

CISPR A

• (Basic Standards)

1. (Basic Standards)

가. CISPR SC- A SC(SC- B ~ SC- H),
(Product Family Standards)

. CISPR SC- A FCC Laboratory A. Wall
Lucent Technologies D. Heirman .
SC- A (Working Group) WG1 WG2가 .
WG1 EMC D.
Heirman , Hewlett- Packard W. Schaefer . WG2
EMC
Rhode & Schwarz M. Stecher ,
B. Despres .

. CISPR 1999 5 31 () 2 San
Diego . CISPR SC- A A. Wall
1998 Frankfurt SC- A
. CISPR/A Working Group

2.

가. CISPR/A

- (1) CISPR 16-1 A2 f3 Ed.1.0 .
(Sub-clause 1.3, new Clause 21, new Annexes Q, R, S, T, U, V)

. Ref. documents: CISPR/A/244/FDIS

- (2) CISPR 16-1 A2 f2 Ed.1.0 1GHz (Sub-clauses 6.2,
15.6, new Clause 22)

.
Ref. documents: CISPR/A/244/FDIS

- (3) CISPR 16-1 A2 f7 Ed.1.0 (Sub-clause 2.6)

.
Ref. documents: CISPR/A/244/FDIS

- (4) CISPR 16-1 A2 f5 Ed.1.0 (artificial mains) V
(New sub-clause 11.10, new Annex F.8)

.
Ref. documents: CISPR/A/244/FDIS

- (5) CISPR 16-1 A2 f6 Ed.1.0 . (Clause 20)
CD

Ref. documents: CISPR/A/252/CD (NC comments due 16/08/99)
CISPR/A/178/RVN, CISPR/A/170/NP

- (6) CISPR 16-1 f1 Ed.2.0 .

.
Ref. documents: CISPR/A/244/FDIS

- (7) CISPR 16-1 A2 f1 Ed.1.0
(Sub-clause 4.4.1)

.
Ref. documents: CISPR/A/244/FDIS

(8) CISPR 16-1 A2 f2 Ed.1.0 CISPR

(Sub- clauses 2.5.1, 4.5)

Ref. documents: CISPR/A/244/FDIS

(9) CISPR 16-2 A1 f3 Ed.1.0 1GHz

(Sub- clause 2.6.3, new Clause 2.6.6)

Ref. documents: CISPR/A/241/FDIS

(10) CISPR 16-2 A1 f5 Ed.1.0

AMN

(New sub- clause 2.4.4.4.3, Annex A)

Ref. documents: CISPR/A/241/FDIS

(11) CISPR 16-2 A1 f4 Ed.1.0

(New sub- clause 2.4.2.1, Annex D)

Ref. documents: CISPR/A/241/FDIS

(12) CISPR 16-2 A1 f1 Ed.1.0

(ambient signals)가

(Sub- clause 4.1)

. [A/WG2]

Ref. documents: CISPR/A/XXX/CDV, CISPR/A/222/CC, CISPR/A/202/CD
NC(National Committee)

(13) CISPR 16-2 A2 f1 Ed.1.0

. (Clause 11)

. {A/WG2]

Ref. documents: CISPR/A/195/RVN, CISPR/A/190/NP
WG2 CD.

(14) CISPR 16-3 A1 f1 Ed.1.0

CC . [A/WG2]

Ref. documents: CISPR/A/234/CD, CISPR/A/250/CC

(15) CISPR 16-1, Clause 13: 30MHz 1000MHz

clamp Annex H: clamp
PNW CIS/A- 210 Ed.1.0

Ref. documents: CISPR/A/226/RVN, CISPR/A/210/NP

(16) CISPR 16- 1, Clause 12, Subclause 12.2:
가 PNW CIS/A- 211 Ed. 1.0

Ref. documents: CISPR/A/227/RVN, CISPR/A/211/NP

(17) CISPR 16- 1, Clause 6.2: 1GHz 18GHz
- New Annex XX: (APD)
PNW CIS/A- 212 Ed. 1.0

Ref. documents: CISPR/A/228/RVN, CISPR/A/212/NP
1GHz

(18) CISPR 16- 1, Clause 4: 9kHz 1000MHz
PNW CIS/A- 213 Ed. 1.0

Ref. documents: CISPR/A/229/RVN, CISPR/A/213/NP

(19) CISPR 16- 2: EMC anechoic chambers - anechoic
chambers (anechoic rooms (FAR))
PNW CIS/A- 215 Ed. 1.0

