guidance of IMT-2000 frequency plan.

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1

IMT - 2000 , , 3GPP
3GPP2 1999 . ITU ITU
ITU IMT - 2000
가 가
가 가
가 . 가 , /
/
(unwanted emission)
ITU (ITU-R WP8F)
IMT - 2000 (Global Roaming)
2000 5 ITU (RA)
IMT - 2000 ITU-R M.1457 (Detailed
specifications of the Radio Interface of International Mobile
Telecommunication- 2000(IMT - 2000)
[1]. 1999 11 ITU-R TG 8/1 18
ITU-R M.1457 가
M.[IMT - UNWANTED(Generic Unwanted Emission
Characteristics Associated with the Terrestrial Radio Interfaces of
IMT - 2000)] [2].

M.1457

가
가
가 , , ,
 ,

2000 8 San Diego ITU-R WP8F 2
IMT - 2000

M.[IMT.UNWANT] TG 1/5 2
“Unwanted Emission Related to IMT-2000 Radio Interfaces”
”Concerning A Preliminary Draft New Recommendation on the
Protection of Passive Services from Unwanted Emissions”
[3,4]. IMT - 2000

M.[IMT.UNWANT]

가

가

ITU-R WP8F 가

1999 4 7 “Official Journal of European
Communities” , 1999 5 2000 3
1999/5/EC R&TTE (Radio Equipment and
Telecommunication Terminal Equipment Directive) 가
[5]. R&TTE Directive

(Harmonised Standards)

R&TTE 3.2 “ /

”

ETSI IMT - 2000
3GPP 3GPP2 가 TFES(Task Force on European
Harmonized Standards)

ITU-R WP8F 2

ETSI TFES

ETSI

(ARIB, CWTS, T1, TTA, TTA, TIA, TIA TR-45.3, TIA TR-45.5)

ITU-R

[6].

ITU-R

2000 10 WP8F 3
2000 10 2001 3

IMT - 2000

가

ETSI TFES

R&TTE 3.2

IMT - 2000
[5,6,7,8].

가

가

(Guard Band)

[11].

2 IMT - 2000

2.1 WCDMA RF

IMT - 2000 R&TTE (Directive) 3.2
 . 2.1 R&TTE 3.2
 WCDMA [7].

.

2.1 R&TTE 3.2 WCDMA

R&TTE 3.2	WCDMA

2.1.2

2.1.2.1

가
EIRP()

2.1.2.2

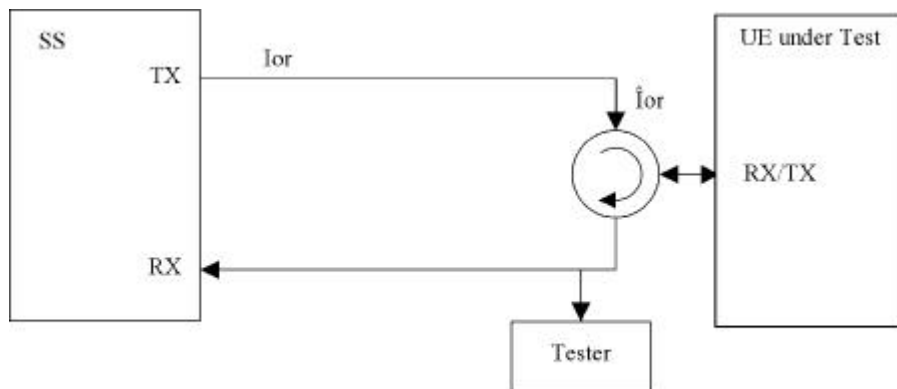
[8]. 3

2.2

1	+33 dBm	+1/ - 3 dB
2	+27 dBm	+1/ - 3 dB
3	+24 dBm	+1/ - 3 dB
4	+21 dBm	±2 dB

2.1.2.3

2.1 .



2.1

2.1.3

2.1.3.1

12.5MHz . 2.5MHz
3.84MHz .

2.1.3.2

2.3

2.3 WCDMA

	Δf	
2,5 - 3,5 MHz	- 35 - 15*(Δf - 2,5) dBc	30 kHz
3,5 - 7,5 MHz	- 35 - 1*(Δf - 3,5) dBc	1 MHz
7,5 - 8,5 MHz	- 39 - 10*(Δf - 7,5) dBc	1 MHz
8,5 - 12,5 MHz	- 49 dBc	1 MHz

()

1. 30 kHz 2,515 MHz
3,485 MHz .
2. 1MHz 4MHz 12
MHz .

,

.

.

2.1.3.3

2.1 .

2.3

가 (

)

.

.

2.3

.

.

2.1.4

2.1.4.1

’ , ’

.

2.1.4.2

2.4 2.5

12.5MHz [14].

2.4

$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz	- 36 dBm
$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz	- 36 dBm
$30 \text{ MHz} \leq f < 1000 \text{ MHz}$	100 kHz	- 36 dBm
$1 \text{ GHz} \leq f < 12,75 \text{ GHz}$	1 MHz	- 30 dBm

2.5 가

1893.5 MHz ≤ f < 1919.6 MHz	300 kHz	-41 dBm
925 MHz ≤ f ≤ 935 MHz	100 kHz	-67 dBm
935 MHz < f ≤ 960 MHz	100 kHz	-79 dBm
1805 MHz ≤ f ≤ 1880 MHz	100 kHz	-71 dBm

2.1.4.3

2.1 .

.

2.1.5

2.1.5.1.

가 .

2.1.5.2

roll off 가 0.22
 Root Raised Cosine(RRC)
 . 50dBm 가 .

2.1.5.3

2.1 .
.

2.1.6

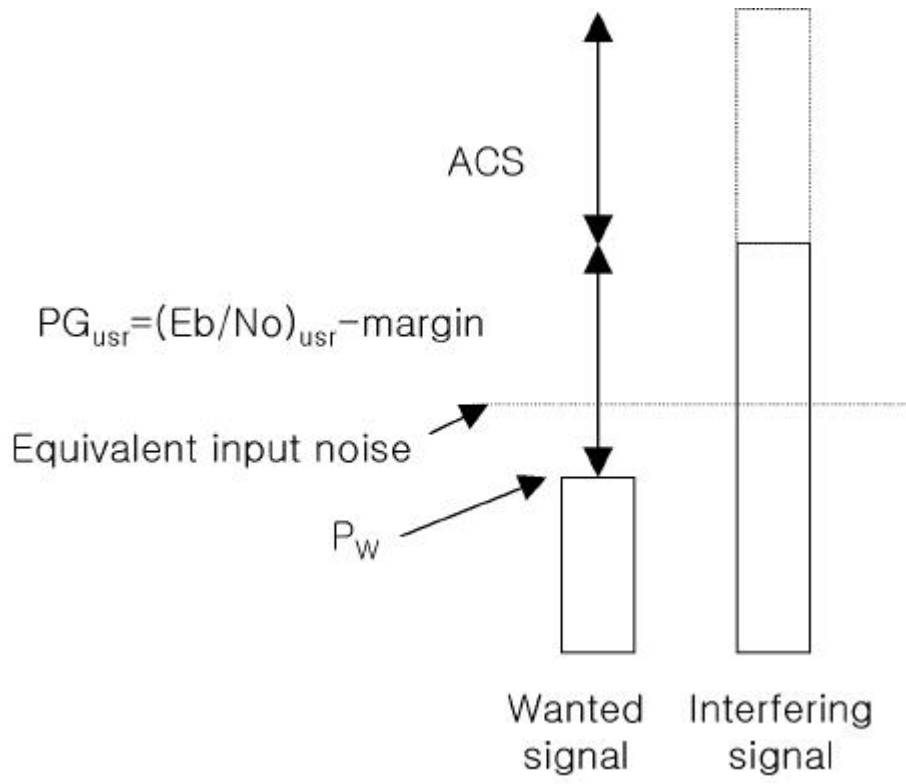
2.1.6.1

(Receiver adjacent channel selectivity;
ACS)
가
WCDMA . ACS

.
2.2 .

$$P_{ac} = P_{DPCH} + A_{CS} + PG_{usr} - \left(\frac{E_b}{N_o} \right)_{usr} - margin$$

P_{DPCH} : CDMA
 P_{ac} : CDMA
 F_{uw} :
 PG_{usr} :
: (BER) $E_b/N_o, E_b$
margin : margin



2.2 ACS

2.1.6.2

3	4	BER(Bit Error Ratio)	2.6
	0.001	.	ACS
33dB	.		

2.6

DPCH_Ec	- 103dBm / 3,84 MHz
\hat{I}_{or}	- 92,7dBm / 3,84 MHz
I_{oac} (modulated)	- 52dBm / 3,84 MHz
F_{uw} (offset)	± 5 MHz

DPCH_Ec : DPCH(Dedicated Physical Channel)

\hat{I}_{or} :

I_{oac} :

()

F_{uw} :

2.1.6.3

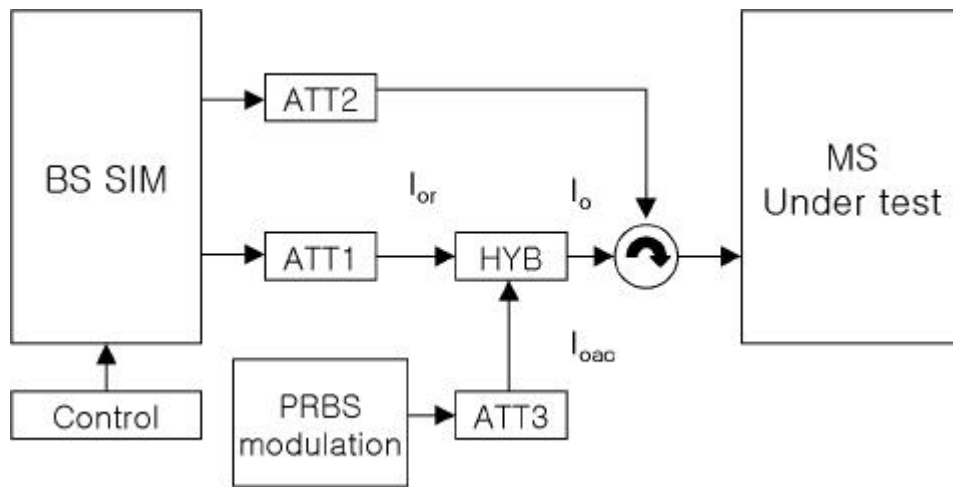
2.3

ACS

. 2.6

RF

.



2.3 ACS

2.1.7

2.1.7.1

(Receiver blocking characteristics)

2.1.7.2

BER	2.7	2.8	0.001
-----	-----	-----	-------

2.7 (in - band)

		10 MHz offset	15 MHz offset
DPCH_Ec	dBm / 3,84 MHz	- 114	- 114
\hat{I}_{or}	dBm / 3,84 MHz	- 103,7	- 103,7
$I_{blocking}$ (modulated)	dBm / 3,84 MHz	- 56	- 44
F_{uw} (offset)	MHz	+10 or - 10	+15 or - 15

2.8 (out - of - band)

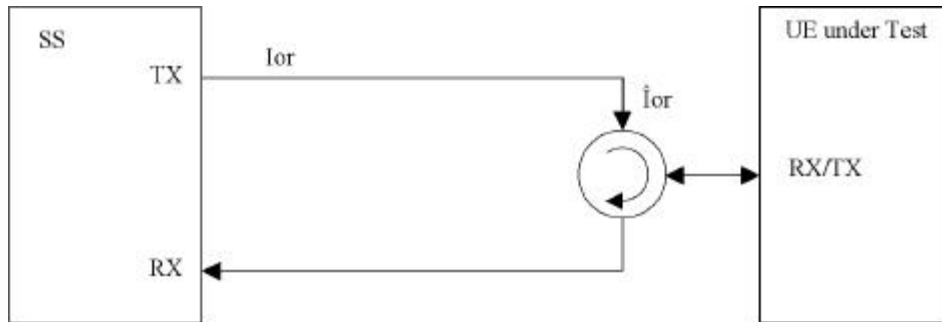
		1	2	3
DPCH_Ec	dBm / 3,84MHz	- 114	- 114	- 114
\hat{I}_{or}	dBm / 3,84 MHz	- 103,7	- 103,7	- 103,7
$I_{blocking}$ (CW)	dBm	- 44	- 30	- 15
F_{uw}	MHz	2050 < f < 2095 2185 < f < 2230	2025 < f < 2050 2230 < f < 2255	1 < f < 2025 2255 < f < 12750

$I_{blocking}$:

2.1.7.3

2.4 . RF 2.7
2.8 . CW

2.7 2.8 . SS
DCH BER .



2.4

2.1.8

2.1.8.1

,
CW
가

2.1.8.2

BER 2.9 0.001

2.9

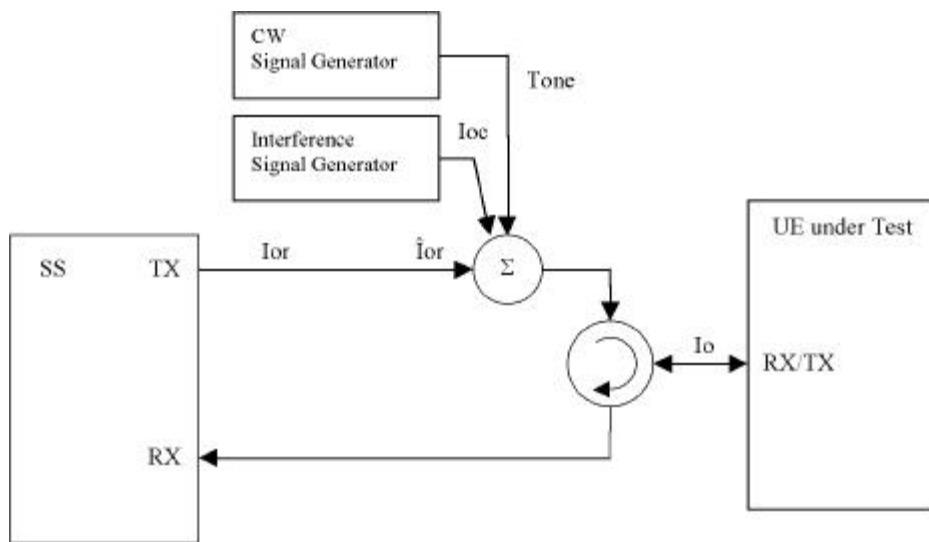
Parameter	Unit	Level
DPCH_Ec	DBm / 3,84MHz	- 114
\hat{I}_{or}	DBm / 3,84MHz	- 103,7
Iblocking (CW)	dBm	- 44
F_{uw}	MHz	Spurious response frequencies

2.1.8.3

2.5 . RF 2.9

2.9 CW SS

DCH BER .



