

⋮

⋮

1. :
 2. : 1999. 1. 1 1999. 12. 31
 3. :
 - 4.
- 가.

														()
		1	2	3	4	5	6	7	8	9	10	11	12	
o														
o														
oITU-R														
()														
	“													
		25			50			75			100			14, 014

·

1)

o

2)

o FM CDMA

o WL

3)

4) ()

5.

가.

1) ITU-R

2) IS-95B

3) /

.

1) FM

2) CDMA

.

1)

2)

6.

가.

가

. 가

7.

가.

- 1) (HP8564E) 1
- 2) (HP83640A) 1
- 3) Noise Figure Meter(HP8970V) 1

.

- 1)
- 2) WL

SUMMARY

In this study, the measurement method of the technical requirement for radio equipment has been discussed and general method of conformity assessment for radio equipment has been derived. For the reference, the measurement method of spurious emission power limit from ITU-R and some technical document relevant to technical standard are summarized. Further some analytical description for the measurement methods of spurious emission power limit of the CDMA equipment and the frequency modulated radio equipment are given for a reference.

1

1

2

2

1

3

1

2

4 가

1

2

3

4

5

6 가

7

8

9

10

11

12

5

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

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6

1

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3

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PCS.....

FM.....

7

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1

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2

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3

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1

가 ,

3

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가가

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가

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가

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가

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가

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가

가

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, 1999 7

(APT) 가

, 2000 7

APT

가

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•

CDMA

2

1

， ， ，
， “
” 29 2 . 29
2()

， 가 .

1. .

2.

3. (.
)

， 가
.

，

4 () 23 (가) ，
38 () 63 () .

， ， ，

29 ()

29 (

) (

) .

가

가 .

(TTA KO 05. 0028

, TTA KO 09. 0018)

· ,

29 2()

(1997-43

, 1997-44)

·

(1999-70 :

) ,

·

“ ”

가

·

가

		1990	
CDMA		1994	
		1995	
		1997	
가		1997	

(47CFR; Code of Federal Regulations Title 47)

47CFR2(47CFR
Part 2)
CDMA(Code Division Multiple Access) 가
TIA/EIA IS-95B IS-98A

RTCA(Radio Technical Committee for Aeronautical Service) ,

RTCM(Radio Technical Committee for Maritime Service)

. EPIRB(Emergency Position Indicating Radio Beacon)

, 47CFR68

TIA/EIA TR-41 가 TSB-31 ,

,
IEC(International Electric Committee) .

(EU; European Union)

CEPT(The European Conference of the Administration of Post and Telecommunication), ETSI(European Telecommunications Standards Institute), CEN(Comite Europeen de Normalisation), CENELEC(Comite Europeen de Normalisation Electrotechnique)

.
 , .

MKK

,
 , JIS

, .

ITU 2

,
 . ,

(ISO)

2

가

(IMD)

(ICAO)

가

가

1999- 70

()

()

가 , ,
 , , ,
 .
 ,
 가 .
 ,
 , , 가 . ,
 .

3

1

2

, 가,

가

.

(TTA) ,

, EM

. , 가

,

가 가

.

,

.

TTA

,

가

, EM

가

(CSPR)

,

TTA

.

,

.

TTA/EIA RTCA(Radio Technical Committee for Aircraft),
RTCM(Radio Technical Committee for Maritime)

, FCC

ETSI(European Telecommunication Standard Institute)

TTA

2

. 21

가

가

.

,

.

.

.

,

가

가

.

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.

-

-

-

-

CATV

- EM / EMS

,

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,

,

가

가 .

- () ()

, 가

- ,

-

- ()

- ()

- 가

,

·

4

가

.

.

가

.

.

.

,

,

.

1

1.1

○ 가
.

1.2

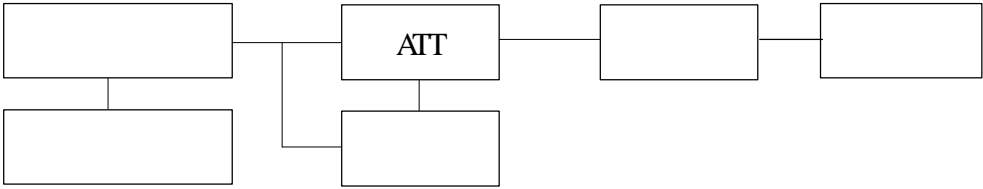
○ : 15
○ : ()
.

1.3

1.3.1



1.3.2



1.4

가 .

가 1 3

.

1 3 .

.

가 .

()

.

1.5 ()

- 8
- -
- 24
- 1 () , 2 · 3 · 4
 -
 -
 -

500

•

•

1

2

가

가

• 1

(

),

2

(

),

(-) 20

1

4

(

9 1

)

•

(-) 20

1

48

•

(-) 20

96

8

(

•

9 1

)

•

2

2. 1

○ 가 가

•

2. 2

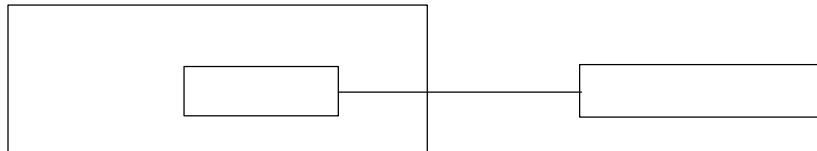
○ : 15

$$\bigcirc \qquad \qquad \qquad : \qquad \qquad \qquad (\qquad \qquad \qquad)$$

■

•

2.3



2.4

가 .

•

●

•

가 (-)20 (+)5

O

■

1

가

.

.

•

4.28MHz

()

.

2.5

()

가

(-)20

(+)50

.

1

가

•

•

•

•

• 가

•

•

• 900MHz

•

•

•

가 (-) 10 (+) 50

. 1

가

•

•

•

•

•

•

•

•

7

•

•

•

•

•

•

•

가 0 (+) 40 ,

. 1

가

• SSB

• 27MHz

• F3E G3E

• 28MHz

(+)70 48

가

•

(+)70 3 (+)55

가 2

• 1 (, .)

• (.)

(+)70 2

가

•

•

•

•

(+)20 가 45 1

1 가

•

(-)65 48

가

•

(+)55 3

가 2

• 1 ()

(+)55 2

가

•

•

•

• (DSC)

•

(-)25 3

가 30

• 1 (, .)

(-)40 2 가

•

(-)65 10 가

•

(-)65 48

가

•

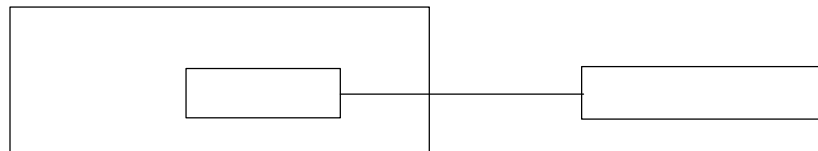
3

3. 1

○ 가 가

3.2

3.3



3.4

(+) 35 95% 4 .

가

.

.

.

()

.

3.5 ()

(+)35 95% 4 .
가

•

• ~

(+)50 95% 100% 48
가

•

(+)40 93% 4 ,
가

•

•

•

•

•

(+)35 93% 10
가

•

(+)35 93% 4
가

• 1 () • 2 • 3 • 4

,

(chamber)가 ,

.

.

4

4.1

○ 가 가 .

4.2

○ : 15
○ : ()
. .

4.3

가
. .
• (±) 10%
.
• 가 +10%
- 10% .
•
(-) 10% .
()
.

4.4 ()

• ((±) 20%)

• (-) 10% (-) 20%

• (-) 20% 0V
2%

• (+) 55 (+) 10%

• (-) 40 (-) 10%

3mm 0 500
1mm 500 1,800

30 (10

)가 가

· ·

()

·

5.5 ()

○ 가 , ·

3mm 0 500
1mm 500 1,800

30 (10

)가 가

· , , ·

2mm 3mm 0 500

1mm 500 1,800

15 (5

)가 가

·

·

•

•

•

28MHz

(.)

•

SSB

• 27MHz

3mm

0

500 ,

0.75mm

500

1,500

0.2mm

1,500

3,000

30

(10

)가

가

•

1 (

)

,

2

·

3

·

4

가

15mm

600

3,000

30

(10

)가

•

6 가

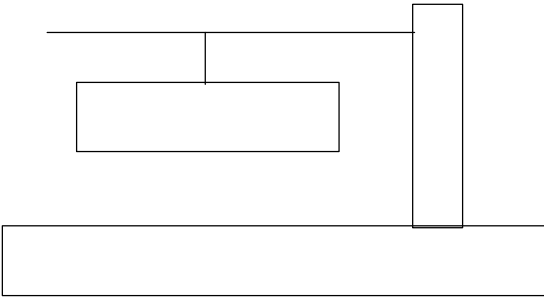
6.1

○ 가 가 가 .

6.2

○ : 15
○ : ()
 . .

6.3



6.4

 , 5Cm 1Cm
 3 , 18
 .

가 .

.

6.5 ()

○ 가 , .

5cm 3 1cm
3 .
, ,

.