Ref. documents: CISPR/A/235/RVN, CISPR/A/215/NP

(20) CISPR 16- 1, Clause 14: PNW CIS/A- 216 Ed. 1.0

Ref. documents: CISPR/A/235/RVN, CISPR/A/215/NP

- (가) CISPR/A(SanDiego/Killian- Pietranik)99- 1
(CISPR/A(San Diego/Poland) 01- 99)
() CISPR/A(San Diego/Killian- Pietranik)99- 2
() CISPR/A(San Diego/Killian- Pietranik)99- 3
() CISPR/A(San Diego/Germany)99- 1

IEC/TC77

(21) CISPR 16-1 f2 Ed.2.0 (TEM)

(6.22)

Ref. documents: CISPR/A/199/RVN, CISPR/A/191/NP

(7) CISPR/A-SC77B(JTF-TEM-Garbe)99-3A

() CISPR/A-TC77B(JTF-TEM-Garbe)99-7

(22) CISPR 16-2 f3 Ed.1.0 TEM

Ref. documents: CISPR/A/247/INF(77B/265/CD), CISPR/A/199/RVN,
CISPR/A/191/NP

(23) CISPR 16-2 A1 f6 Ed.1.0

CD

Ref. documents: CISPR/A/251/CD (NC comments due by 16/08/99),
CISPR/A/183/RVN, CISPR/A/167/NP

(24) CISPR 16-2 A1 f2 Ed.1.0 -in-situ EUT .(Clause 7.4)

CC

Ref.document: CISPR/A/153/RVN, CISPR/A(Germany)42/NP, CISPR/A/233/CD
CIS/A/248/CC

(25) PNW CIS/A-203 Ed. 1.0 EMC

Ref. documents: CISPR/A/225/RVN, CISPR/A/203/NP

(26) PW CIS/A-xxx Ed. x.0

(the stirred mode reverberating chamber) . (SQ 90)

WG

Ref. document: CISPR/A/242/NP, CISPR/A/243/INF(77B/260/CD)
RVN

CISPR/A

- (27) CISPR 95-1 Ed.1.0 SQ 95/1 -
scanning

Ref. document: CISPR(Sec.)1044

- (28) PWI CIS/A-SQ-106 Ed.1.0 SQ 106 - CISPR

Ref. document: CISPR(Sec.)1058

- (29) PWI CIS/A-SQ-94 Ed.1.0 SQ 94 -

Ref. document: CISPR(Sec.)1042

- (30) PNW CIS/A-40-1 Ed. 1.0 Screened absorber lined chamber facilities
(SQ32/1-가)

Ref. documents: CISPR/A(Sec.)142/NP, CISPR(Sec.)1042

- (31) PWI CIS/A-SQ-85 Ed. 1.0 SQ 85 -
()

Ref. document: CISPR(Sec.)1042

New work item proposal.

- (32) CISPR 16-1: 1993, sub-clause 15.4.2: new
sub-clause 15.4.3: cross-polar
RVN

Ref. document: CISPR/A/218/NP, CISPR/A/238/RVN

- (33) Proposed NWIP: 1.

2. (n extended) CISPR/A(Germany)99-2

가

- (34) Proposed NWIP:
weighting; weighting

CISPR/A(Germany)99- 3

- (35) Proposed NWIP: "H"
CISPR/A(San Diego- Kerry/Lauder)99- 01

CISPR/H, TC77 IEC

- (1) CISPR/H CISPR/A
- (2) TC77 (Joint Task Forces)
(ㄱ) CISPR/A/239/RM, B
() 77(San Diego/Chairman)5, CISPR TC77
- (3) TC102

. CISPR/A WG2

- (1) **Proj. CISPR 95- 1 Ed.1** .
∴ (SQ94)

CISPR/A
WG2 A 가
.

- (2) **Proj. CISPR 16- 3.A1.f1.Ed.1 :**

References : (ㄱ) CISPR/A/WG2(Secretariat)98- 3, 1998 7
() CISPR/A/234/CD
() CISPR/A/250/CC

J. Hunter

. A
UCISPR (, 0.6 1 dB)

- UCISPR CISPR 16-1
(, 2 dB) ;

- UCISPR

J. Hunter 가
가 가

가

J. Hunter가

CD

CD

Saint Petersburg

Action Point 1 : J. Hunter

: WG2

CD

(3) Proj. CIS/A- 203 Ed. 1.0 : EMC

References:(가) CISPR/A/203/NP

References:(가) CISPR/A/WG2(Secretariat)98- 3, 1998 7

() CISPR/A/WG2(ad- hoc Compl. Unc/Goedbloed)99- 02

() CISPR/A/WG2(ad- hoc Compl. Unc/Goedbloed)99- 03

P. Beeckman

J. Goedbloed

slides references () ()

- ref. () 가 CISPR

- ref. ()

J. Goedbloed 가
(round robin)

가

NCs ref() ()
CD

Action Point 2 ; P. Beeckman :
CD .