2.5

2.1.9

2.1.9.1

.

2.1.9.2

.

a)

-60 dBm / 3,84 MHz 가 .

b) 9 kHz 1 GHz

-57 dBm / 100 kHz 가 .

c) 1 GHz 12,75 GHz

-47 dBm / 100 kHz 가 .

2.1.9.3

2.6

. 가 , 가

1MHz 가

3 .



2.6

2.2 WCDMA RF

IMT - 2000 R&TTE (Directive) 3.2
 . 2.10 R&TTE 3.2
 WCDMA [8].

2.10 R&TTE 3.2 WCDMA

R&TTE 3.2	WCDMA

2.2.2

2.2.2.1

,

.

2.2.2.2

RF

.

2.11

2.14

$\Delta f = 2.5$

MHz

$f_{\text{offset}_{\text{max}}}$

.

Δf

가 가

3dB

. f_{offset}

. $f_{\text{offset}_{\text{max}}}$ 12.5MHz

2.11 WCDMA

($P \geq 43 \text{ dBm}$)

Δf (MHz)	f_{offset} (MHz)	- 3dB	
$2.5 \leq \Delta f < 2.7$	$2.515 \leq f_{\text{offset}} < 2.715$	- 14 dBm	30 kHz
$2.7 \leq \Delta f < 3.5$	$2.715 \leq f_{\text{offset}} < 3.515$	- 14- 15($f_{\text{offset}} - 2.715$) dBm	30 kHz
	$3.515 \leq f_{\text{offset}} < 4.0$	- 26 dBm	30 kHz
$3.5 \leq \Delta f < 7.5$	$4.0 \leq f_{\text{offset}} < 8.0$	- 13 dBm	1 MHz
$7.5 \leq \Delta f$	$8.0 \leq f_{\text{offset}} < f_{\text{offsetmax}}$	- 13 dBm	1 MHz

2.12 WCDMA

($39 \leq P < 43 \text{ dBm}$)

Δf (MHz)	f_{offset} (MHz)	- 3dB	
$2.5 \leq \Delta f < 2.7$	$2.515 \leq f_{\text{offset}} < 2.715$	- 14 dBm	30 kHz
$2.7 \leq \Delta f < 3.5$	$2.715 \leq f_{\text{offset}} < 3.515$	- 14- 15($f_{\text{offset}} - 2.715$) dBm	30 kHz
	$3.515 \leq f_{\text{offset}} < 4.0$	- 26 dBm	30 kHz
$3.5 \leq \Delta f < 7.5$	$4.0 \leq f_{\text{offset}} < 8.0$	- 13 dBm	1 MHz
$7.5 \leq \Delta f$	$8.0 \leq f_{\text{offset}} < f_{\text{offsetmax}}$	P - 56 dBm	1 MHz

2.13 WCDMA

($31 \leq P < 39 \text{ dBm}$)

Δf (MHz)	f_{offset} (MHz)		
$2.5 \leq \Delta f < 2.7$	$2.515 \leq f_{\text{offset}} < 2.715$	P-53 dBm	30 kHz
$2.7 \leq \Delta f < 3.5$	$2.715 \leq f_{\text{offset}} < 3.515$	P-53-15(f_{offset} - 2.715) dBm	30 kHz
	$3.515 \leq f_{\text{offset}} < 4.0$	-26 dBm	30 kHz
$3.5 \leq \Delta f < 7.5$	$4.0 \leq f_{\text{offset}} < 8.0$	P-52 dBm	1 MHz
$7.5 \leq \Delta f$	$8.0 \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	P-56 dBm	1 MHz

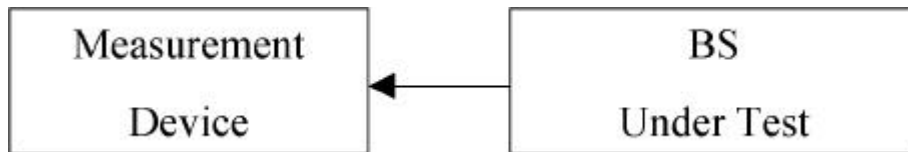
2.14 WCDMA

($P < 31 \text{ dBm}$)

Δf (MHz)	f_{offset} (MHz)		
$2.5 \leq \Delta f < 2.7$	$2.515 \leq f_{\text{offset}} < 2.715$	-22 dBm	30 kHz
$2.7 \leq \Delta f < 3.5$	$2.715 \leq f_{\text{offset}} < 3.515$	-22-15(f_{offset} - 2.715) dBm	30 kHz
	$3.515 \leq f_{\text{offset}} < 4.0$	-26 dBm	30 kHz
$3.5 \leq \Delta f < 7.5$	$4.0 \leq f_{\text{offset}} < 8.0$	-21 dBm	1 MHz
$7.5 \leq \Delta f$	$8.0 \leq f_{\text{offset}} < f_{\text{offset}_{\text{max}}}$	-25 dBm	1 MHz

2.2.2.3

1. 2.7 .
2. 30kHz
2.515MHz 4.0MHz .
3. 1MHz 50kHz
1MHz
4.0MHz 8.0MHz .
4. 1MHz
8.0MHz ($\Delta f_{\max} - 500 \text{ kHz}$) .
5. RMS .
6. BS 1(B.1) .
7. .



2.7

2.2.3

2.2.3.1

(adjacent channel leakage ratio; ACLR)

roll-off

가 0.22 RRC (Root Raised Cosine)
가

가

2.2.3.2

2.15

2.15 WCDMA

5 MHz	45 dB
10 MHz	50 dB

2.2.3.3

1. 2.7 RF .
 2. : 2.11- 2.14 .
 3. : RMS
 4. 1(B.1)
. RF
 5. .
 6. 5MHz .
5MHz 10MHz .
- 가 가
가 .

2.2.4

2.2.4.1

가 (/)

가

12,5MHz

12.5 MHz

RF

2.2.4.2

2.2.4.2.1 (Category B)

2.16 WCDMA

(Category B)

9 kHz 150 kHz	- 36 dBm	1 kHz	ITU - R SM.329-7, 4 .
150 kHz 30 MHz	- 36 dBm	10 kHz	ITU - R SM.329-7, 4 .
30 MHz 1 GHz	- 36 dBm	100 kHz	ITU - R SM.329-7, 4 .
1 GHz Fc1-60 MHz 2 100 MHz	- 30 dBm	1 MHz	ITU - R SM.329-7, 4 .
Fc1-60 MHz 2 100 MHz Fc1-50 MHz 2 100 MHz	- 25 dBm	1 MHz	ITU - R SM.329-7, 4 .
Fc1-50 MHz 2100 MHz Fc2+50 MHz 2180 MHz	- 15 dBm	1 MHz	ITU - R SM.329-7, 4 .
Fc2+50 MHz 2180 MHz Fc2+60 MHz 2 180 MHz	- 25 - 13 dBm	1 MHz	ITU - R SM.329-7, 4 .
Fc2 + 60 MHz or 2 180 MHz 12,75 GHz	- 30 dBm	1 MHz	ITU - R SM.329-7, 4 . ITU - R SM.329-7, 2.6 .
Fc1: Fc2:			

2.2.4.2.2 GSM 900

2.17 GSM 900 UTRA가 GSM 900
TR 25.942
가 ,
.

2.17 GSM 900

921 MHz - 960 MHz	- 47 dBm	100 kHz

2.2.4.2.3 DCS 1800

2.18 DCS 1800 UTRA DCS 1800
[15]
가 ,
.

2.18 DCS 1800

1 805 MHz - 1 880 MHz	- 57 dBm	100 kHz

2.2.4.2.4

2.19 UTRA
IMT - 2000 2110- 2170MHz 1930- 1990MHz
.

2.19

	(dBm)	
2 100 MHz - 2 105 MHz	- 30 + 3.4 (f - 2 100)	1 MHz
2 175 MHz - 2 180 MHz	- 30 + 3.4 (2 180 - f)	1 MHz
1 920 MHz - 1 925 MHz	- 30 + 3.4 (f - 1 930)	1 MHz
1 995 MHz - 2 000 MHz	- 30 + 3.4 (2 000 - f)	1 MHz

2.2.4.2.5 UTRA - TDD

2.20 UTRA-TDD UTRA-FDD

.

2.20 UTRA-TDD

1 900 MHz - 1 920 MHz	- 52 dBm	1 MHz
2 010 MHz - 2 025 MHz	- 52 dBm	1 MHz

2.2.4.3

가

1(B.1)

RF

2.11-2.14

2.2.5

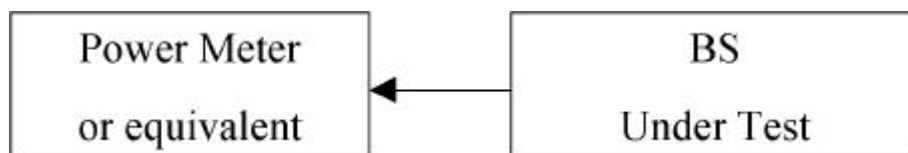
2.2.5.1

2.2.5.2

+2.5dB 2.5dB

2.2.5.3

1. 2.8 RF
2. 1(B.1)
PCCPCH, SCCPCH DPCH
3. RF



2.8

2.2.6

2.2.6.1

(transmit intermodulation)

가

WCDMA

가

30dB

5,10,15MHz

2.2.6.2

2.2.6.3

1. 2.9

2. 1(B.1)

BS

3. 2(B.3)

5MHz

WCDMA)

4. WCDMA

가

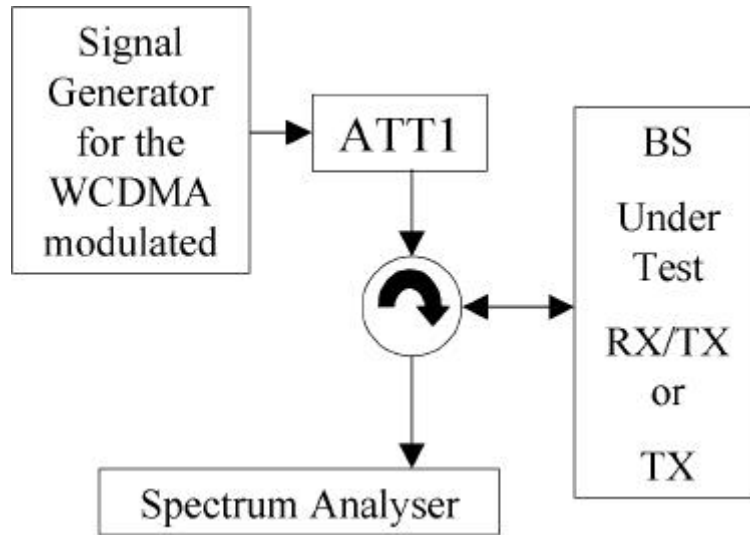
30dB ATT 1

5. 2.2.2.3

6. 2.2.3.22

7. -5MHz

8. $\pm 10\text{MHz}$ $\pm 5\text{MHz}$



2.9

2.2.7

2.2.7.1

가

가

2.23

가

2.21

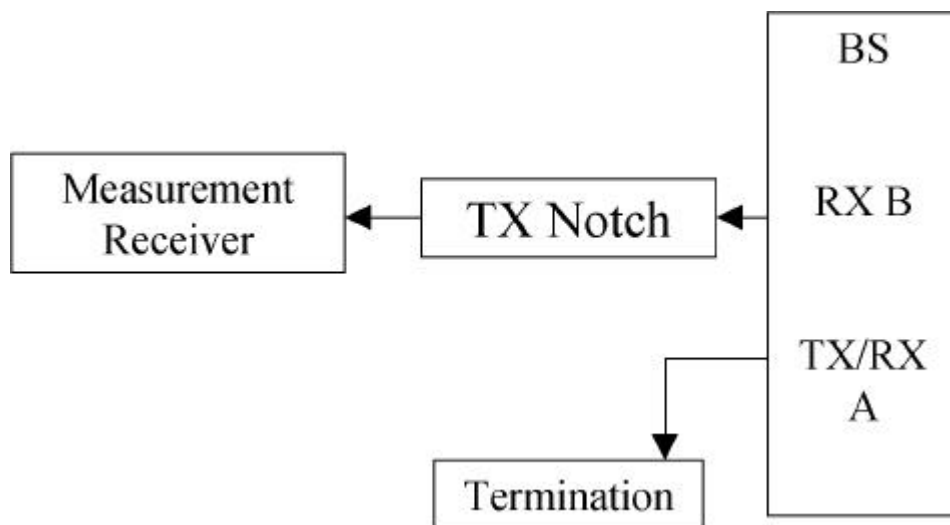
1900 - 1980 MHz 2010 - 2025 MHz	-78 dBm	3.84 MHz	
9 kHz - 1 GHz	-57 dBm	100 kHz	
1 GHz - 12.75 GHz	-47 dBm	1 MHz	12.5MHz

2.2.7.3

1. 2.10 BS
2. BS
- 3 1(B.1)
4. 2.22
5. 2.22
6. 가

2.22

Measurement Band width	3.84 MHz (Root raised cosine,0.22) / 100 kHz (note)
Sweep frequency range	9 kHz to 12.75GHz
Detection	True RMS



2.10

2.2.8

2.2.8.1

가

2.24

2.23

BER 0.001

2.23

1920MHz- 1980MHz	- 40 dBm	- 115 dBm	10 MHz	WCDMA
1900MHz- 1920MHz 1980MHz- 2000MHz	- 40 dBm	- 115 dBm	10 MHz	WCDMA
1MHz- 1900MHz 2000MHz- 12750MHz	- 15 dBm	- 115 dBm	-	CW

2.2.8.2

1. WCDMA

2.