•

•

•

•

•

• 27MHz

•

•

5G 1G 980 cm/s² 가 , 1G
가 .) 2G
2G 1 가 2
15G 3 가 가

•

7

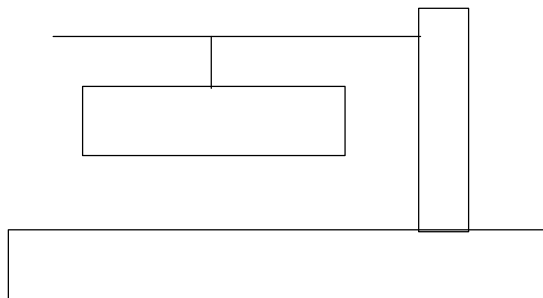
7.1

○ 가 가 .

7.2

○ : 15
○ : ()
.

7.3



7.4

.
(3.5~20m 3~5)
가 .
.

7.5 ()

3.5m 3 가

•

5m 3 가

•

•

5m 5 가

•

9m 3 가

•

20m 2 가

•

,

•

,

5가

•

(POOL)

,

•

,

8

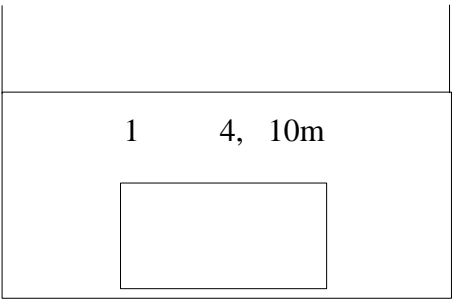
8.1

○ 가 가
.

8.2

○ : 15
○ : ()
.

8.3



8.4

.
5 (2, 24)
가 .

.

()

.

8.5 ()

1m 2 (가
30)

•

•

4m 24 가

•

(F3E G3E)

•

10m 5 가

•

•

가

.

, 3가 .

가

.

,

가

가

3

,

.

가

,

,

.

9

9.1

○ 가 가
.

9.2

○ : 15
○ : ()
.

9.3

가
.
()
.

9.4 ()

5cm 30 (1 1mm)
가 cm 3kg 4kg

2 가

•

5cm 36 (1 1mm) 가

3. 6Kg/ cm² 2

가 . , .

.

• 1 (), 2 . 3 . 4

20cm 15 °

3mm 5mm . 25

가

• (F3E GE)

.

가

, 가

가 .

10

10. 1

○ 가 가 .

10. 2

○ : 15
○ : ()
· .

10. 3

·
가
·
()
·

10. 4 ()

9, 000m :
가

- 6,000m 9,000m : 1 30%
가

- 6,000m : 1 45%
가

-

11

11.1

○ 가 가 .

11.2

○ : 15
○ : ()
· .

11.3

51.5m s 가
() .
· 1 ()
()
·

12

12. 1

○ 가 가 .

12. 2

○ : 15
○ : ()
.

12. 3

가 .
○ 84 2 8 가
• 1 ()
• 2

5

1

1.1

,

가 .

,

.

, (ITU-T

G 227 가) .

,

(511 2 9 PN) .

가 .

.

1.2

(50)

2

가
(Uechoi c Chamber)

가

1.3

3~10

○ 15kHz

○ 20kHz

1 가

.

,

가 ,

가 .

2

2.1

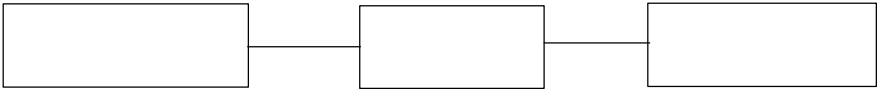
○ 가
.

2.2

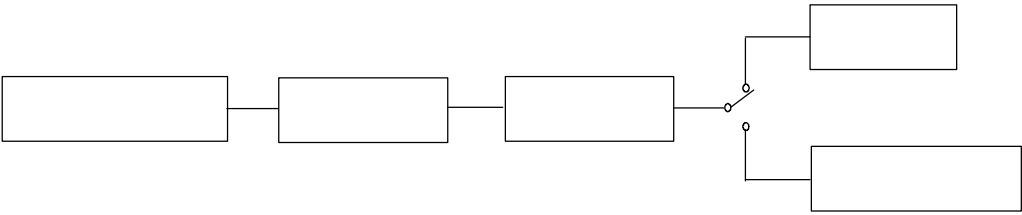
○ : 15
○ : (
)
○ : ()
.

2.3

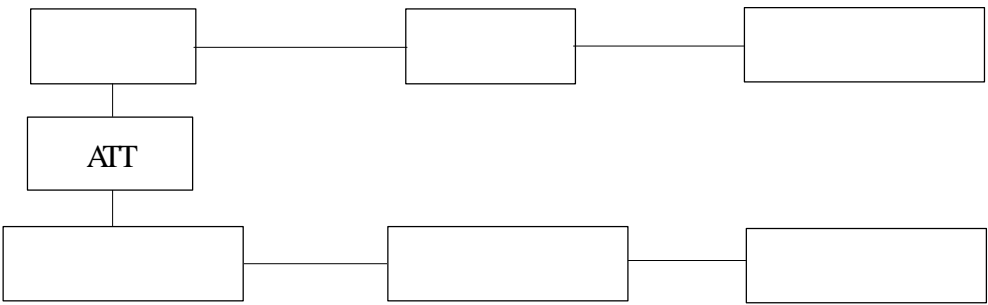
2.3.1



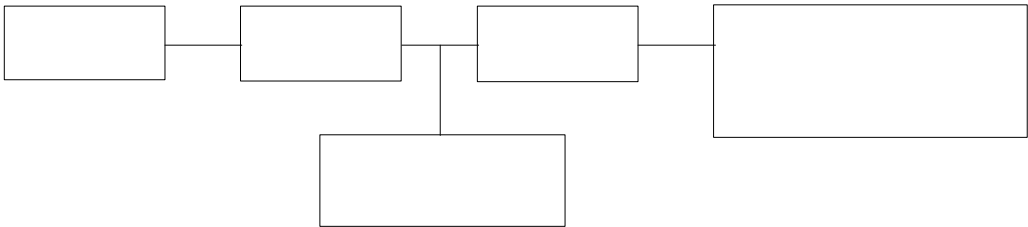
2.3.2



2.3.3



2.3.4



○ (Phase Locked Loop)
가 가 .

2.4

가
가 (가
) .
가
가 ,
가 .

·
(J3E) 1,400Hz
80% 가 가

·
() 1
, 3 , 가
가 .

2.5 ()

(R3E HBE)

• ~

J3E

• 28MHz

(
)

•

• 가

•

• 가

3

3.1

○ FM

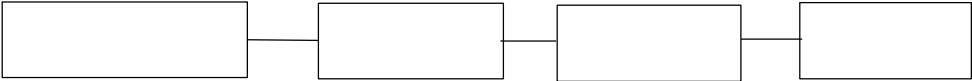
.

3.2

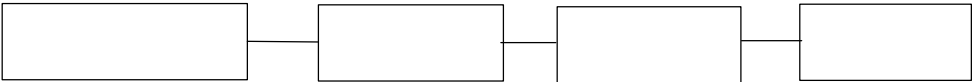
- : 15
 - : (
 -)
 - : ()
- .
- .

3.3

3.3.1



3.3.2



3. 4

3. 4. 1

,
15kHz .

3. 4. 2

,
20kHz .

3. 5

3. 5. 1

(: 500Hz,
1000Hz, 3000Hz 3)
(- 20dB + 30dB)
(+ -) .
가 ON
.

3. 5. 2

가 .
(- 20dB + 30dB)
(+ -) .

3. 5. 3

. (:
1000Hz, : 60%)
(20dB)

(+ -) .

가 ON

.

3. 6 ()

• 7

• F3E GE ()

•

•

•

4

4. 1

○ FM

.

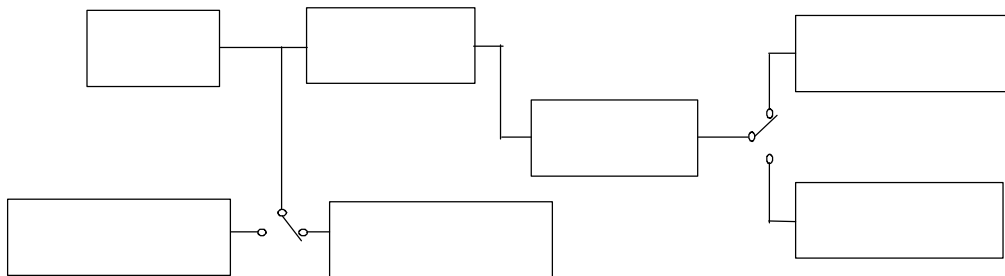
4. 2

○ :

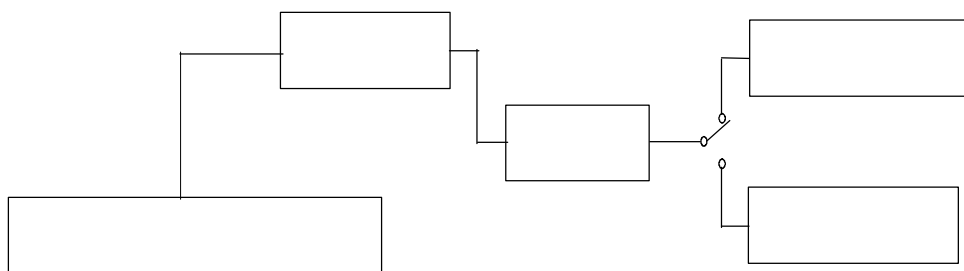
- : ()
 - : ()
- . .