(4) Proj. CISPR 16- 2.A1.f1.Ed.1 : ambient 가

References:(가) CISPR/A/WG2(Secretariat)98- 3, 1998 7

() CISPR/A/WG2(San Diego/Heirman)1

L. Dunker A D. Heirman CDV가

(NC) .

Don Heirman /A/WG2 Action point 4

CISPR/A/WG2(San Diego/Heirman)1 .

ambient가

CD . J.

Hunter CDV 가 가

L.

Dunker .

Action Point 3 : D. Heirman L. Dunker :
CISPR/A/WG2(San Diego/Heirman)1 CDV
IEC (Central Office)

(5) Proj. CIS/A- 215 Ed. 1.0:

References: (가) CISPR/A/WG2(Secretariat)98- 3, 1998 7

() CISPR/A/WG2 FAR/convenor 1

- () CISPR/A/WG2 FAR/convenor 2
- () CISPR/A/WG2 FAR/convenor 3
- () CISPR/A/WG2 FAR/convenor 4
- () CISPR/A/WG2 FAR/convenor 5
- () CISPR/A/WG2(San Diego FAR) 01

E. Ristig references () () (reference ()
) M. Alexander reference () .

:

a) EUT

(convenor 4 5) ;

E. Ristig

5 10 dB (30 80 MHz)
 (가)

.

.

-

-

b) Anechoic Room (convenor 2 & 3) ;

가 CENELEC EN 50147

16- 1

CD

16- 2

CD

.

CD

.

c) FAR (Anechoic Room) OATS (San Diego FAR 01)

FAR (Anechoic Room)

NPL

.

(

3m FAR 가 10 m OATS 5 dB

). CISPR/A CISPR 16

CISPR/H CISPR/A

.

Action Point 4 : E. Ristig: FAR 16- 1 CD FAR
16- 2 CD .

(6) Proj. CIS/A- 167.Ed.1 :

References: (7) CISPR/A/WG2(Secretariat)98- 3, 1998 7
() CISPR/A/251/CD

E. Ristig () CD

(7) Proj. CISPR 16- 2 A2.f1.Ed1 :

References:(7) CISPR/A/WG2(Secretariat)98- 3, 1998 7
() CISPR/A/WG2(Schaefer)99- 1
() CISPR/A/WG2(San Diego/ad- hoc autem Convenor)99- 1

(reference 2) M. Stecher W. Schaefer
(scan rates)
16- 2 가
() working group
M. Stecher reference ()
NC CD

Action Point 5 : A/WG2 : CISPR/A/WG2(San Diego/ad- hoc autem Convenor)99- 1 M. Stecher

Action Point 6 : M. Stecher :
CD

(8) Proj. CISPR 16- 2.A1.f2.Ed.1 : situ EUT

References:(7) CISPR/A/WG2(Secretariat)98- 3, 1998 7
() CISPR/A/233/CD
() CISPR/A/248/CC
() CISPR/A/WG2(San Diego/ad hoc in situ- Dunker)99- 1
L. Dunker 248/CC 233/CD
() A
CD L. Dunker

Action Point 7 : L. Dunker in situ :
CD

. SC/A A/WG2 Action

(1) : EMC

References: (가) CISPR/A/242/NP

() CISPR/A/243/INF(77B/260/CD)

() CISPR/A- SC77B(JT F- Reverb- Harrington,Hatfield)99- 01

() CISPR/A/WG2(San Diego/Harrington,Koepke,Johnk)99- 01

T. Harrington SC 77B 가 (joint task force)

reference () . 77B CD

(reference 2) CDV

61000- 4- 3 . T. Harrington , OATS

reference ()

(IEEE EMC) 8

CD가 reverb 10

IEC

.

Action Point 8 : EMC JT F :

CD .

(2) :

.

(n)

가

Reference : (가) CISPR/A/WG2(San Diego/Stecher)99- 1 (CISPR/A()2)

working group M. Stecher reference (가)

.