3. WCDMA

2.24 UL (12.2kbps)

4.

F_{uw}

$$F_{uw} = (n \times 1 \text{ MHz})$$

n n=10 가
1MHz 12.75GHz 가

2.23

2.23

=0.22 RRC

3.84Mcps

가

WCDMA

CW

α
가

5. BER .

2.24

	12.2	kbps
DPCH	60	kbps
	Off	
T FCI	On	
	22	%

2.2.9

2.2.9.1

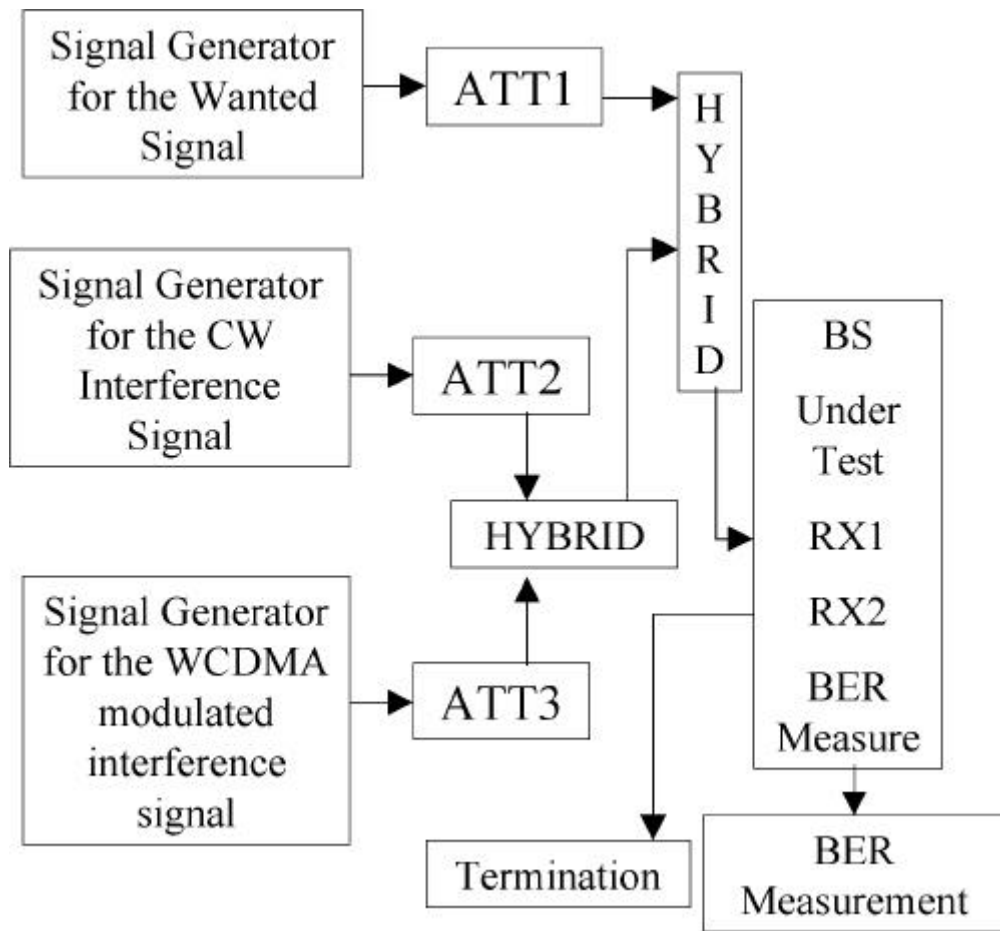
RF 가 3
.
2 가
BER BER 0.001
2.29 BER 0.001
.

2.25

	-	- 115 dBm
CW	10 MHz	- 48 dBm
WCDMA	20 MHz	- 48 dBm

2.2.9.3

1. 2.11 .
2. ()
- 115dBm ATT 1 .
3. 가
+10MHz(CW tone) +20MHz(WCDMA)
.
4. ATT 2
ATT 3 .
5. BER
.
6. CW WCDMA 10MHz 20MHz
.
7. .



2.11

2.2.10

2.2.10.1

가

. ACS

F_{uw}

2.26

BER 0.001

2.26

	12.2	kbps
	- 115	dBm
	- 52	dBm
F_{uw} ()	5	MHz

2.2.10.2

1. 2.12

2. 115dBm

3.

ATT 2

ACS

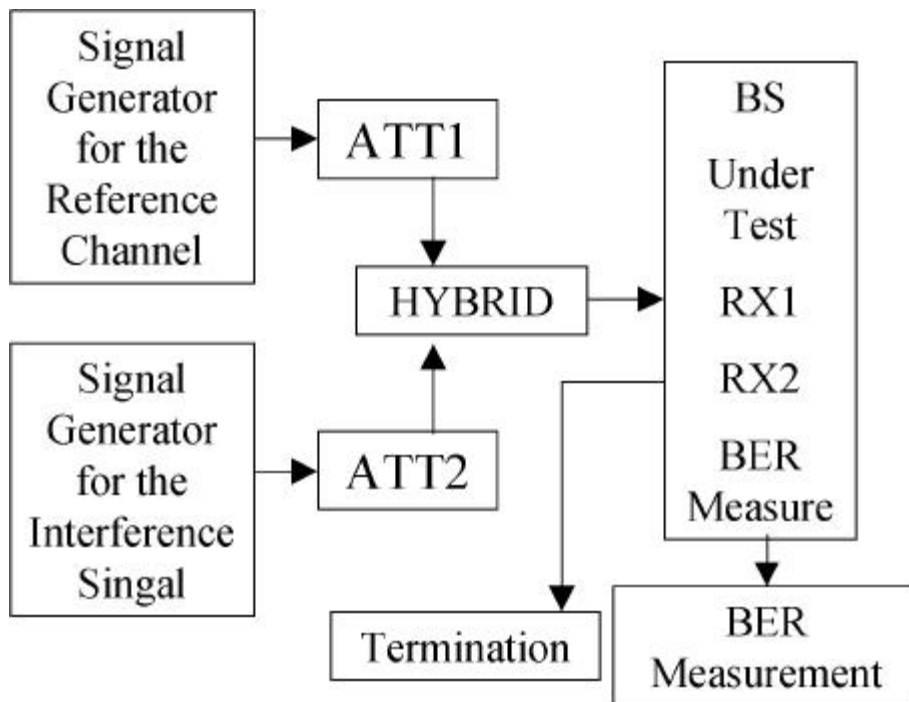
ACRL 63dB가

CDMA

4. BER

(BER<0.001)

5.



2.12

2.3 cdma2000

2.3.1

IMT - 2000 R&TTE (Directive) 3.2
 . 2.27 R&TTE 3.2
 cdma2000 [9].

2.27 R&TTE 3.2 cdma2000

R&TTE 3.2	cdma2000
	RF

2.3.2

2.3.2.1

CDMA

2.3.2.2

2.3.2.2.1 1x

1x

2.28

2.28 cdma2000 1x

$ \Delta f $		
1.25 MHz - 1.98 MHz	- 42 dBc/ 30 kHz	- 54 dBm/ 1.23 MHz
1.98 MHz - 2.25 MHz	- 50 dBc/ 30 kHz	- 54 dBm/ 1.23 MHz
2.25 MHz - 4.00 MHz	- [13+1 x (Δf - 2.25 MHz)] dBm / 1 MHz	
> 4.00 MHz	- 36 dBm / 1 kHz;	9 kHz < f < 150 kHz
	- 36 dBm / 10 kHz;	150 kHz < f < 30 MHz
	- 36 dBm/ 100 kHz;	30 MHz < f < 1 GHz
	- 30 dBm / 1 MHz;	1 GHz < f < 12.5 GHz

(): Δf

, $\Delta f =$ 가

1x

2.29

2.29 cdma2000 1x 가

1893.5 - 1919.6 MHz	-41 dBm / 300 kHz	PHS
925 - 935 MHz	-67 dBm / 100 kHz	GSM 900
935 - 960 MHz	-79 dBm / 100 kHz	GSM 900
1805 - 1880 MHz	-71 dBm / 100 kHz	DCS 1800

(): 가 CDMA 11.25MHz
. PHS 200kHz

2.3.2.2.2 3x

3x 2.30
2.31 가 .

2.30 cdma2000 3x

$ \Delta f $	
2.5 MHz - 2.7 MHz	- 14 dBm / 30 kHz
2.7 MHz - 3.5 MHz	- [14 + 15 (Δf - 2.7 MHz)] dBm / 30 kHz
3.08 MHz	- 33 dBc / 3.84 MHz
3.5 MHz - 7.5 MHz	(- 13 + 1 (Δf - 3.5 MHz)) dBm / 1 MHz
7.5 MHz - 8.5 MHz	- [17 + 10 (Δf - 7.5 MHz)] dBm / 1 MHz
8.08 MHz	- 43 dBc / 3.84 MHz
8.5 MHz - 12.5 MHz	- 27 dBm / 1 MHz
> 12.5 MHz	- 36 dBm / 1 kHz; 9 kHz < f < 150 kHz - 36 dBm / 10 kHz; 150 kHz < f < 30 MHz - 36 dBm/ 100 kHz; 30 MHz < f < 1 GHz - 30 dBm / 1 MHz; 1 GHz < f < 12.5 GHz

(): Δf

, $\Delta f =$ 가

가 . 3.08MHz 8.08MHz

33dB 43dB ACLR

WCDMA 5MHz 10MHz

ACLR 가 .

2.31 cdma2000 3x 가

1893.5 - 1919.6 MHz	-41 dBm / 300 kHz	PHS
925 - 935 MHz	-67 dBm / 100 kHz	GSM 900
935 - 960 MHz	-79 dBm / 100 kHz	GSM 900
1805 - 1880 MHz	-71 dBm / 100 kHz	DCS 1800

(): 가 CDMA 12.5MHz
. PHS 200kHz

2.3.3 RF

2.3.3.1

RF

2.32 cdma2000

Class I	EIRP	- 2 dBW (0.63 W)	3 dBW (2.0 W)
Class II	EIRP	- 7 dBW (0.2 W)	0 dBW (1.0 W)
Class III	EIRP	- 12 dBW (63 mW)	- 3 dBW (0.5 W)
Class IV	EIRP	- 17 dBW (20 mW)	- 6 dBW (0.25 W)
Class V	EIRP	- 22 dBW (6.3 mW)	- 9 dBW (0.13 W)

2.3.4

2.3.4.1

2.3.4.2

CDMA

1x - 50 dBm/ 1.23 MHz 가
 3x - 50 dBm/ 3.69 MHz 가 .

2.3.5

2.3.5.1

2.3.5.2

- 1) 1MHz 76dBm .
- 2) 1MHz 61dBm .
- 3) 30kHz 47dBm .

2.3.6

2.3.6.1

가
CDMA

2.3.6.2

FER(Frame Error Ratio) 95% 1.0%

2.3.7

2.3.7.1

CW 가
CDMA
CW 가

3 가
 CDMA
 FER(frame error rate)

2.3.7.2

FER 95% 1.0%

2.3.8

2.3.8.1

ACS 1x $\pm 2.5\text{MHz}$ 3x
 $\pm 5\text{MHz}$ CDMA
 CDMA

2.3.8.2

FER 95% 1.0%

2.4 cdma2000 RF

2.4.1

IMT - 2000 R&TTE (Directive) 3.2
 . 2.33 R&TTE 3.2
 cdma2000 [10].

2.33 R&TTE 3.2 cdma2000

R&TTE 3.2	cdma2000

2.4.2

2.4.2.1

RF

CDMA

2.4.2.2

1

가

가

가

2.34

2.35

2.34 cdma2000

$ \Delta f $	
885 kHz - 1.25 MHz	-45 dBc / 30 kHz
1.25 - 1.45 MHz	-13 dBm / 30 kHz
1.45 - 2.25 MHz	-[13 + 17 x (Δf - 1.45 MHz)] dBm / 30 kHz
2.25 MHz - 4.00 MHz	-13 dBm / 1 MHz
> 4.00 MHz	-36 dBm / 1 kHz; 9 kHz < Δf < 150 kHz -36 dBm / 10 kHz; 150 kHz < Δf < 30 MHz -36 dBm/100 kHz; 30 MHz < Δf < 1 GHz -30 dBm / 1 MHz; 1 GHz < Δf < 12.5 GHz

():

Δf

, $\Delta f =$

가

가

2.35 가

921 - 960 MHz	- 57 dBm / 100 kHz	GSM 900
1805 - 1880 MHz	- 71 dBm / 100 kHz	DCS 1800
1900 - 1920 MHz 2010 - 2025 MHz	- 52 dBm / 1MHz	UTRA-FDD

2.4.3

2.4.3.1

.