4.3

4.3.1



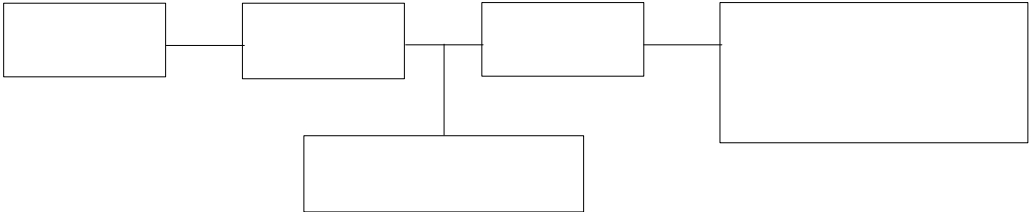
4.3.2



4.3.3

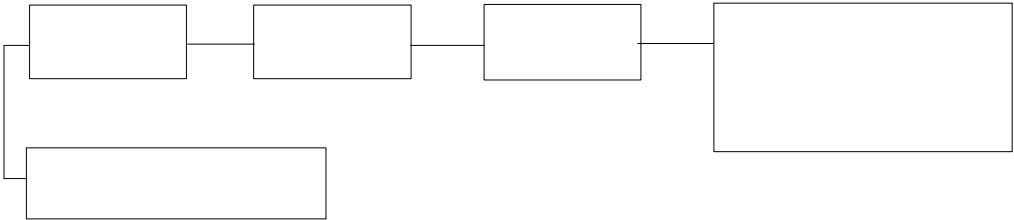


4.3.4



4.3.5

가



4.4

.

	3 5
	10001
	50 1
	(Max.Hold)
	10

4.5

4.5.1

1,000Hz 70% (70% 가)

.

10dB .

.

.()

.

() .

가

0.5%가 ()

.

가

0.5%가 ()

.

.

4. 5. 2

○

(J3E)

1, 400Hz

80% (

80%

가)

(HBE, R3E)

1, 400Hz

80% (

80%가

)

§ 4. 5. 1 ~

4. 5. 3

()

§ 4. 5. 1 ~

4. 5. 4

§ 4. 5. 1 ~

4. 5. 5

，
.
() .
§ 4. 5. 1 ~ .

4. 5. 6

가

(
) .
，
가 .
§ 4. 5. 1 ~ .

4. 6

()

- 7
-
- F3E GB E (
-)
-

-

-

- 28MHz

(

)

-

-

-

-

-

- 900MHz

-

- 가

-

- 가

가

- 가

-

- 가

5.1

○
.

5.2

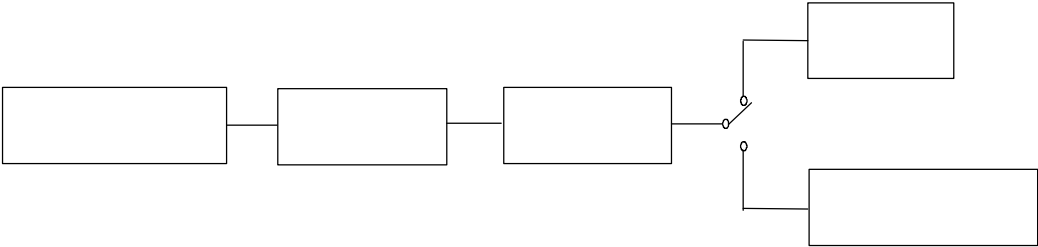
○ : 15
○ : (
)
○ : ()
.

5.3

5.3.1



5.3.2



5.4

5.4.1

가

	3 ~5
	10001
	50 1
	(Peak Detect)
	1 (Single Sweep)
	가
	()

5.4.2

	3 ~5
	10001
	가
	(Peak Detect)
	1 (Single Sweep)

1,400Hz

80% (

80%

가)

•

.

5.5 ()

●

- 28MHz

(

)

6

6.1

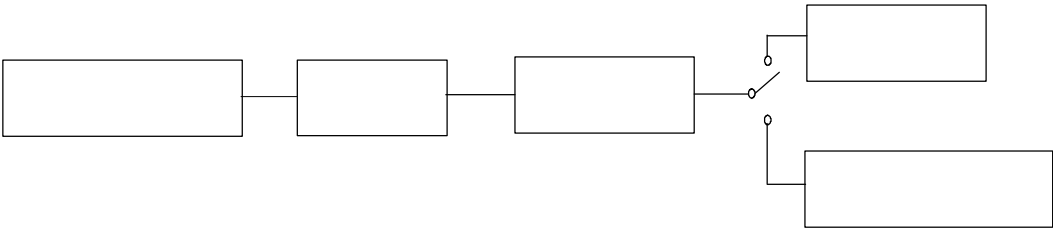
○
.

6.2

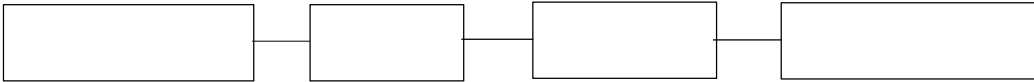
○ : 15
○ : (
)
○ : ()
.

6.3

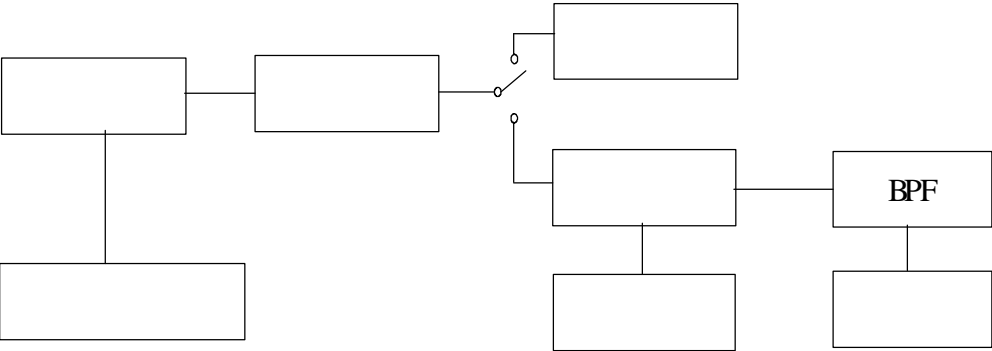
6.3.1



6.3.2



6. 3. 3 F3E, G3E



6. 4

	4 -6
	10001
	100
	300Hz
	(Peak Detect)
	1 (Single Sweep)

() P_0 .

(P_0) .

가

() .

가

1250Hz 60%

10dB 가 .

(ACPR)

100kHz
100kHz (±) 40kHz

•

25kHz 25kHz
(±) 8kHz

P_u, P_l

$(P_u/P_0), (P_l/P_0)$.

•

•

12.5kHz
12.5kHz (±) 5kHz

(P_0) .

가 A3E

(2, 500Hz 50%) 가
(5kHz,

10kHz)

(P_0) .

F3E

(1, 250Hz 1.5kHz) 가
(6kHz)

(P_0)

•

ACPR

가

§ 6. 3. 3

.

• F3E G3E

•

•

()

(F_L)

(F_0) -

(F_1) .

F_L 가 P_0 6dB

F_L (F_{L1}) .

F_L $F_{L1} + \Delta f$.

1250Hz 60%

+ 10dB 가 .

(P_u) .

()

(F_L)

(F_0) -

(F_1) .

F_L P_0 6dB

F_L (F_{L1}) .

F_L $F_{L1} - \Delta f$.

7

7.1

○

.

7.2

○

:

15

○

:

(

)

○

:

(

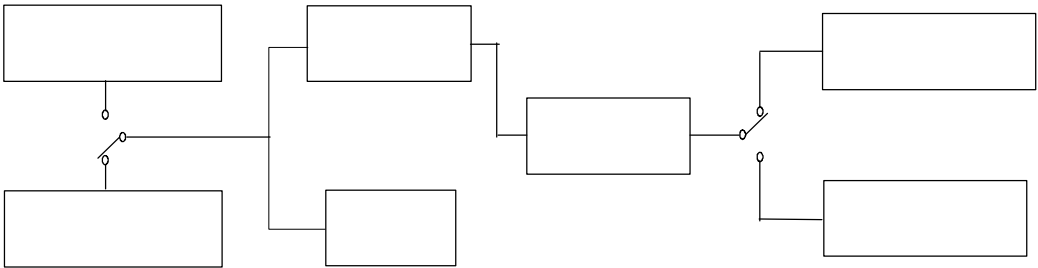
)

.

.