2.4.3.2

+2dB - 4dB

.

2.4.4

2.4.4.1

가

,
가

가

.

2.4.4.2

2.4.2.2

2.34

2.35

.

2.4.5

2.4.5.1

RF 가 RF 가 .

2.4.5.2

.

1) RF - 80dBm
30kHz 가 .

2) RF - 60dBm
30kHz 가 .

3) RF 30kHz
- 47dBm 가 .

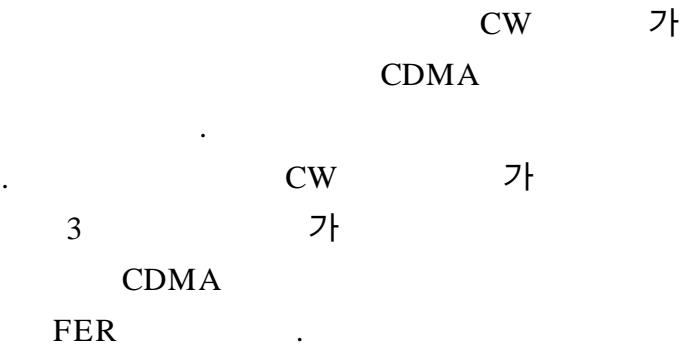
2.4.6

2.4.6.1

FER 95% 1.5%

2.4.7

2.4.7.1

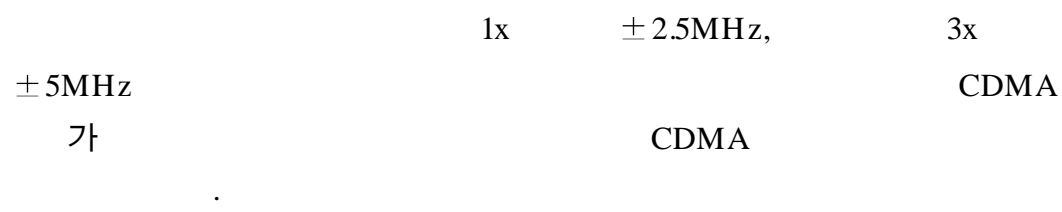


2.4.7.2



2.4.8

2.4.8.1



2.4.8.2



3 WCDMA cdma2000 RF

3.1

IMT - 2000

3 2 2 IMT - 2000

3.2

3.2.1

3.2.1.1

IMT - 2000 cdma2000
3.1

EIRP

WCDMA

WCDMA

가 0.5dB

가

3.1 3.2 1 2 WCDMA

I cdma2000 .

I II WCDMA 3GPP

, 1 2 WCDAM I

cdma2000 . cdma2000 가

II . II

cdma2000 23dBm .

cdma2000 WCDMA (21dBm

33dBm 21dBm 24dBm

.) . WCDMA 3 (24dBm)

25dBm()

. cdma2000 II

. 3.1 cdma2000 .

3.1 WCDMA

1	+33 dBm	+1/- 3 dB	cdma2000 I
2	+27 dBm	+1/- 3 dB	-
3	+24 dBm	+1/- 3 dB	cdma2000 II
4	+21 dBm	±2 dB	

3.2 cdma2000

EIRP

I	EIRP	+28 dBm	+33 dBm
II	EIRP	+23 dBm	+30 dBm
III	EIRP	+18 dBm	+27 dBm
IV	EIRP	+13 dBm	+24 dBm
V	EIRP	+8 dBm	+21 dBm

3.2.1.2

cdma2000 1x - 50 dBm/1.23 MHz , cdma2000
 3x - 50 dBm/3.69 MHz . WCDMA
 - 50 dBm/3.84 MHz(.)
 . 3.3 cdma2000 WCDMA
 30kHz

3.3 WCDMA cdma2000

		30kHz
WCDMA	- 50 dBm/3.84MHz	- 71.0 dBm/30kHz
cdma2000 1x	- 50 dBm/1.23MHz	- 66.1 dBm/30kHz
cdma2000 3x	- 50 dBm/3.69MHz	- 70.9 dBm/30kHz

3.2.1.3

가 cdma2000
1MHz - 61dBm
- 56dBm/ 3.84MHz(- 61.8dBm/ 1MHz) WCDMA

3.2.2

IMT - 2000 cdma2000
CDMA 190MHz
 ± 150 Hz
 ± 0.076 ± 0.078 ppm WCDMA
 ± 0.1 ppm

3.2.3 RF

3.2.3.1

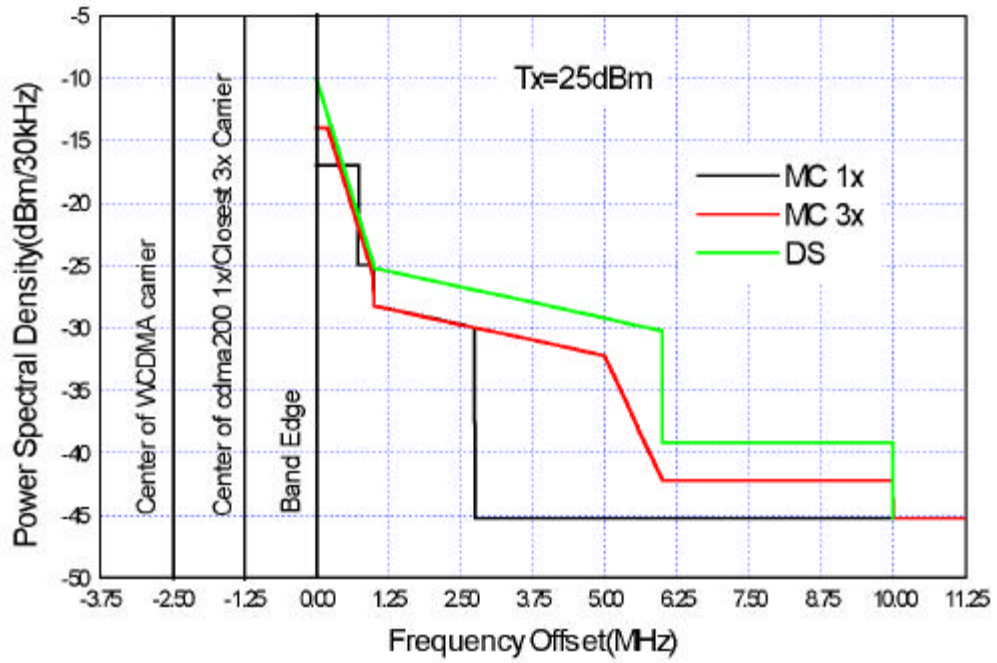
3.1 WCDMA 25dBm
가 cdma2000 1x
3x WCDMA
WCDMA cdma2000 가
2.5MHz , cdma2000 1x
1.25MHz 가
WCDMA cdma2000 1x
3.2 4 WCDMA

3

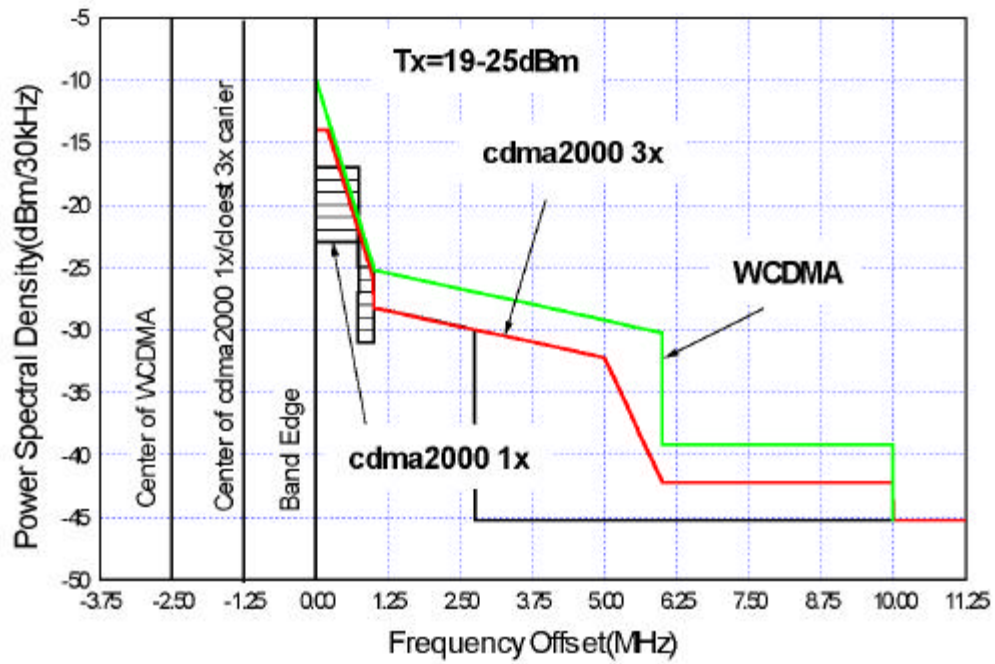
19dBm

25dBm

1dB



3.1



3.2 WCDMA cdma2000

cdma2000 가 WCDMA

가

WCDMA

WCDMA

2.2GHz

1.5dB

[16].

WCDMA

, cdma2000

WCDMA

. (HS)
가 .

3.2.3.2 (A CLR)

cdma2000 ACLR

.
. ACLR

cdma2000 WCDMA 25dBm
가 ACLR
3.4 .

$\pm 3.75\text{MHz}$ cdma2000 1x
ACLR WCDMA
33dB, 43dB .
cdma2000 1x ACLR

가
. cdma2000 WCDMA
ACLR .

3.4

ACLR

IMT - 2000			A CLR (dB)
cdma2000 1x	± 2.5 MHz	1.2288MHz	33.8
cdma2000 1x	± 3.75 MHz	1.2288MHz	39.9
cdma2000 3x	± 5 MHz	3.6864MHz	29.7
cdma2000 3x	± 10 MHz	3.6864MHz	48.5
WCDMA	± 5 MHz	3.84MHz	29.4
WCDMA	± 10 MHz	3.84MHz	43.3

3.2.3.3

IMT - 2000	cdma2000	3.5
ITU-R	Category B	
	cdma2000 1x	4MHz
	cdma2000 3x	
12.5MHz		
	GSM PHS	3.6
	WCDMA	

3.5 ITU Category B

- 36 dBm / 1 kHz;	9 kHz < f < 150 kHz
- 36 dBm / 10 kHz;	150 kHz < f < 30 MHz
- 36 dBm/100 kHz;	30 MHz < f < 1 GHz
- 30 dBm / 1 MHz;	1 GHz < f < 12.5 GHz

3.6 GSM PHS

1893.5 - 1919.6 MHz	-41 dBm / 300 kHz	PHS
925 - 935 MHz	-67 dBm / 100 kHz	GSM 900
935 - 960 MHz	-79 dBm / 100 kHz	GSM 900
1805 - 1880 MHz	-71 dBm / 100 kHz	DCS 1800

3.2.4

cdma2000

3.7

IMT - 2000	cdma2000	1890.5
1919.6MHz	PHS	RF
300kHz	-41dBm	
3.7	2.19	WCDMA
-60 dBm/3.84 MHz	-47 dBm/100 kHz	
WCDMA		
3GPP RAN WG4		

3.3

3.3.1

cdma2000

(15- 30°C) WCDMA
+2 dB -4 dB
+2 dB - 2dB

WCDMA

0.5dB [16].

cdma2000

+2dB

WCDMA

+2.5dB

+3dB

.

3.3.2

cdma2000

WCDMA

± 0.05 ppm

가

.

3.3.3

3.3.3.1

WCDMA

가

2.5MHz

가

cdma2000 1x

cdma2000 3x

가

가

1.25MHz가

가

.

3.3

3.4

WCDMA

1dB

21- 43dBm

cdma2000

1dB

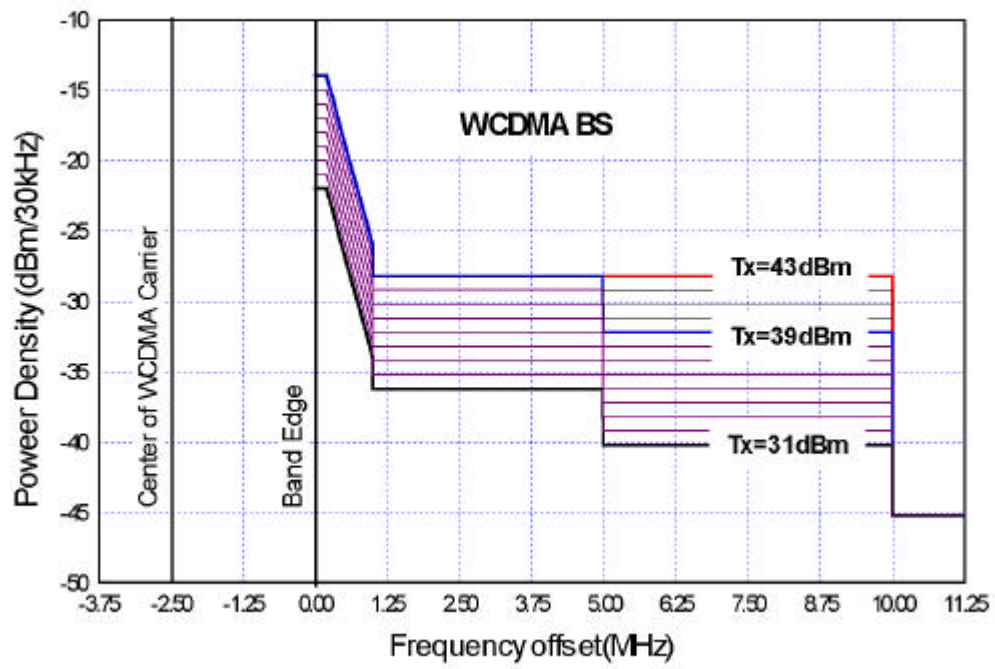
26- 38dBm

5dB

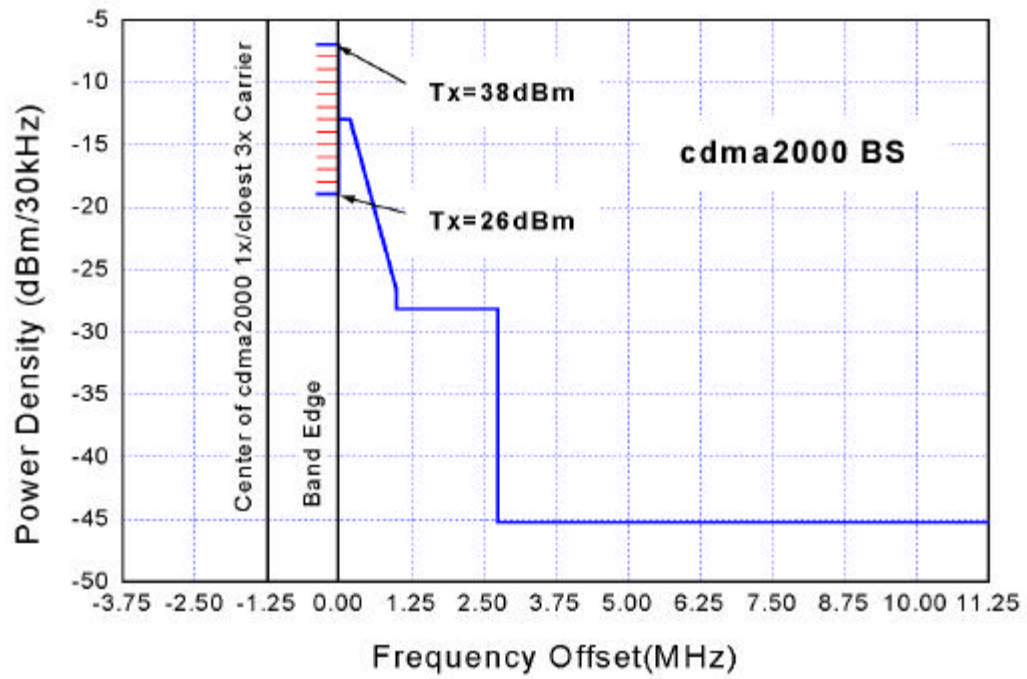
WCDMA

cdma2000 1x

5dB 가



3.3 WCDMA



3.4 cdma2000

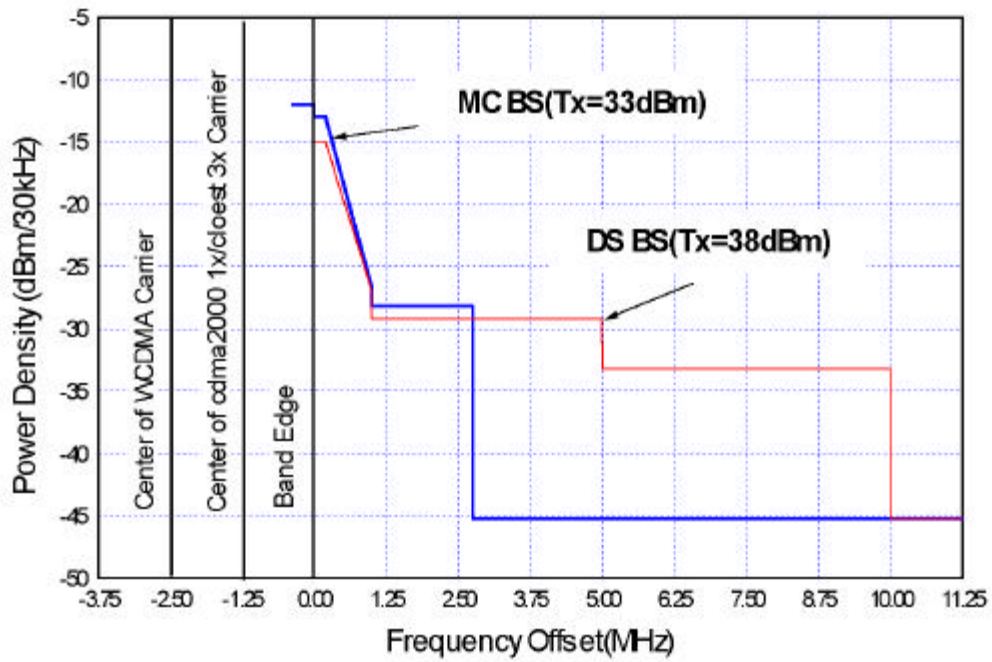
3.5 WCDMA cdma2000

WCDMA

38 dBm

cdma2000 1x

33 dBm



3.5 WCDMA cdma2000

cdma2000 WCDMA 가

.

WCDMA

cdma2000

. WCDMA

2.2GHz

가 1.5dB

[16].

가

WCDMA

cdma2000

WCDMA

가 .

3.3.3.2

(A CLR)

cdma2000 ACLR

.

.

ACLR

. cdma2000 38 dBm ,

cdma2000 1x 33dBm 가

3.8 .

± 2.5 MHz (가 가)

cdma2000 1x ACLR WCDMA

(,

45dB 50dB)

.

cdma2000

ACLR 가 roll off

가 가

.

cdma2000

WCDMA ACLR .

ACLR cdma2000

.

3.8 ACLR

IMT - 2000			A CLR (dB)
cdma2000 1x	± 2.5 MHz	1.2288 MHz	43.7
cdma2000 1x	± 3.75 MHz	1.2288 MHz	44.5
cdma2000 3x	± 5 MHz	3.6864 MHz	49.0
cdma2000 3x	± 10 MHz	3.6864 MHz	50.3
UTRA-FDD	± 5 MHz	3.84 MHz	45.0
UTRA-FDD	± 10 MHz	3.84 MHz	50.2

3.3.3.3

[13] 3.9 3.10 ITU Category A or B
 cdma2000
 4MHz
 GSM PHS 3.10
 GSM PHS
 3.11

3.9 ITU Category A

9 kHz < f < 150 kHz	- 13 dBm / 10 kHz
150 kHz < f < 30 MHz	- 13 dBm / 10 kHz
30 MHz < f < 1 GHz	- 13 dBm / 100 kHz
1 GHz < f < 12.5 GHz	- 13 dBm / 1 MHz

3.10 ITU Category B

9 kHz < f < 150 kHz	- 36 dBm / 1 kHz
150 kHz < f < 30 MHz	- 36 dBm / 10 kHz
30 MHz < f < 1 GHz	- 36 dBm / 100 kHz
1 GHz < f < 12.5 GHz	- 30 dBm / 1 MHz

3.11 IMT - 2000

가

1893.5 to 1919.6 MHz	- 41 dBm / 300 kHz	PHS
876 - 915 MHz	- 98 dBm / 100 kHz (co-located only)	GSM 900
921 - 960 MHz	- 57 dBm / 100 kHz	GSM 900
1710 - 1785 MHz	- 98 dBm / 100 kHz (co-located only)	DCS 1800
1805 - 1880 MHz	- 47 dBm / 100 kHz	DCS 1800
1900 - 1920 MHz 2010 - 2025 MHz	- 86dBm / 1 MHz (co-located) - 52 dBm / 1 MHz	UTRA-TDD

3.3.4

cdma2000

3.12

3.12 cdma2000

1920 - 1980 MHz	- 80 dBm	1MHz	
2110 - 2170 MHz	- 60 dBm	1MHz	
	- 47 dBm	30kHz	-

4 IMT - 2000

가

4.1 WCDMA 가

(carrier spacing) 가
CDMA 가

. WCDMA

가 [6].

①

RF

가 .

②

가 가

.

가

①

가 .

packaging

WCDMA 가
가 .

(factor) =1/

②

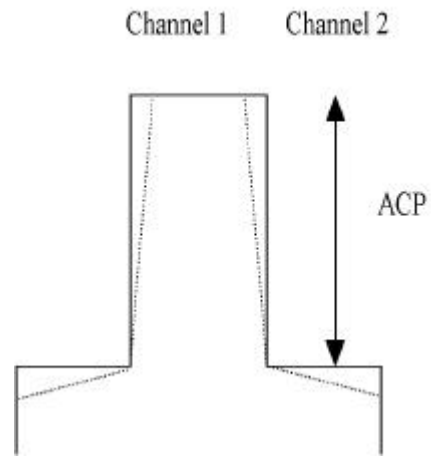
가 .

Ericsson Nokia[5,6]

(ACP;Adjacent Channel Protection)

ACP

4.1 ACP

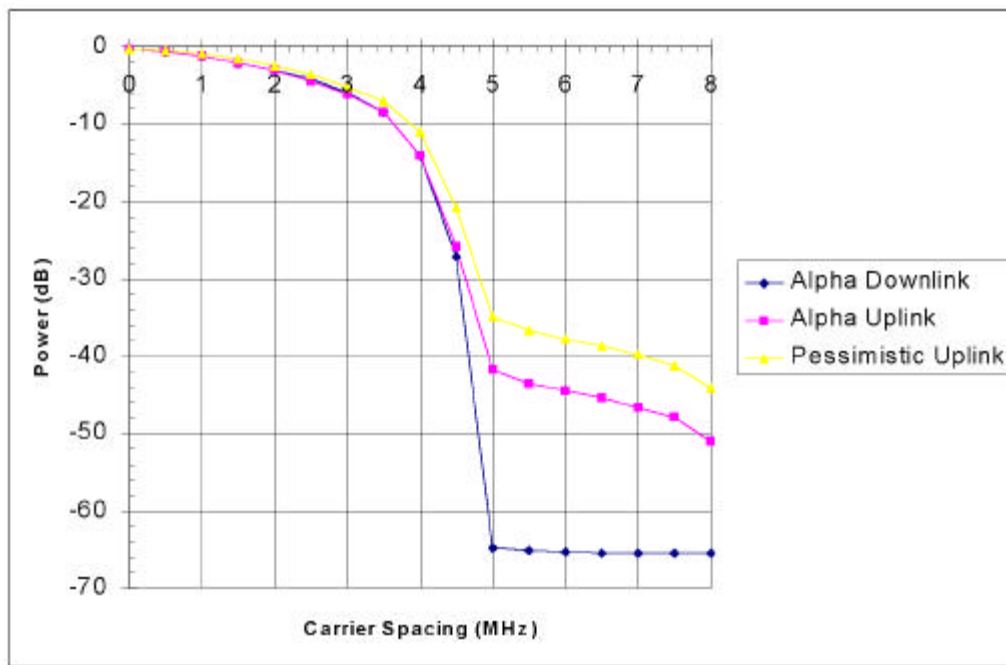


4.1 ACP

가

ACP

4.2



4.2 WCDMA FDD

WCDMA FDD

4.2

ACP 3

MCL(minimum coupling loss) Monte Carlo simulation

. MCL
(minimum path loss)

Monte Carlo simulation
, MCL

가

WCDMA 가(,
) UTAG “UMTS

Intra-Service Guard Bands" [11]

4.1.1

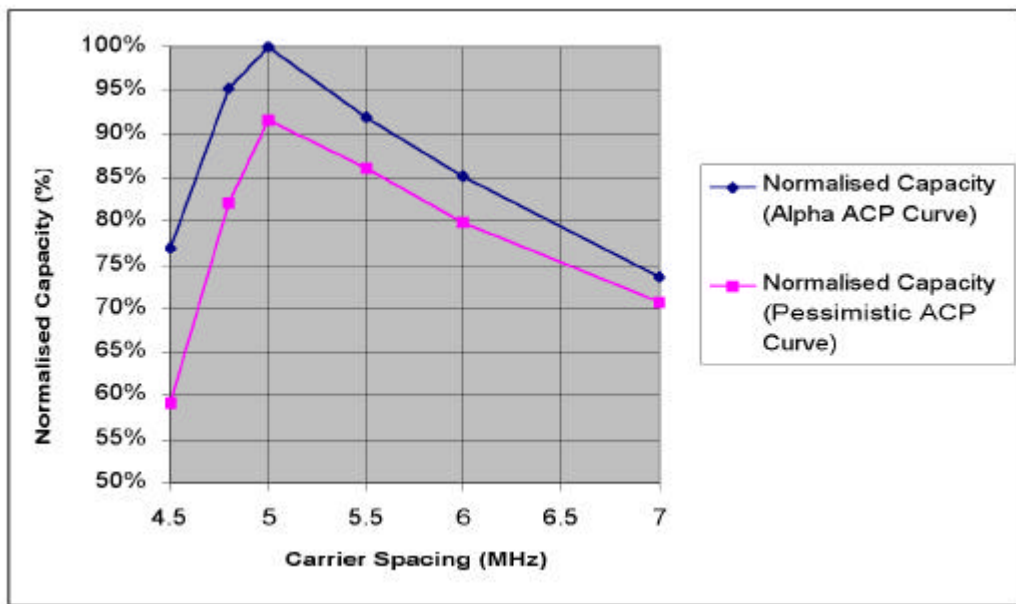
가
가 Ericsson
[17] 0.8
가
4.1 .