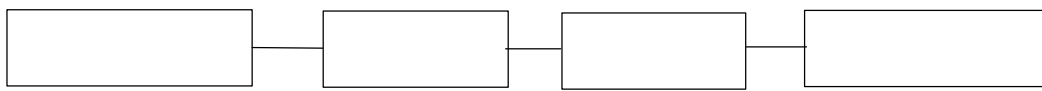
7.3

7.3.1

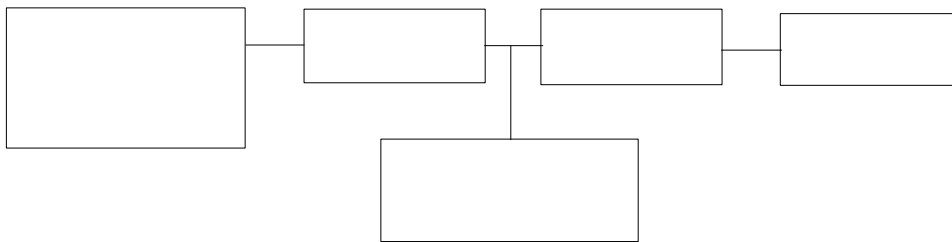


7.3.2

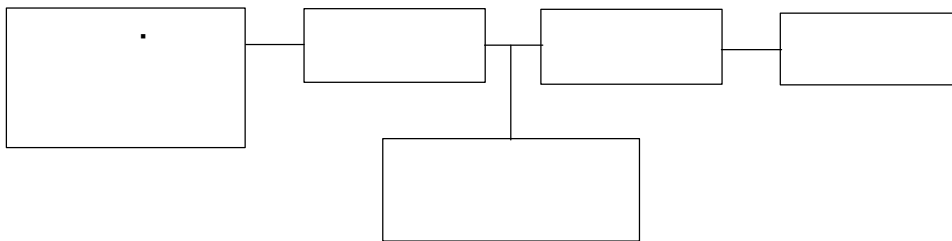
(. 가)



7.3.3



가



7.4

○

•

7.5

• 50 1

.

• 300Hz .

• (Max. Hbl d Mode) 10 .

() P_0 .

(P_0) .

1250Hz

60% .

,

10dB .

(P_0) .

가

.

• 가 가 $\pm 2\text{KHz}$,

$\pm 8\text{KHz}$

• CDMA CDMA

.

(

250%)

.

7.6 ()

- 가
-
-
-
-
- 가

8

8.1

○ 가 .

8.2

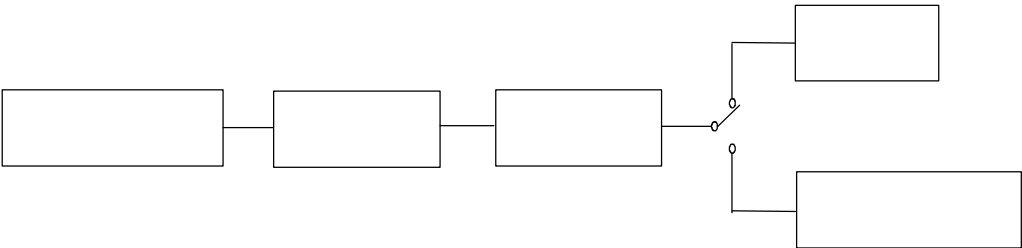
○ : 15
○ : ()
○ : ()
.

8.3

8.3.1



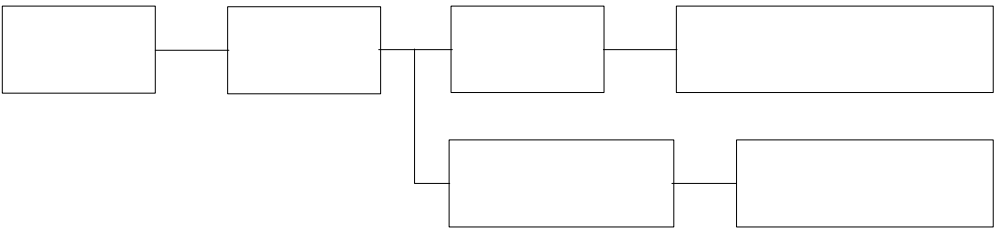
8.3.2



8.3.3

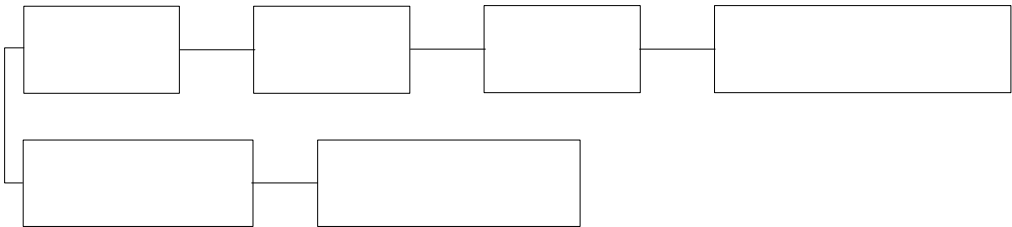


8.3.4



8.3.5

가



8.4

A3E

가

(

100pF)

50

가

8.5

가

.

.

	3 3
	.
	9kHz 150kHz : 1kHz 150kHz 30MHz : 10kHz 30MHz 1GHz : 100kHz 1GHz : 1MHz : 4kHz
	3
	()
	(Max.Hold)
	10

J3E 1, 400Hz 80%

(80% 가)

HBE 1, 400Hz 80%

(80%가)

.

.

.

9

9.1

○ .

9.2

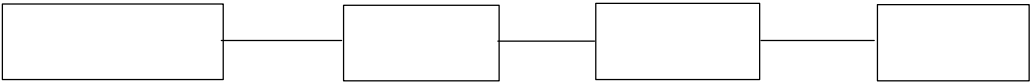
○ : 15
○ : (
)
○ : ()
 . .

9.3

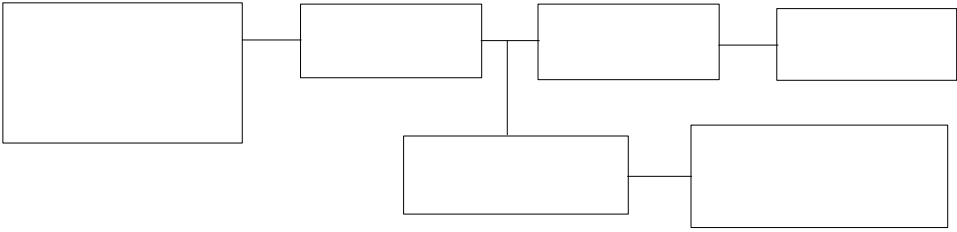
9.3.1



9.3.2

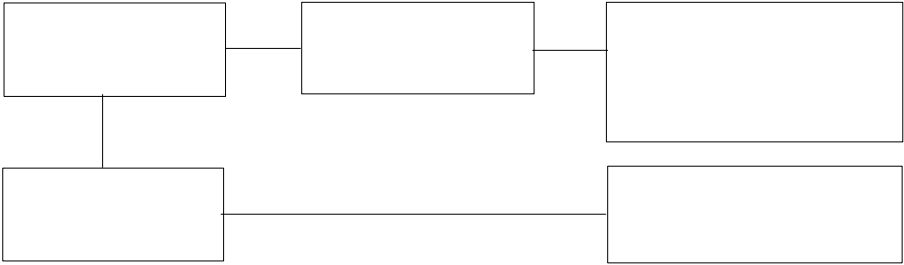


9.3.3



9.3.4

가



9.4

○

2dB

.

9.5

9.5.1

. , 가 가 () .

.

9.5.2

1,400Hz

가 ,

.

.

.

10

10.1

○
.

10.2

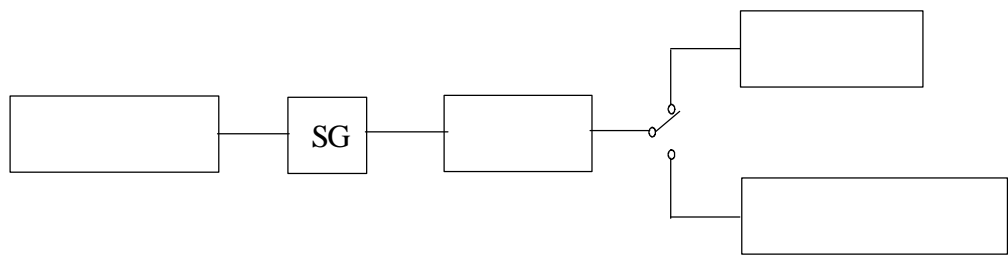
- : 15
- : (
-)
- : ()
- .
- .

10.3

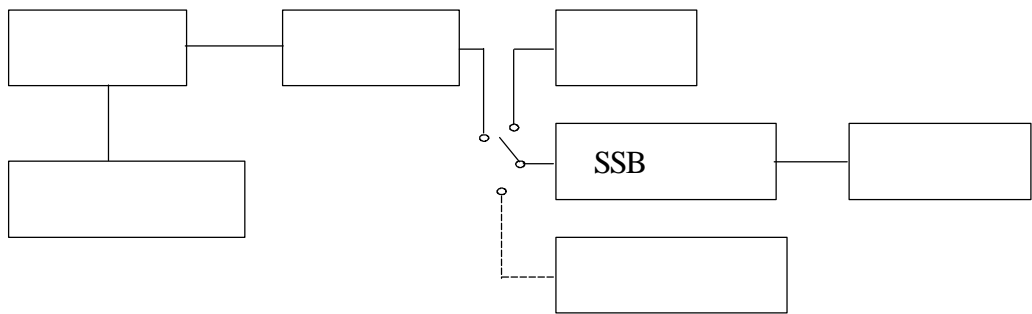
10.3.1 , , F3E G3E



10.3.2 , F3E G3E
, 28MHz



10.3.3 28MHz



10.4

○

300Hz .

10.5

()

1000Hz 70%

.

$S + N + D$ $N + D$.

()

SG 1kHz 70%

.

20dBμ

가

SG

1/2

SG

SINAD

(SSB)

1,400Hz

80% (

80%

가)

SSB 가

SINAD . (SINAD = (S+N+D)/(N+D), S : , N :

D :)

(SSB)

•

• 500Hz .