4.1 ACP

Carrier Spacing (MHz)	A CP (dB)	A CI Capacity (%)	Relative No. of Channels (%)	Capacity (%)	Normalised Capacity (%)
4.5	26	65	22	14.4	77
4.8	35	86	21	17.9	95
5	42	94	20	18.8	100
5.5	43	95	18	17.3	92
6	44	96	17	16.0	85
7	47	97	14	13.9	74

ACP

4.3



4.3

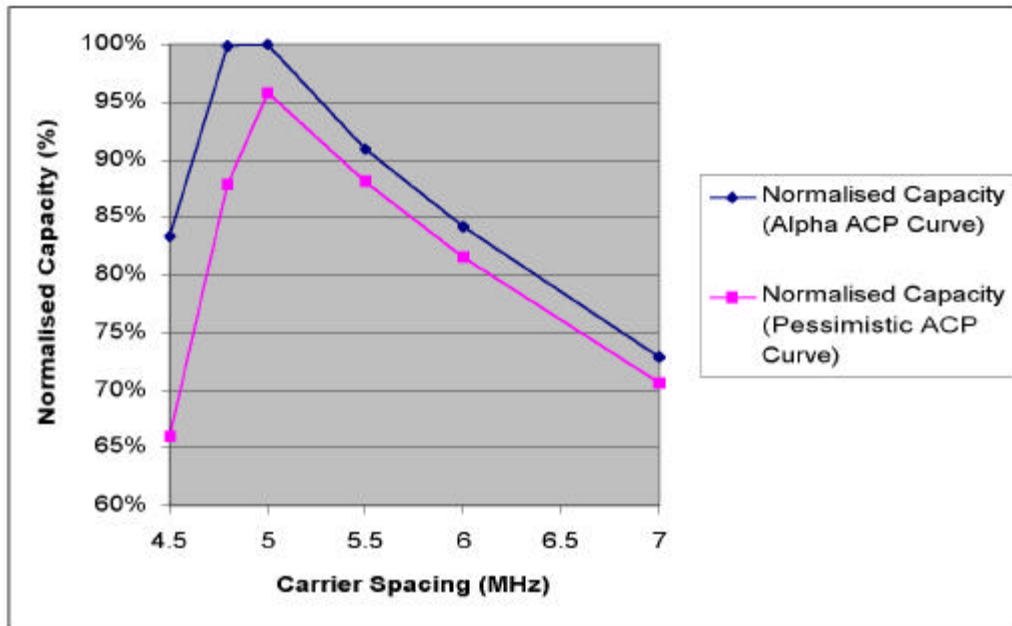
ACP
5MHz가

가 ACP ,
가

4.1.2 ,

. 0.5 가

4.1.2 .
4.4 .



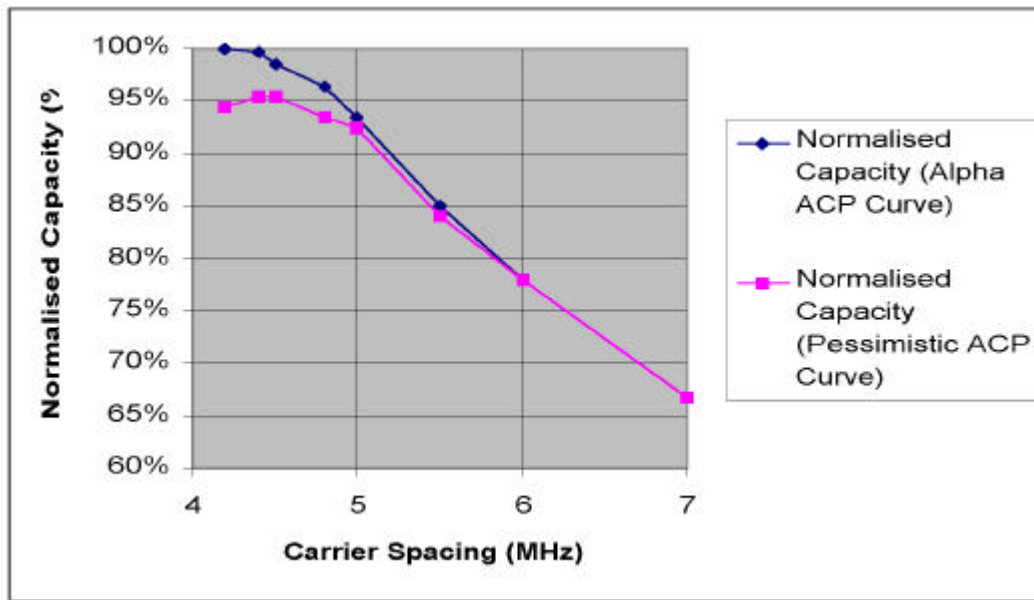
4.4

5MHz가 , ACP 4.8MHz 5.0MH
가 ACP

4.1.3 ,

0.1 ()가

4.5



4.5

4.5 4.2 4.4MHz

ACP

4.4MHz가

4.4MHz 가

4.4MHz

ACP

E_b/N_o

가

$$E_b/N_o = \frac{P_{sr} \cdot W \cdot P_{intracell} + P_{intercell} \cdot ACP + P_{intercell} + P_{intercell_b}}{R}$$

P_{sr}

$P_{intracell}$

$P_{intercell}$

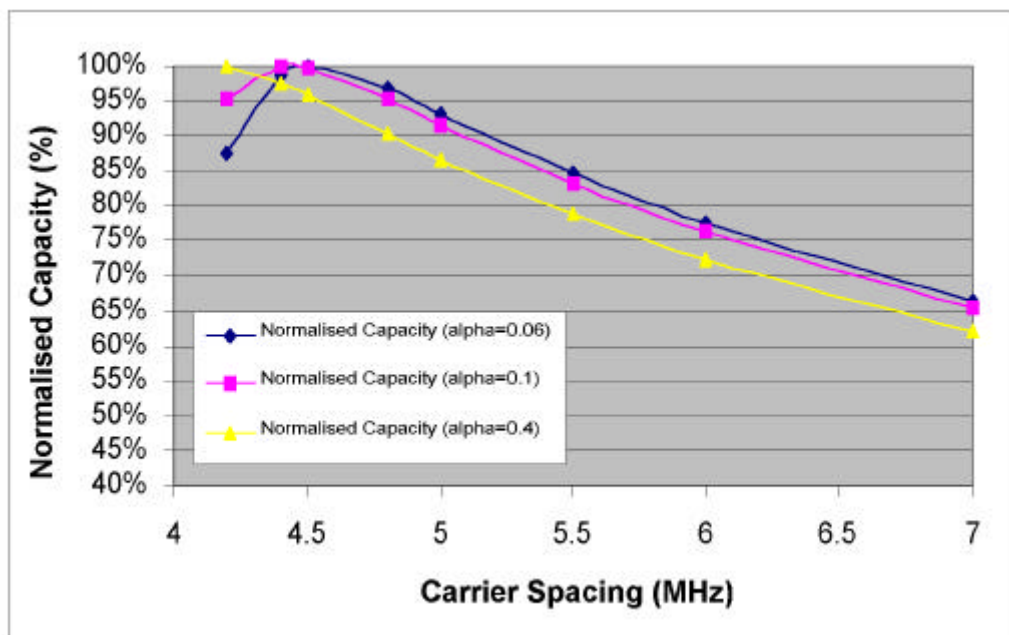
N_{th}

W/R

MS

MS

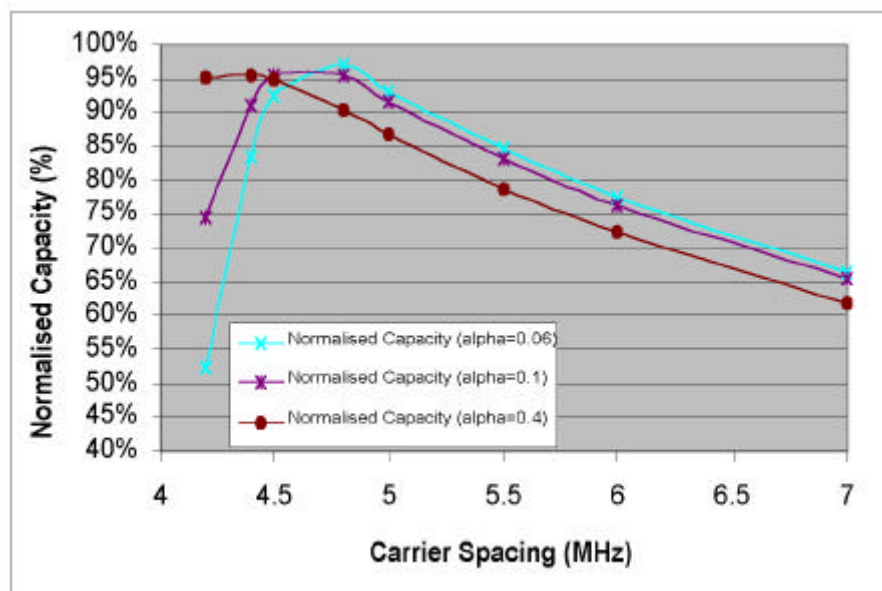
$$E_b/N_o = P_{sr} \cdot W(1 + A_{CP}) \cdot (P_{intracell} + P_{intercell})/R$$



4.6

(

ACP)



4.7

()

ACP

- ① () 가 ,
4.4MHz .
- ② () 가 , 4.4 4.6MHz

가 , 4.4MHz

4.6MHz가

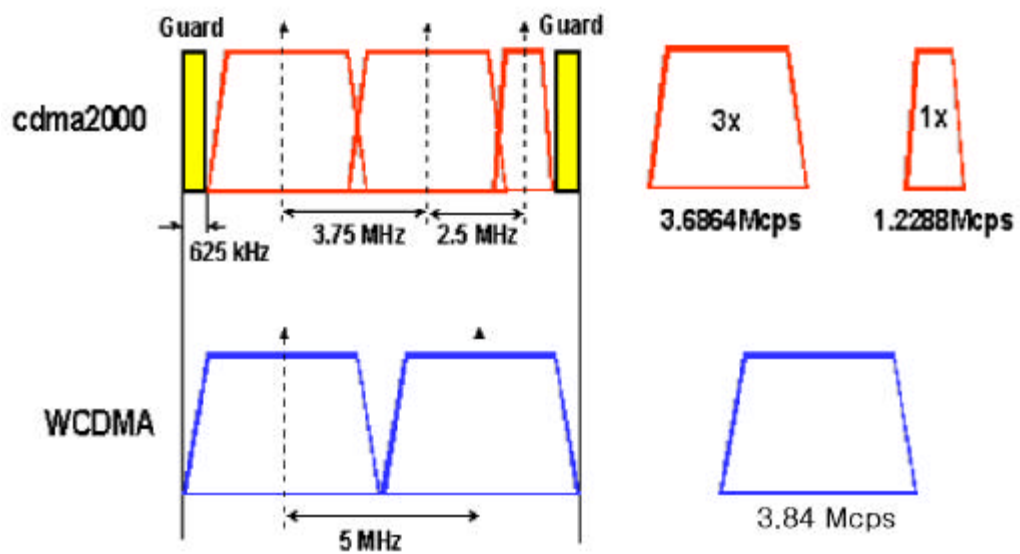
4.1.2 4.1.4 WCDMA FDD
4.6MHz 4.4MHz ,
5MHz가

4.2 cdma2000 가

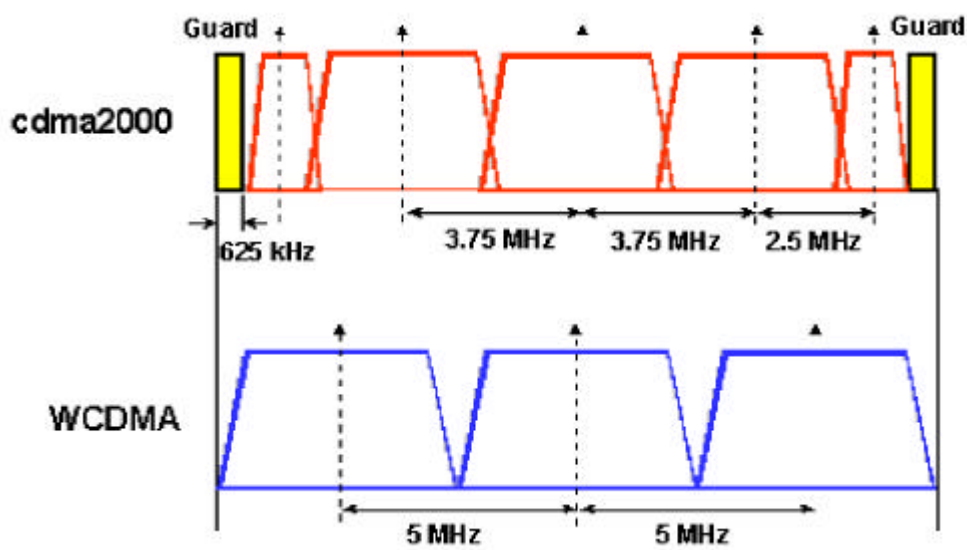
cdma2000 IS-95
(1X), 3X 1X 3 . cdma2000
, IS-95 가
1FA(1.25MHz)가 . cdma2000
가
4.375MHz(3.75MHz+0.625MHz)
3.75MHz .
cdma2000 (3.6864Mcps)가 WCDMA (3.84Mcps)
cdma2000 WCDMA
5MHz 가 가 .