• 100Hz .

1,400Hz

80% (

80%

가)

(S, 1000Hz) 7

(D)

(S+D)/D .

(SSB)

SG , 가 (가 1,400Hz) .

SG 30 μ V가

.

SG

(1/2) .

(1,400Hz)

(S+N+D) / (N+D) .

10.6 ()

• 7

•

• F3E GE ()

• 28MHz

(

)

• F3E GE ()

11

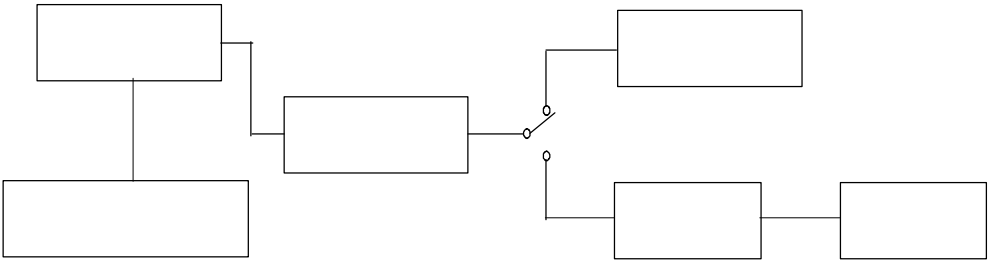
11.1

○ 가 .

11.2

- : 15
 - : ()
 - : ()
- .

11.3



11.4

1,000Hz 가
1KHz .

,

300Hz, 500Hz, 2000Hz 3000Hz

.

,

.

11.5 ()

• 가 ()

12

12. 1

○

.

12. 2

○

:

15

○

:

(

)

○

:

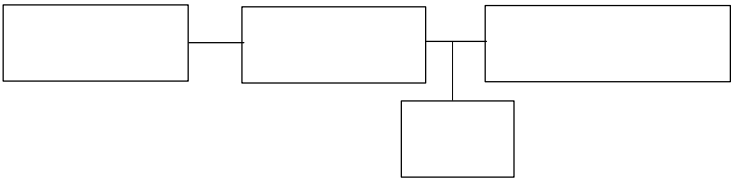
(

)

.

.

12. 3



12. 4

○

가

.

○

.

○ , , ,

12. 5

12. 5. 1

.

12. 5. 2

1

2

.

2

.

12. 6 ()

○

13

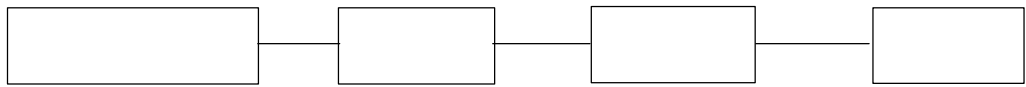
13. 1

○ 가
·

13. 2

○ : 15
○ : (
)
○ : ()
· ·

13. 3



13. 4

, ·

13. 5 ()

14

14. 1

○ 가
.

14. 2

○ : 15
○ : (
)
○ : ()
.

14. 3



14. 4

1. 5m
.
(3m)
.
.

14.5 ()

- 가
-

15

15.1

○ 가

.

15.2

○ : 15

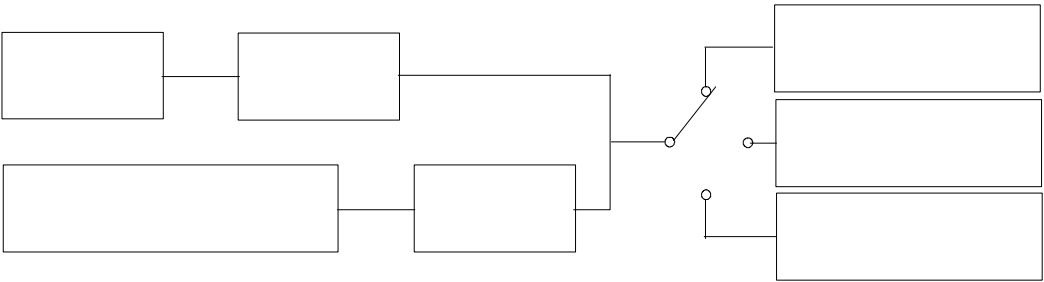
○ : ()

○ : ()

.

.

15.3



15.4

○ μs .

15.5

.

.

,

.

15.6 ()

○ 가

○

16

16. 1

○ 가 가

16. 2

16.3

16.3.1 가



16. 3. 2 가



16. 4

○ .

16. 5

()
1. 5m

16. 6 ()

-
-
- 28MHz
- (
-)
- F3E G3E (
-)
-
- 가
-
-

- 900MHz

-

-

-

17

17.1

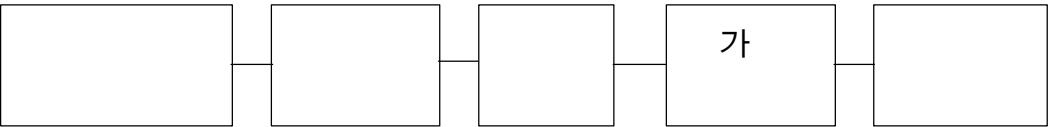
○ ()가

.

17.2

- : 15
 - : ()
 - : ()
- .

17.3



17.4

17.4.1

1000Hz 30% ,
() .

.
 , V1dB .
 Re .
 AdB .
 .
 .
 3 .
 AdB가 V2dB .
 .
 $V2dB - V1dB$.

17. 4. 2

. (1, 400Hz)
 (가)
)
 (1/2) .
 +
 10dB
 .
 $\frac{1}{3}$ 3 .

3 μ V

17.5 ()

• 7

• F3E GE ()

• 28MHz

18

18. 1

○

.

18. 2

○

:

15

○

:

(

)

○

:

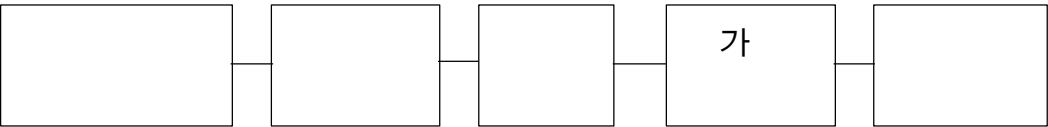
(

)

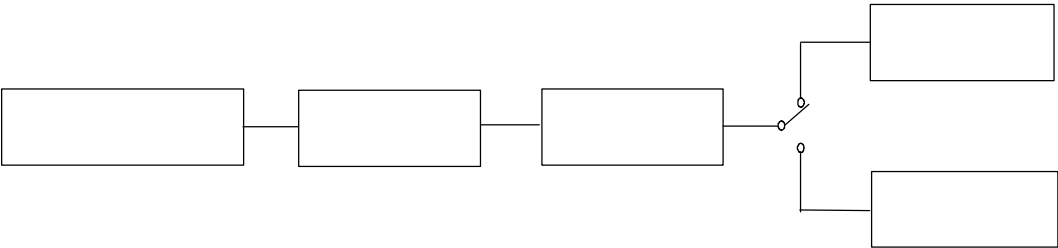
.

.

18. 3



○



18. 4

18. 4. 1

(
가 1,400Hz) .
ACC OFF , 가
(
,).
(A dB) (B dB)
.
가

A dB .
B dB
A dB (A - B) dB .

• : - 6dB 2

• :
.

$\Delta B_x / (f_x - f_e) [dB/ KHz]$

$\Delta B_x : f_x - f_e$

$f_e :$

$f_x :$

18. 4. 2

가

2. 3KHz ,

A dB

.

$\pm 2. 3KHz$

B dB

A dB

(A - B) dB

.

- 6dB

- 26, - 46, - 66dB

.

18. 5 ()

• 7

• F3E G3E (

)

• 28MHz

(

)

•

19

19.1

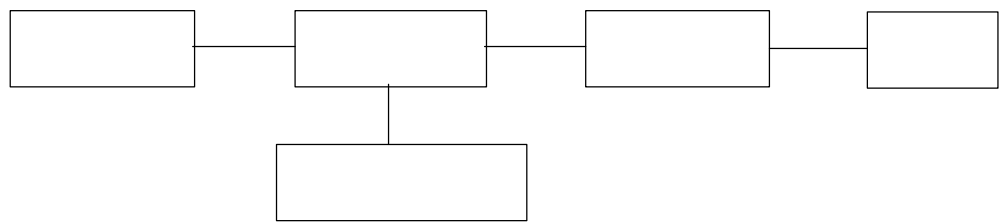
○ , 가 .

19.2

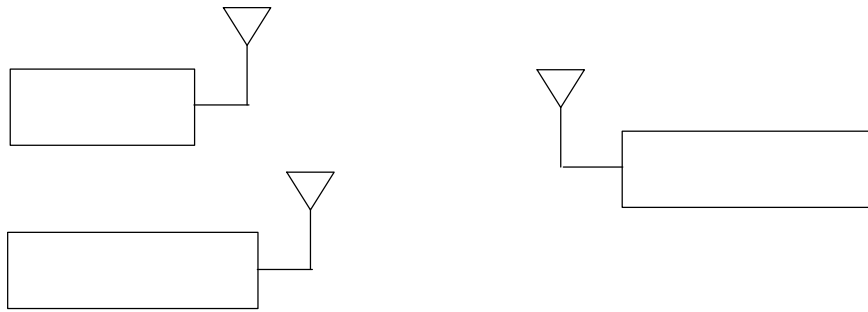
- : 15
 - : ()
 - : ()
- .

19.3

19.3.1 가



19. 3. 2



19.4

2

1.5m

19.5

19.5.1 가

() 가 .

QN

19. 5. 2 가

()

ON

○

$$V_i = E + Gr + 20 \log \quad - 9.94 \text{dB}$$

$$V_i : \quad () \text{ dB} \mu \text{V}$$

$$E : \quad \text{dB} \mu \text{V/m}$$

$$Gr : \quad \text{dB}$$

$$: \quad \text{m}$$

19. 6 ()

•

20

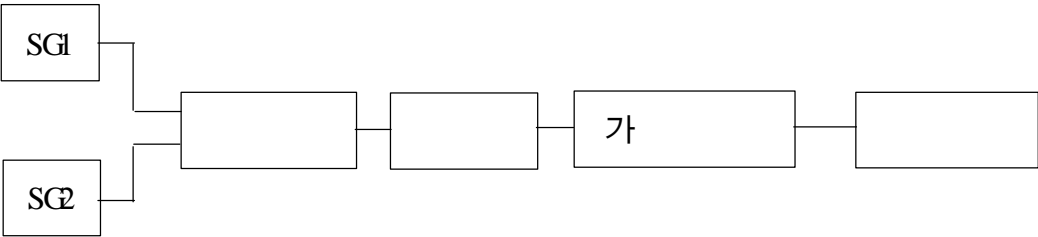
20. 1

○
·

20. 2

○ : 15
○ : (
)
○ : ()
· ·

20. 3



20. 4

SG
·
SG fr ·

, 가

SG1 .

SG1 $f_r + \Delta f$.

SG2 $f_r + 2\Delta f$.

SG 가 f_r ,

, SG

가 .

SG1 SG2

20dB .

SG1 SG2 .

SG1 20dB

SG2 SG .

SG 6dB

20dB . [SG2 f_r

$+ 2\Delta f$ (dB) SG1 $f_r + \Delta f$]

SG ,

P .

20.5 ()

• 7

• F3E G3E (

)

21

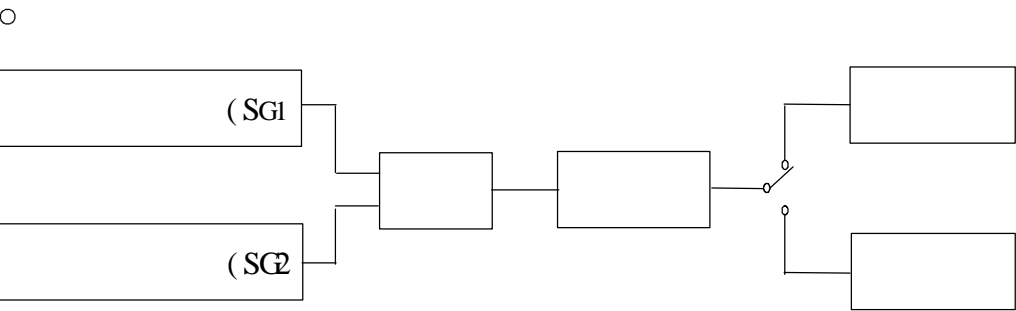
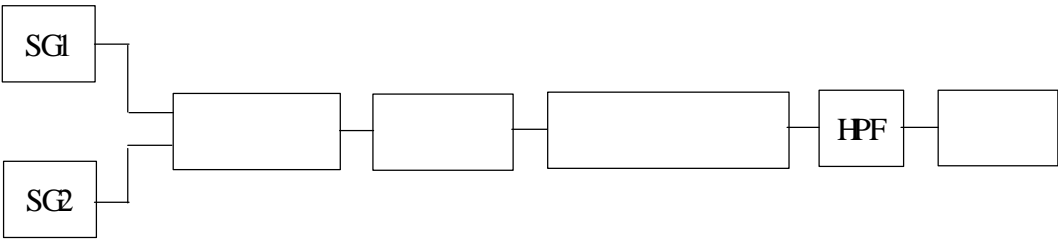
21.1

- ()가 .

21.2

- : 15
 - : ()
 - : ()
- .

21.3



21. 4

21. 4. 1

SGI

1, 000Hz 70% .

(20dB S/ N) 6dB 가가 SGI

(- 6dB) .

ACC ,

,

(1, 000Hz)

.

SG2

(Δf)

가 .

가 600

.

21. 4. 2

SGI , SG2 .

21. 5

21. 5. 1

SG2 가 3dB(

6dB) ()

.

,

가 .

() 가

10KHz, 20KHz, 30KHz

.

21. 5. 2

SC2 SG1 .

SG1 (가

1, 500Hz 10 μ V

가).

(1/2) .

SC2 .

SC2 4KHz

3dB .

SC2 4KHz

.

가 (

가 3dB가) 10mV

() .

21.6 ()

• 7

• F3E G3E ()

• 28MHz ()

22. 4. 1

·
OFF ·
SG , 20dB ·
·
·

22. 4. 2

(SG)
1, 000Hz 가
·

22. 5

22. 5. 1

SG ·
SG OFF ·
·
20dB (·
20dB 가) .
SG ON
·
SG ,
(dB) ·

22. 5. 2

SG

가 1, 000Hz

SG

3 μ V

(

,

)

1/ 2

$$SINAD(S+N+D/N+D)$$

22.6 ()

• 7

• F3E G3E ()

• 28MHz ()

23

23. 1

○

.

23. 2

○

:

15

○

:

(

)

○

:

(

)

.

.

23. 3



23. 4

SG

1, 000Hz

70%

.

(

1/ 2)

.

SG 1KHz, 10 μ V

1 KHz, 10 μ V

10 μ V

SG 300Hz, 500Hz, 2000Hz 3000Hz

300Hz, 500Hz, 2000Hz 3000Hz

23.5 ()

- 가

24

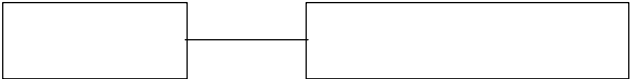
24. 1

○ 가 가 .

24. 2

○ : 15
○ : ()
○ : ()
.

24. 3



24. 4

24. 4. 1

가
.
가 1
 f_{max} f_{min} f_s

$$\frac{(f_{\max} - f_s)}{f_s} [\%] \quad \frac{(f_s - f_{\min})}{f_s} [\%] \quad .$$

24. 4. 2

가

.

가

1

F_{\max} ,

F_{\min} ,

F_s

$F_{\max} - F_s$

$F_s - F_{\min}$

.

24. 5 ()

• 7

• F3E G3E ()

• 28MHz ()

25

25.1

○ SSB

.

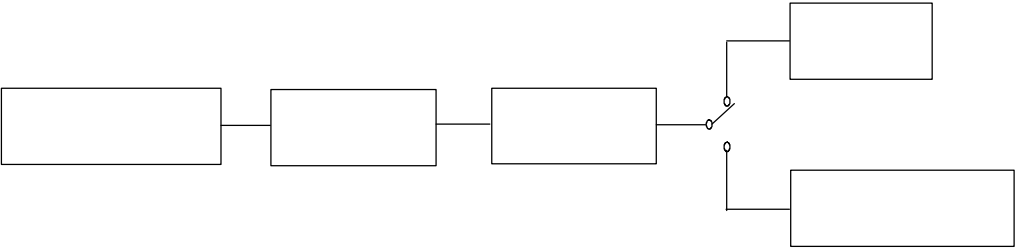
25.2

- : 15
- : (
-)
- : ()

.

.

25.3



25.4

○ .

	+
	10KHz
	300Hz

25. 5

25. 5. 1J3E

1, 400Hz 25% (25% 가) . 200Hz 3, 000Hz . 350Hz 2, 700Hz . ○ : 200Hz 3, 000Hz 150Hz . 2, 700Hz .

25. 5. 2HBE

1, 400Hz 25% (25% 가) . 200Hz 3, 000Hz . 350Hz 2, 700Hz .

25. 6 ()

- 28MHz

6

1

ITU

S3

. ITU

가

~~WRC-97~~

.

~~WRC-97~~

가가

가

가

, 가가

가

.

,

S3

가

, 가
 (ITU-R SM329) (7)
 .
 ITU-R SM329-7 (SM329-8) TGI/5
 ITU-R TGI/5 3 (99 1 12)
 SM329-7 Category-C(),
 Category-D(), 4 (8 16 ,)
 . 가
 WRC-97 (Category-B).

, 가
 .
 , , 가
 가 .
 가 .
 가 .

2.