4.3 WCDMA cdma2000

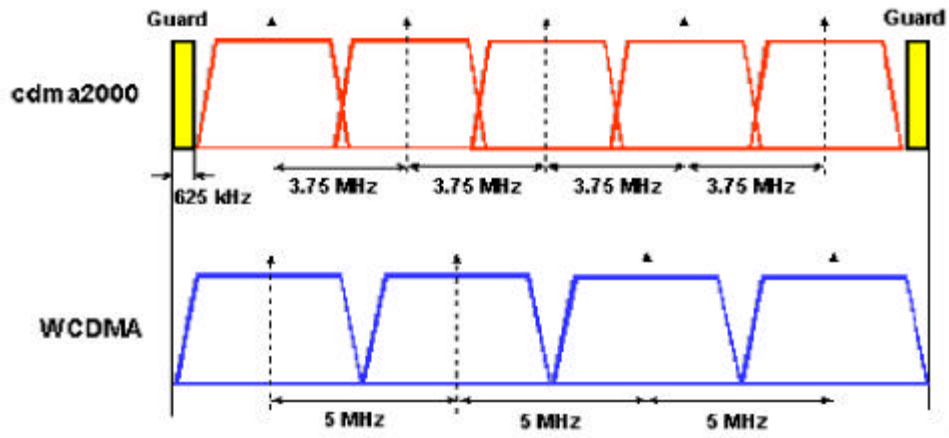
4.8 4.10 10,15,20MHz cdma2000
WCDMA .



4.8 2x 10MHz cdma2000 WCDMA



4.9 2x 15MHz cdma2000 WCDMA



4.10 2x20MHz cdma2000 WCDMA

IS - 95

WCDMA

cdma2000 1x 3x

13%

가가 20MHz

5 WCDMA cdma2000

5 3

WCDMA cdma2000

4

.

가

(Minimum

Coupling Loss;MCL)

가 (Monte Carlo;MC)

2 가

. MCL

가

MC

.

MC

,

가

.

MCL

,

가

가

.

MCL

.

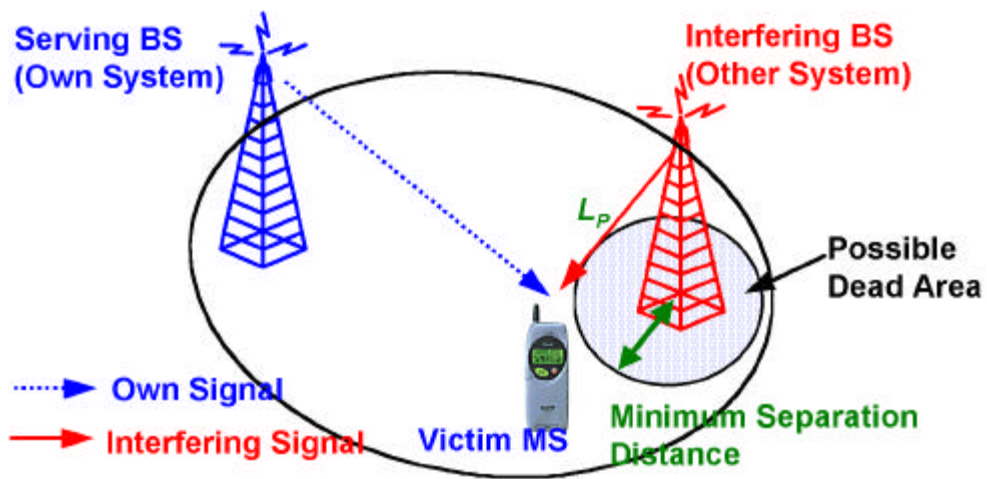
가

.

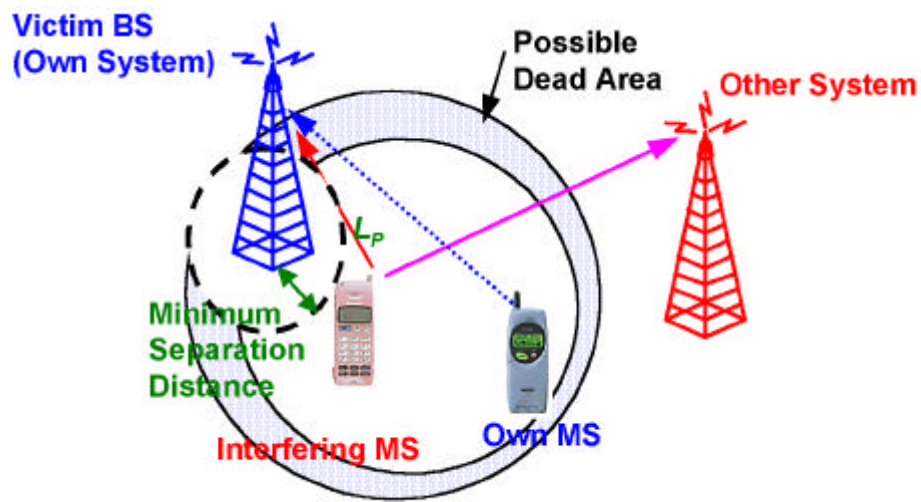
5.1

5.1.1

(Minimum Coupling Loss ; MCL) 가
 (Non Line-of-Sight ; NLOS)
 . 5.1 5-2
 (L_M)
 (5.1) L_M d (5.3) (5.4)



5.1 ()



5.2 ()

$$L_M = P_{OOB} - I_{TOL} \quad (5.1)$$

$$P_{OOB} = \int_{f_{OOB}} P(f) df \quad (5.2)$$

$$P_{OOB} =$$

$$f_{OOB}$$

$$P(f) = f_{OOB} P_{OOB}$$

$$f_{OOB} =$$

$$I_{TOL} =$$

5.1.2

5.1

가

5.2

가

가

Ericsson

[11].

$$L_P = 15.3 + 37.6 \log(d) + L_F - GTX_{Int} - GRX_{Victim} \text{ dB}$$

$$L_M = L_F$$

$$L_F =$$

$$GTX_{Int} =$$

$$GRX_{Victim} =$$

$$d = L_M \text{ .}$$

5.2

WCDMA cdma2000

4 5MHz 가
WCDMA cdma2000
[18]. 가 5MHz가
가 .

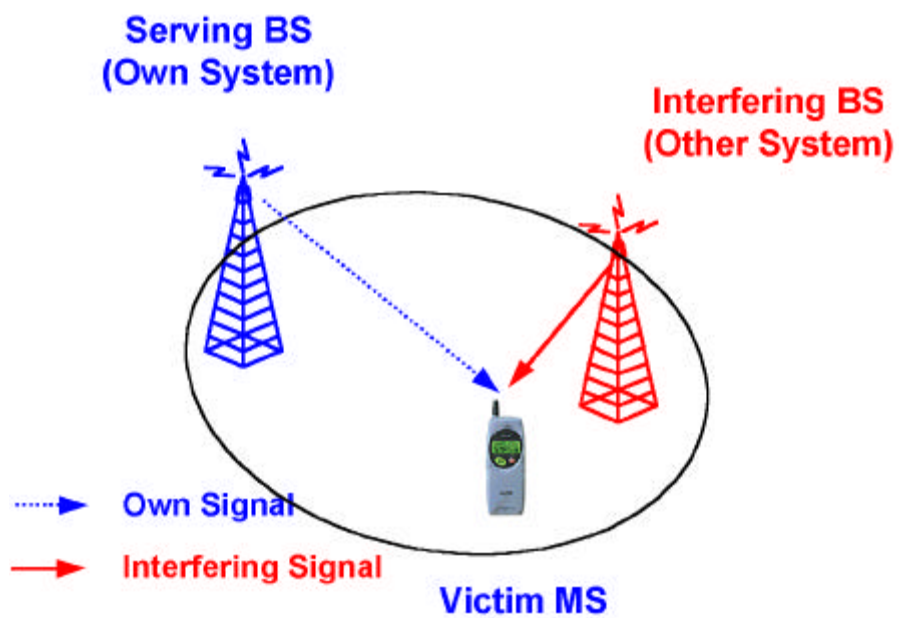
5.2.1

WCDMA cdma2000

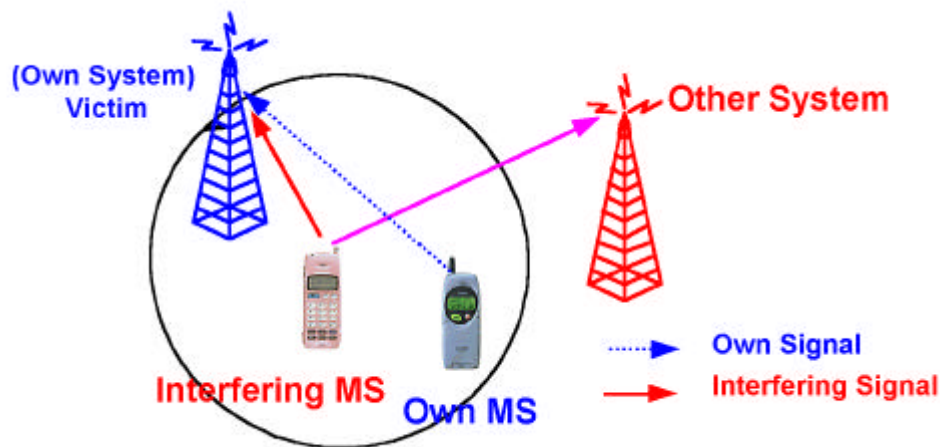
5.3 5.4 .

WCDMA cdma2000

.



5.3



5.4

5.1

	10 dB	L_F
	- 174 dBm/Hz	N_o
	5 dB	NF
	60 %	$L \%$
	4 dB	N_c

5.2

	WCDMA	cdma2000	
	39 dBm	34dBm	Tx_{BS}
	20 dBi		G_{BS}
noise floor	- 103 dBm		N_F
	3		dB
	3.84 MHz	1.2288 Mhz	$B W_{BS}$
E_b/N_o	7 dB		$(E_b/N_o)_{WANTED_BS}$

5.3

	WCDMA	cdma2000	
	25 dBm		Tx_{MS}
	20 dBi		G_{MS}
	3.84 MHz	3.6864 MHz	$B W_{MS}$
	65.8 dB	65.6 dB	$(B W_{MS})_{dB}$
	24.3 dB		PG
roll-off	0.22		α

5.2.2

5.2.2.1 WCDMA

WCDMA

5.3

WCDMA

WCDMA

가 .

(1) , P_{OOB}

WCDMA

Tx_{BS}

WCDMA

P_{OOB} .

- WCDMA : 4.6848MHz
 f_{OOB}
- : 2.6576MHz, 7.3424MHz
- : 2.12

(5.2)

$$P_{OOB} = -2.1 \text{ dBm}$$

(2) , N_i

WCDMA N_i

$$N_i = (B W_{MS})_{dB} + NF + N_o = -103.1 \text{ dBm}$$

(3) , S_{BS}

60% 가 40%
 $N_c = 4$

가 .
 $N_c = -10 \log (1 - 0.6)$.

WCDMA S_{BS}
 가

$$S_{BS} = N_i + (E_b/N_o)_{WANTED_BS} + N_c - PG = -116.4 \text{ dBm}$$

$$(4) \quad , I_{Tot}$$

$$(I_{Tot}) = Tx_{BS} - (Tx_{MS} - S_{BS}) = -102.4 \text{ dBm}$$

$$(5) \quad , I_{TOL}$$

WCDMA 3dB 가 가 I_{TOL}

$$I_{TOL} = 10 \log (10^{I_{Tot}/10} * (10^{F_{Deg}/10} - 1)) = -102.4 \text{ dBm}$$

$$(6) \quad (L_M) \quad (d)$$

$$(5.1) \quad .$$

$$L_M = P_{OoB} - I_{TOL} = 100.4 \text{ dB}$$

$$d \quad (5.3)$$

$$d = 338.3[\text{m}]$$

5.2.2.2 WCDMA cdma2000

5.3 WCDMA cdma2000
가 .

(1) , P_{OOB}

WCDMA Tx_{BS} cdma2000
 P_{OOB} .

- cdma2000 : 4.497408 MHz
 f_{OOB}
- : 2.751296 MHz, 7.248704 MHz
- : 2.12

(5.2)

.

$$P_{OOB} = -3.04 \text{ dBm}$$

(2) , N_i

cdma2000 N_i

.

$$N_i = (B W_{MS})_{dB} + NF + N_o = -103.3 \text{ dBm}$$

(3) , S_{BS}

WCDMA S_{BS}
 가

.

$$S_{BS} = N_i + (E_b/N_o)_{WANTED_BS} + N_c - PG = -116.6 \text{ dBm}$$

$$(4) \quad , I_{Tot}$$

$$(I_{Tot}) = Tx_{BS} - (Tx_{MS} - S_{BS}) = -102.6\text{dBm}$$

$$(5) \quad , I_{TOL}$$

$$I_{TOL} = 10\log(10^{I_{Tot}/10} * (10^{F_{Deg}/10} - 1)) = -102.6 \text{ dBm}$$

$$(6) \quad (L_M) \quad (d)$$

$$L_M = P_{OOB} - I_{TOL} = 99.6 \text{ dB}$$

$$d = 322 \text{ [m]}$$

.

5.2.2.3 cdma2000 WCDMA

5.3 cdma2000 WCDMA
가 .

$$(1) \quad , P_{OOB}$$

cdma2000 Tx_{BS} WCDMA
 P_{OOB} .

- WCDMA : 4.6848MHz
 f_{OOB}
- : 2.6576MHz, 7.3424MHz
- : 2.33

(5.2)

.

$$P_{OOB} = -11.7 \text{ dBm}$$

(2)

, N_i

WCDMA

N_i

.

$$N_i = (B W_{MS})_{dB} + NF + N_o = -103.2 \text{ dBm}$$

(3)

, S_{BS}

cdma2000

S_{BS}

.

가

.

$$S_{BS} = N_i + (E_b/N_o)_{WANTED_BS} + N_c - PG = -116.5 \text{ dBm}$$

(4)

, I_{Tot}

$$(I_{Tot}) = Tx_{BS} - (Tx_{MS} - S_{BS}) = -107.5 \text{ dBm}$$

(5)

, I_{TOL}

$$I_{TOL} = 10 \log (10^{I_{Tot}/10} * (10^{F_{Deg}/10} - 1)) = -107.5 \text{ dBm}$$

(6)

(L_M)

(d)

$$L_M = P_{OOB} - I_{TOL} = 95.7 \text{ dB}$$

$$d = 255 \text{ [m]}$$

5.2.2.4 cdma2000 cdma2000

5.3 cdma2000 cdma2000
가 .