(RR)	/	/	(5 RR)	I TU- R
		98- 56		46+10l og(P) 60dBc
	FM			46+10l og(P) 70dBc
	MF/ HF			50dBc 50mW
08xx		97- 17	25W70dBc 1mW <25W2. 5 μ W	43+10l og(P) 70dBc
11xx 가		109	60dBc 43+10l ogPy	43+10l og(P) 70dBc
12xx TRS		98- 14 8	380MHz : 60dBc 1mW 25kHz : - 13dBm/ 30kHz 12. 5kHz : <1GHz: 20dBm/ 10kHz 70dBc >1GHz: 20dBm/ 1MHz 70dBc	43+10l og(P) 70dBc
31xx 1800MHz 가		96- 88	- 13dBm/ 1MHz	43+10l og(P) 70dBc
33xx 900MHz		96- 90	60dBc	43+10l og(P) 70dBc
		98- 74	250nW(- 36dBm)	43+10l og(P) 70dBc

(RR)	/	/	(5 RR)	I T U- R
	02xx			Nb Li mi t
	03xx			Nb Li mi t
	06xx			Nb Li mi t
	09xx	94	43dB 50mW(Py) .	43dB (PEP)
	10xx VHF / UHF			
	14xx 27MHz			43+10l og(P) 50dBc
	21xx	69 5	50mW(Py) .	43+10l og(P) 50dBc
	22xx			43+10l og(P) 50dBc
	25xx			43+10l og(P) 70dBc
	29xx			43+10l og(P) 70dBc
	30xx			
	37xx 가	98- 33	43+10l og(Py) .	43+10l og(P) 70dBc
	39xx	96	60dBc() .	43dB (PEP)
		92- 155	60dBc .	43+10l og(P) 60dBc

(RR)	/	/	(5 RR)	I T U · R
	05xx	78 79	60dBc 43+10l ogPy .	43dB . (PEP)
	13xx			43+10l og(P) 60dBc
	04xx			43+10l og(P) 60dBc
	07xx			43+10l og(P) 60dBc
	18xx			43+10l og(P) 60dBc
	26xx			43+10l og(P) 60dBc
	27xx	92- 152	No Li mi t	No Li mi t

(RR)	/	/	(5 RR)	ITU-R
	38xx	98-107	<p><30MHz: -66dBW 10kHz</p> <p><1GHz: -66dBW 100kHz</p> <p><1.559GHz: -66dBW 1MHz</p> <p><1.610MHz: -70dBW 1MHz</p> <p><1.6285GHz:</p> <p><1.6315GHz: -60dBW 30kHz</p> <p><1.6365GHz: -60dBW 100kHz</p> <p><1.6465GHz: -60dBW 300kHz</p> <p><1.6665GHz: -60dBW 1MHz</p> <p>>1.6665GHz: -60dBW 3MHz</p>	<p>43+10log(P) 60dBc</p>

(RR)	/	/	(5 RR)	I TU- R
	15xx			
	19xx	98- 90		
	19xx	98- 90	40dBc	56+10lg(P) 40dBc
	19xx	98- 90 -		56+10lg(P) 40dBc
	19xx LAN	98- 90	43dBc	56+10lg(P) 40dBc
	19xx	98- 90	40dBc	56+10lg(P) 40dBc
	19xx	98- 90	40dBc	56+10lg(P) 40dBc
	19xx	98- 90	40dBc	56+10lg(P) 40dBc
	19xx	98- 90	40dBc	56+10lg(P) 40dBc
	20xx	98- 14 9	60dBc	56+10lg(P) 40dBc
	32xx			56+10lg(P) 40dBc
	36xx	98- 44	960MHz: 55dBc . >960MHz: 50dBc .	56+10lg(P) 40dBc .

(RR)	/	/	(5 RR)	ITU-R
	17xx			
	35xx			
	34xx , ,			
	01xx			
ISM	16xx			

ITU-R -

.

5 RR

.

2 PCS

1999 -25 (1999. 4. 3)

.

.

. ,

.

2.1

1998-25 , 2

.

. 1840 1850MHz, 1850 1860MHz 1860 1870MHz

.

- (1)

1MHz

12. 5kHz
- 13dBm

.
- (2)

1MHz

1MHz
- 13dBm

.

(1) 가

FA (Frequency Allocation) 1. 25MHz

2. 25MHz 12. 5kHz ,

가 (: 10kHz) - 13dBm

·

· (2) ITU-R S3 2

FA

2. 25MHz

1MHz 가 (: 100kHz)

- 13dBm ·

2. 2

ITU-R ITU-R SM329

·

· (Fundamental Rejection Filter)

·

(RBW) ,

가

·

(ITU-R Rec. SM329-8 2 §1.1.2).

$$RBW = 2 \times (\Delta f - NBW/2) / (SF - 1)$$

RBW :
 Δf : ()
 NBW : ()
 SF :

PCS

가 FA 2.25MHz
 가 RBW 230kHz

RBW : 230kHz
 Δf : 2.25MHz
 NBW : 1.25MHz(ITU-R PCS)
 SF : 15

○ “ ” (RBW
 “ ” IF 가
 15:1 Shape Factor 가

(1) 가 .

(2) RBW ,

가

가

가

RBW

.

$$= + 10 \log(/)$$

○ 12.5kHz

$$10\text{kHz} = + 10 \log(12.5 / 10) .$$

○ 1MHz 100

$$\text{kHz} = + 10 \log(1000 / 100) .$$

(1) 10kHz

가 FA

1.25MHz 2.25MHz

-13dBm .

(2) RBW 100

kHz 가 FA

2.25MHz

-13dBm .

VBW (Video Bandwidth) RBW 3 5 가

RBW

(Span)

3 가

5~7 가 .

FA

7.5MHz(Shape Factor 15:1)

RBW 1MHz 3

,

,

.

.

2.3

(HPA)

,

FA

FA

.

FA

FA

.

, 4FA 8W

가 1FA

2W

.

FA

.

, 4FA 8W

1FA 8W

FA

.

2FA 4W

4FA

4FA 4WFA 1W

.

(FA) FA

.

FA

FA 가

. ,

,

FA 가

.

,

FA(1 , 3 , 5

) 가

가 .

3 FM

1999 - 28 (1999. 6. 1)

.

가

3. 1

5

72.610	73.910MHz	60kHz	$\pm 22\text{kHz}$
74.000	74.800MHz		
75.620	75.790MHz		
173.020	173.280MHz	200kHz	$\pm 75\text{kHz}$
217.250	220.110MHz		
223.000	225.000MHz		
740.000	752.000MHz		
928.000	930.000MHz		
950.000	952.000MHz		

1/ 2

300Hz

25dB

300Hz

35dB

2. 5

100kHz

- 13dBm

.

100kHz

- 13dBm

.

5

(“ ” .)

.

70MHz

5kHz

100MHz

1GHz

15kHz

. (1), (2)

(200

kHz

$\pm 500\text{kHz}$

) , (3), (4)

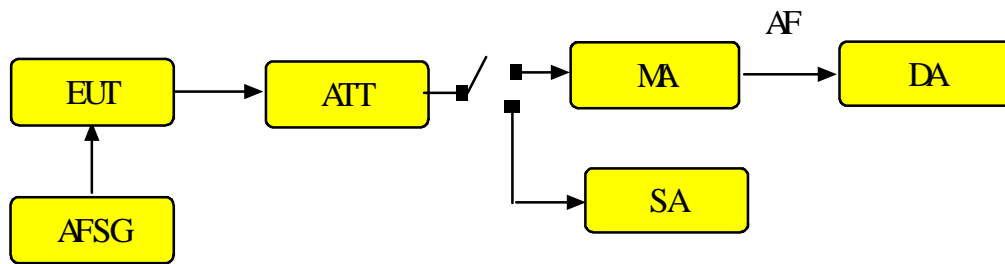
(Radi o Regul at i on) S3 2

500kHz

.

3. 2

3. 2. 1



AFSG : Audio Frequency Signal Generator

EUT : Equipment under Test

ATT : Attenuator

MA : Modulation Analyser

DA : Distortion Analyser

SA : Spectrum Analyser

3.2.2

AFSG 1kHz

EUT 가 .

가 가

(“ ”),

70% 가

(“ ” .)

○ ,

“ ” ± 25

$\pm 75\text{kHz}$, 1kHz 가

70%

,

.

10dB
AFSG 100Hz 15kHz
가 .
○ CITT
C27
10dB .
가 가
가 가 ITU .
: DA 가
5 .

3.2.3

- .
- : 3
 - : (EUT
 - : EUT) 1/100 ,

3.2.2 EUT SA
OBW .
: 가 5

3.2.4

ITU-R ITU-R

SM329-7

,

ITU-R

(RBW)

.

(RR S3)		
1 kHz	: 9 kHz	150 kHz
10 kHz	: 150 kHz	30 MHz
100 kHz	: 30 MHz	1 GHz
1 MHz	: > 1 GHz.	

,

(Fundamental

Rejection Filter)

.

3.2.2

SA

.

(3) 70MHz

,

150kHz(

2.5)

RBW

21kHz

.

Δf : 150kHz

NBW : 200kHz ()

SF : 15 (RBW)

RBW : 21kHz

(3) 100MHz

, 500kHz

RBW 57kHz

.

(4) 100MHz

, 가

200kHz

,

가

RBW 14kHz

.

·

·

·

RTCA

,

, I T U - R

·

,

가 .