(1) , P_{OOB}

cdma2000 Tx_{BS} cdma2000
 P_{OOB} .

- cdma2000 : 4.497408 MHz
 , f_{OOB}
- : 2.751296 MHz, 7.248704 MHz
- : 2.33

$$P_{OOB} = -12 \text{ dBm}$$

(2) , N_i

WCDMA N_i

$$N_i = (B W_{MS})_{dB} + NF + N_o = -103.3 \text{ dBm}$$

(3) , S_{BS}

cdma2000

S_{BS}

가

$$S_{BS} = N_i + (E_b/N_o)_{WANTED_BS} + N_c - PG = -116.6 \text{ dBm}$$

$$(4) \quad , I_{Tot}$$

$$(I_{Tot}) = Tx_{BS} - (Tx_{MS} - S_{BS}) = -107.6 \text{ dBm}$$

$$(5) \quad , I_{TOL}$$

$$I_{TOL} = 10 \log (10^{I_{Tot}/10} * (10^{F_{Deg}/10} - 1)) = -107.6 \text{ dBm}$$

$$(6) \quad (L_M) \quad (d)$$

$$L_M = P_{OOB} - I_{TOL} = 95.6 \text{ dB}$$

$$d = 253 \text{ [m]}$$

5.2.3

5.2.3.1 WCDMA

WCDMA

5.4 WCDMA

WCDMA

가 .

(1) , P_{OOB}

WCDMA

$T_{X_{BS}}$

WCDMA

P_{OOB} .

• WCDMA

, f_{OOB} : 4.6848MHz

• : 2.6576MHz, 7.3424MHz

• : 2.3

(5.2)

.

$$P_{OOB} = -0.67 \text{ dBm}$$

(2) , I_{Tot}

$$I_{Tot} = N_F + N_c = -99 \text{ dBm}$$

(3) , I_{TOL}

$$I_{TOL} = 10 \log (10^{I_{Tot}/10} * (10^{F_{Deg}/10} - 1)) = -99 \text{ dBm}$$

(4) (L_M) (d)

$$L_M = P_{OOB} - I_{TOL} = 99.3 \text{ dB}$$

$$d = 298 \text{ [m]}$$

.

5.2.3.2 WCDMA cdma2000

5.4 WCDMA cdma2000
가 .

(1) , P_{OOB}

WCDMA T_{XBS} cdma2000
 P_{OOB} .

- cdma2000 : 4.497408 MHz
 , f_{OOB}
- : 2.751296 MHz, 7.248704 MHz
- : 2.3

(5.2)

.

$$P_{OOB} = -2.5 \text{ dBm}$$

$$(2) \quad , I_{Tot}$$

$$I_{Tot} = N_F + N_c = -99 \text{ dBm}$$

$$(3) \quad , I_{TOL}$$

$$I_{TOL} = 10 \log (10^{I_{Tot}/10} * (10^{F_{Deg}/10} - 1)) = -99 \text{ dBm}$$

$$(4) \quad (L_M) \quad (d)$$

$$L_M = P_{OOB} - I_{TOL} = 96.5 \text{ dB}$$

$$d = 267 \text{ [m]}$$

.

5.2.3.3 cdma2000 WCDMA

5.4 cdma2000 WCDMA
가 .

$$(1) \quad , P_{OOB}$$

cdma2000 Tx_{BS} WCDMA

P_{OOB} .

- WCDMA : 4.6848MHz
 f_{OOB}
- : 2.6576MHz, 7.3424MHz
- : 2.30

(5.2)

$$P_{OOB} = -2.37 \text{ dBm}$$

(2) , I_{Tot}

$$I_{Tot} = N_F + N_c = -99 \text{ dBm}$$

(3) , I_{TOL}

$$I_{TOL} = 10 \log (10^{I_{Tot}/10} * (10^{F_{Deg}/10} - 1)) = -99 \text{ dBm}$$

(4) (L_M) (d)

$$L_M = P_{OOB} - I_{TOL} = 96.7 \text{ dB}$$

$$d = 269 \text{ [m]}$$

5.2.3.4 cdma2000 cdma2000

5.4 cdma2000 cdma2000
 가 .

$$(1) \quad , P_{OOB}$$

$$\begin{array}{ccc} \text{cdma2000} & Tx_{BS} & \text{cdma2000} \\ & & P_{OOB} \end{array} .$$

$$\begin{array}{ll} \bullet \text{ cdma2000} & : 4.497408 \text{ MHz} \\ , f_{OOB} & \\ \bullet & : 2.751296 \text{ MHz}, 7.248704 \text{ MHz} \\ \bullet & : 2.30 \end{array}$$

(5.2)

$$P_{OOB} = -2.88 \text{ dBm}$$

$$(2) \quad , I_{Tot}$$

$$I_{Tot} = N_F + N_c = -99 \text{ dBm}$$

$$(3) \quad , I_{TOL}$$

$$I_{TOL} = 10 \log (10^{I_{Tot}/10} * (10^{F_{Deg}/10} - 1)) = -99 \text{ dBm}$$

$$(4) \quad (L_M) \quad (d)$$

$$L_M = P_{OOB} - I_{TOL} = 96.1 \text{ dB}$$

$$d = 261 \text{ [m]}$$

.

6

6.1 WCDMA cdma2000

6.1.1 WCDMA

, ,
ACP,
Monte Carlo simulation . ACP
.

가

가)

4.2

5MHz가 가

, 5MHz

()

5MHz

) ,

4.3

5MHz가

가

) ,

4-4

4.4MHz

가

, 4.6 ~ 4.8MHz

3

, 2 5MHz가 .

6.1.2 cdma2000

가)

MC3X IS - 95A/B ,
ACP IS - 95A/B
IS - 95A/B
625kHz .

) ,
3GPP2 3.75MHz

6.1.3 WCDMA cdma2000가

WCDMA cdma2000 가
WCDMA cdma2000
가 WCDMA cdma2000
ACP 가 . 6.1

6.1 WCDMA cdma2000

	WCDMA	cdma2000
(chip rate)	3.6864Mcps	3.84Mcps
	1.25MHz	1.16MHz(?)
	5MHz	5MHz
ACP ()	-	MC 1~2dB

6.1 WCDMA cdma2000

5MHz , 1.25MHz,
1.16MHz WCDMA cdma2000
cdma2000- cdma2000 WCDMA - WCDMA
WCDMA cdma2000 45kHz
.

ACP WCDMA cdma2000 1 ~
2dB WCDMA
cdma2000 .
WCDMA cdma2000 45kHz
가
5MHz

6.2 WCDMA cdma2000

6.2.1

6.2.1.1 WCDMA

6.2 WCDMA WCDMA
cdma2000 WCDMA

6.2 WCDMA

	WCDMA BS to WCDMA MS	cdma2000 BS to WCDMA MS	
BS	39	34	dBm
MS	25	25	dBm
BS	20	20	dB
WCDMA BS	- 116	- 116	dBm
WCDMA MS	- 102.4	- 107.5	dBm
WCDMA MS (3dB)	- 102.4	- 107.5	dBm
BS WCDMA P_{OOB}	- 2.1	- 11.7	dBm
	100.4	95.7	dB
	338.3	255	m

6.2.1.2 cdma2000

6.3 WCDMA cdma2000
cdma2000 cdma2000

6.3 cdma2000

	cdma2000 BS to cdma2000 MS	WCDMA BS to cdma2000 MS	
WCDMA MS (3dB)	- 107.6	- 102.6	dBm
BS WCDMA P_{OOB}	- 12	- 3.04	dBm
	95.6	99.6	dB
	253	322	m

6.2.2

6.2.2.1 WCDMA

6.4 WCDMA WCDMA
cdma2000 WCDMA

6.4 WCDMA

	WCDMA MS to WCDMA BS	cdma2000 MS to WCDMA BS	
MS	25	25	dBm
BS noise floor	- 103	- 103	dBm
BS	20	20	dB
WCDMA BS	- 116	- 116	dBm
WCDMA MS	- 99	- 99	dBm
WCDMA MS (3dB)	- 99	- 99	dBm
BS WCDMA P_{OOB}	- 0.67	- 2.37	dBm
	99.3	96.7	dB
	298	269	m

6.2.2.2 cdma2000

6.5 WCDMA cdma2000
cdma2000 cdma2000

6.5 cdma2000

	WCDMA MS to cdma2000 BS	cdma2000 MS to cdma2000 BS	
WCDMA MS (3dB)	- 99	- 99	dBm
BS WCDMA P_{OOB}	- 2.5	- 2.88	dBm
	96.5	96.1	dB
	267	261	m

6.2.3

6.6 6.7 5MHz

$d(m)$

.

6.6 5MHz

	$P_{OOB} (dBm) / d(m)$	
	WCDMA	cdma2000
WCDMA	- 2.1/ 338.3	- 11.7/ 255
cdma2000	- 3.04/ 322	- 12/ 253

6.7 5MHz

	$P_{OOB} \text{ (dBm) } / d \text{ (m)}$	
	WCDMA	cdma2000
WCDMA	- 0.67/ 298	- 2.37/ 269
cdma2000	- 2.5/ 267	- 2.88/ 261

6.6 6.7

가 , , .

가 ,

.

가 .

7

IMT - 2000 RF

IMT - 2000

ITU

2002

IMT - 2000

IMT - 2000

ITU WP8F

가

, 2001 6

ITU

가

가

가

가

가

RF

(Measurement Uncertainty)

ITU WP8F

[IMT UNCERTAIN]

[20].

IMT - 2000

IMT - 2000

IMT - 2000

(Minimum Coupling Loss)

(Minimum Separation Distance)

(cdma2000 3X)

(WCDMA)

가

5MHz

.
 [19] 2000 8 ITU-R WP8F 2
 , ITU
 IMT - 2000 .

가 .
 2
 () 2001 TFES ITU-R
 가 .

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101/98.

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2000-04-27 Rev A.
- [19] RRC, et al, "Carrier channel spacing for co-existence between
IMT-DS(WCDMA) and IMT-MC(cdma2000) in adjacent bands",
ITU-R Doc 8F/11-e, Aug. 2000.
- [20] ITU-R Doc 8F/TEMP/64-E, " Measurement Uncertainty as it
Applied to Test Limits for the Terrestrial Component of
IMT-2000", Oct. 2000.

[A]

A.1

(emission)

Regulation) ITU-R (Radio
(occupied bandwidth) (necessary bandwidth) 가
가 [12].

ITU-R
가
xdB

가

-
-
-

가

가

A.2

가

(spurious emission)

[13].

(out of band emission)

.

ITU-R

No.146(S1.152)

90%

가

.

, ,

250%

.

.

.

.

250%

.

[B]

. -X dB

X dB

B.1 1

-
- (ACLR)
-
-
-

B.1 1

		(%)	(dB)		(x 256T _{chip})
PCCPCH +SCH	1	10	- 10	1	0
Primary CPICH	1	10	- 10	0	0
PICH	1	3.2	- 15	16	120
DPCH (SF=128)	16/ 32/ 64	76.8	B.2	B.2	B.2

() TX

B.2

1

DPCCH

,

		(dB) (16)	(dB) (32)	(dB) (64)
	(x 256T _{chip})			
2	66	- 10	- 13	- 16
11	134	- 12	- 13	- 16
17	52	- 12	- 14	- 16
23	45	- 14	- 15	- 17
31	143	- 11	- 17	- 18
38	112	- 13	- 14	- 20
47	59	- 17	- 16	- 16
55	23	- 16	- 18	- 17
62	1	- 13	- 16	- 16
69	88	- 15	- 19	- 19
78	30	- 14	- 17	- 22
85	18	- 18	- 15	- 20
94	30	- 19	- 17	- 16
102	61	- 17	- 22	- 17
113	128	- 15	- 20	- 19
119	143	- 9	- 24	- 21
7	83		- 20	- 19
13	25		- 18	- 21
20	103		- 14	- 18
27	97		- 4	- 20
35	56		- 16	- 24
41	104		- 19	- 24
51	51		- 18	- 22
58	26		- 17	- 21
64	137		- 22	- 18
74	65		- 19	- 20

B.2

	(x 256T chip)	(dB) (16)	(dB) (32)	(dB) (64)
82	37		- 19	- 17
88	125		- 16	- 18
97	149		- 18	- 19
108	123		- 15	- 23
117	83		- 17	- 22
125	5		- 12	- 21
4	91			- 17
9	7			- 18
12	32			- 20
14	21			- 17
19	29			- 19
22	59			- 21
26	22			- 19
28	138			- 23
34	31			- 22
36	17			- 19
40	9			- 24
44	69			- 23
49	49			- 22
53	20			- 19
56	57			- 22
61	121			- 21
63	127			- 18
66	114			- 19
71	100			- 22

B.2

	(x 256T chip)	(dB) (16)	(dB) (32)	(dB) (64)
76	76			- 21
80	141			- 19
84	82			- 21
87	64			- 19
91	149			- 21
95	87			- 20
99	98			- 25
105	46			- 25
110	37			- 25
116	87			- 24
118	149			- 22
122	85			- 20
126	69			- 15

B.2 2

-

B.3 2

		(%)	(dB)		(x 256T _{chip})
PCCPCH +SCH	1	10	- 10	1	0
Primary CPICH	1	10	- 10	0	0
PICH	1	10	- 15	16	120
DPCH (SF=128)	3	2 x 10 1 x 50	2 x - 10 1 x - 3	24,72,120	1,7,2