가

,

가

가

· ,

,

“

가 ”

·

1. ITU-R SM329-7 " " , ITU-R, 1997
2. ARIB-15A(70, 300, 800MHz), "
3. ARIB-22A(797.125-875MHz, 797.250-805.750MHz), "
(= 125kHz)"
4. ARIB-T54(75MHz), "
5. EIA-152-C, "Minimum Standard for FM or PM Land Mobile Radio Communication Transmitter", TIA/EIA
6. TSO 74C "Airborn ATC Transponder Equipment", FAA
7. TSO C 93 "Airborne Interim Standard Microwave Landing System Converter Equipment", FAA
8. TIA/EIA/IS-98-B, "Recommended Minimum Performance Standards for Dual-Mode Wideband Spread Spectrum Cellular Mobile Stations", TIA/EIA
9. TIA/EIA/IS-95B, Mobile Station-Base Station Compatibility Standard for Dual-Mode Spread Spectrum Systems(Mobile Station Part)
10. TIA/EIA/IS-95B, Mobile Station-Base Station Compatibility Standard for Dual-Mode Spread Spectrum Systems(Base Station Part)
11. 6 , " , ,
1990
12. " CDMA ",
, 1994
13. " ,

14. “ ”,
1997
15. “가”, , 1997
16. “ ”,
, 1995
17. “CDMA
“, , 1996
18. “ ”,
, 1997
19. EN 301 055 V1.1.1, "Transmission and Multiplexing(TM;
Digital Radio Relay Systems(DRRS); Direct Sequence Code
Division Multiple Access(DS-CDMA) point-to-multipoint DRRS
in frequency bands in the range 1GHz to 3GHz", 1998.02, ETSI

1

2

2.1

2.1.1

	ARIB-15A(70, 300, 800MHz)		
	D	C	B
	70MHz	300MHz	800MHz
	10KHz(10mW)	7KHz(1mW)	15KHz(10mW)
	60KHz	30KHz	110kHz
	± 20KHz	± 8KHz	± 40KHz
	± 3KHz	± 2.25KHz	± 5KHz

2.1.2 (= 125KHz)

	ARIB-22A(797.125 - 875MHz, 797.250 - 805.750MHz)	
	40KHz	40KHz
	15KHz(10mW)	15KHz(10mW)
	110KHz	330KHz
	± 40KHz	± 150KHz
	± 5KHz	± 2.4KHz

2. 1. 3

	ARIB-T54(75MHz)		
	10KHz(10mW)	7KHz(10mW)	5KHz(10mW)
	80KHz	30KHz	20KHz
	± 30KHz	± 8KHz	± 5KHz
	± 5KHz	± 2.25KHz	± 1.2KHz

2. 2

		()	
F3E	()	1KHz 70%	10dB 가 ()
F2		60 -90%	
F1		60 -90%	TTI RS-232C
F1E()		70%	
F3E	()	1KHz ± 1.75KHz	10dB 가
B (800MHz)	1KHz	± 5KHz	36dB 가
C (300MHz)	1KHz	± 2.25KHz	28dB 가
D (70MHz)	1KHz	± 3KHz	16dB 가
40KHz	1KHz	± 5KHz	36dB 가
40KHz	1KHz	± 2.4KHz	36dB 가
FM-FM		70%	10dB 가
PWM-FM	가 (가 가)	70%	10dB 가

3

- FM PM , 25 866MHz
(EIA-152-C)

3.1

3.1.1

" $\pm 5\%$
가 . dut y cycl e
." .
.

3.1.2

.
 $\pm 5\%$ 가 .
dut y cycl e
.

3.2

3.2.1

- .
• (dB) = 43 + 10log10(wat t s) (
- 13dBm(50uW)

3.2.2

- 1 KHz 50% 16dB
2.5KHz .
 $\pm 250\%$
가

3.3

3.3.1

- .
• t m (dB) = 43 + 10log10(watt s) (-13dB(50uW))

3.3.2

- .
FIM
.
(calibration ruler) .
가 $\pm 250\%$
가

FIM , 가 , 가 .

. 가 가 가 , .

. () .

가 가 , 가 . 30cm 가 .

FIM

, . 가 .

f

(w a t t s) .

(dB)

$$(dB) = 10 \log_{10} [\quad \quad \quad (watts) /$$

3. 4

3. 4. 1

○ 10% .

3. 4. 2

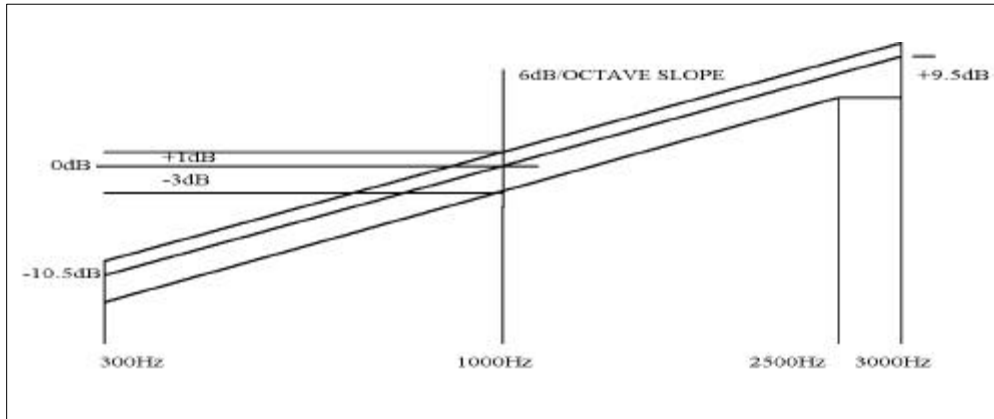
○ 가 .

3. 5

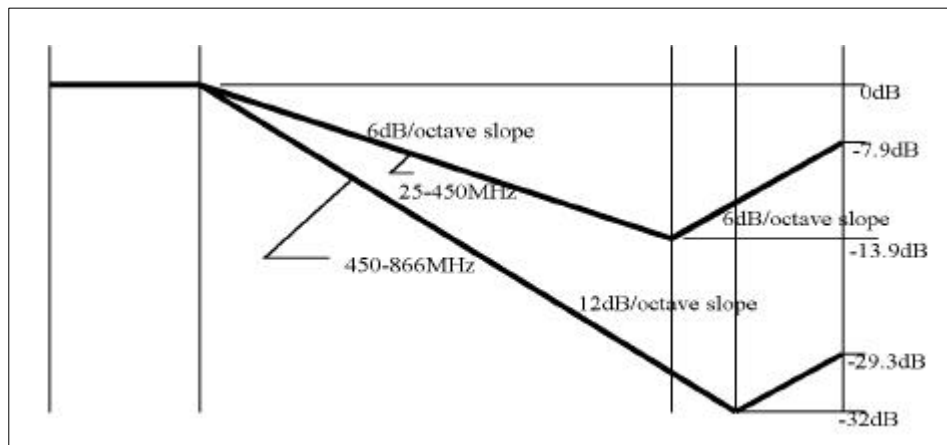
3. 5. 1

300-3000Hz 1000Hz
pre-emphasis 6dB/octave +1
-3dB (2500Hz 3000Hz octave
roll-off 6dB).
(3000Hz) 25-450MHz : 3KHz
15KHz 6dB/octave de-emphasis 15KHz
30KHz 6dB/octave pre-emphasis

(3000Hz) 450- 866MHz : 3KHz
 20KHz 12dB/ octave de-emphasis 20KHz
 30KHz 6dB/ octave pre-emphasis



1. (300- 3000Hz)



2. (3000Hz)

3. 5. 2

1% 1000Hz 60%

.
 . () , 300
 3000Hz . 30%
 .
 1000Hz
 20dB .
 . (0dB)
 , 3000Hz 30, 000Hz

3. 6 FMHum & Noi se

3. 6. 1

- FMHum & Noi se Level < 2-5-5> .
 <2-5-7>

Power Supply Fundamental Operating Frequency	FM Hum & Noise Level
200 Hz	35 dB
200 Hz	40 dB

3. 6. 2

- ,
 ,
 (

).

3. 7

3. 7. 1

.

3. 7. 2

가

.

1000Hz

60%

. one

step(10% 90%

(rise time)

0. 1s

) 20dB

가

.

가

가

.

20dB

,

300Hz- 3000Hz

.

3. 8

3. 8. 1

○

< 2- 5- 6>

.

< 2- 5- 8>

All Fixed and Base	Mobile Over 2W Output	Mobile 2W Output or Less
25-50MHz $\pm 0.002\%$	$\pm 0.002\%$	$\pm 0.005\%$
50-450MHz $\pm 0.0005\%$	$\pm 0.0005\%$	$\pm 0.005\%$
450-512MHz $\pm 0.00025\%$	$\pm 0.0005\%$	$\pm 0.0005\%$
806-866MHz $\pm 0.00015\%$	$\pm 0.00025\%$	$\pm 0.00025\%$

3.8.2

○

가

가

.

5

가

.

15

.

3.9

3.9.1

○

$\pm 10\%$

,

3dB

.

가

$\pm 15\%$

.

- 20%

,

가

6dB

.

3.9.2

○

.

.

1. Recommendation ITU-R SM329-7 "Spurious Emission Limits", ITU-R, 1997
2. ARB-15A(70, 300, 800MHz), "Dedicated Short Range Communication Device(Radio Microphone)"
5. EIA-152-C, "Minimum Standard for FM or PM Land Mobile Radio Communication Transmitter", TIA/EIA
6. TSO 74C "Airborn ATC Transponder Equipment", FAA
9. TIA/EIA/IS-95B, Mobile Station-Base Station Compatibility Standard for Dual-Mode Spread Spectrum Systems(Mobile Station Part)
10. TIA/EIA/IS-95B, Mobile Station-Base Station Compatibility Standard for Dual-Mode Spread Spectrum Systems(Base Station Part)
19. EN 301 055 V1.1.1, "Transmission and Multiplexing(TM); Digital Radio Relay Systems(DRRS); Direct Sequence Code Division Multiple Access(DS-CDMA) point-to-multipoint DRRS in frequency bands in the range 1GHz to 3GHz", 1998.2, ETSI.