Action Point 9 : A/WG2 : CISPR/A/WG2(San Diego/Stecher)99- 1

(CISPR/A()2) M. Stecher

(3) CISPR 16- 3 : 80/80

Reference : (가) CISPR/A/WG2(San Diego/Dunker)99- 1 (CISPR/A()1)

L. Dunker CD
CISPR/F /F CISPR/A
M. Diether가 CISPR/F 가 L.
Dunker CISPR/A CD가

Action Point 10 : 80/80 L. Dunker : CD

A

(1999 6)

Action Point

<u>ID</u>	<u>Action Item</u>	<u>Action Person</u>	<u>Status</u>
99- 01	WG2 CD	J. Hunter	Open
99- 02	CD	P. Beeckman	Open
99- 03	CISPR/A/WG2(/Heirman)1 CDV IEC 가 L. Dunker	D. Heirman	Open
99- 04	FAR 16- 1 CD FAR 16- 2 CD	E. Ristig	Open
99- 05	CISPR/A/WG2 (/ad- hoc autem Convenor) 99- 1 M. Stecher	A/WG2	Open
99- 06	CD	M. Stecher	Open
99- 07	in situ CD	L. Dunker	Open
99- 08	CD	JTF	Open
99- 09	CISPR/A/WG2 (/Stecher)99- 1 (CISPR/A()2) M. Stecher	A/WG2	Open
99- 10	80/80 CD	L. Dunker	Open

CISPR B

· , , (ISM)

EMC

1. ISM (Product Family Standards)

가. CISPR 가 (Product Family)
(群分類) (Emission)
(Immunity) EMC .
가
(Generic Standards) .

· .

· , , (ISM:Industry Science Medical)
(Emission) CISPR B (SC- B)
·

· ISM

· ,
(, 가)
가

·

· 9kHz 400GHz .

· ISM (Emission) (Limits)
CISPR Publication 11 .

2. CISPR

가. CISPR
ITU가
ITU,
(Radio Regulation)
ITU-R, TG1/2
ISM
(,)
가
(NP)
CISPR Pub. 11 13 (3rd. Ed.) , '97 12
(ITU)가 ISM ISM
CISPR Pub. 28 ; ('98 1).
ITU가 ISM ISM
CISPR
ISM
가
CISPR 11 3 (1997.12)
ISM (,) 가
- : 가
- : 1 가
ISM
가 가 ,
(IEC/TC) 가 가 IEC
, ITU가 ISM ()
)가 CISPR,SC- B
ISM (Magnetron)
(2.45GHz) 가
.

3.

가.

SC- B Mr.Vrolljk(Nethrlands), Mr.
Okamura(Japan) 19 51 가가 .
가 (NC) , Mr.Helman SC- B
, Mr.Martel , Mr.Helrman
SC22G/WG7 Mr. Sabhet
.

.

: CISPR/B/224/DA
CISPR/B(San Diego/Secretary)9901
CISPR/B(San Diego/Secretary)9901 가 CISPR/B/224/DA 初案
가 .

Agenda 6.1 CISPR/B(San Diego/Secretary)99- 02

CISPR/B(San Diego, Cecimo)

Agenda 6.3 CISPR/B(San Diego/Secretary)99- 03

Agenda 7.5 가 .

Agenda 7.6 CISPR/B(San Diego- Kerry)99- 01

ISM

Agenda 7.7 CISPR/B(San Diego- Kerry)99- 02

ISM

Agenda 7.8 CISPR/B(San Diego/Poland)99- 1

-

CISPR/B(San Diego/Poland)99- 2

-

CISPR 11

•

Document : CISPR/B/217/RM ('98 SC- B)
IEC 2 異意가

.

• **WG1 - Member UPDATE**

: CISPR/B/219/219A/219B/WG
SC- B , e- mail
가

: CISPR/B(San Diego/Secretary)99- 1
CISPR/B/224/DA('99. 3. 5)
Agenda CISPR/B/224/DA
가

•

: CISPR/B/217/RM

「

2 가 .」

.

.

• **Member**

: CISPR/B/219,219A&219B/WG

가 가 e- mail 가
WG 가

•

SC- B

.

(1) 1GHZ

: CISPR 19 (1983)

Update

寄稿

(2) ISM

: CISPR 23(1983)

CISPR

CISPR

가

, CISPR 23

SC- H

(3) ITU

Guide Line

: Technical report 28(April 1997)

ITU

(4) ISM

: CISPR 11 (December 1997)

CISPR 11 (December 1997)

2가

가

(5) CISPR 11 (1996) Draft amendment 1

: CISPR/B/222/FDIS (:99- 3- 31)

CISPR/B/228/RVD

CISPR/B/222/FDIS 3

- CISPR/B/192/CDV : ISM

- CISPR/B/196/CDV : 10m, 30m

- CISPR/B/204/CDV : 1GHz to 18GHz

CISPR/B/222/FDIS가

CISPR/B/228/RVD

2 A

10m

7.1.2

note()

30MHz

Near field

20dB/decade rule

가

..

(6) CISPR 11 (1996) Draft amendment 2

: CIPSR/210/FDIS(:98- 9- 15)

CISPR/B/216/RVD

CISPR/B/210/FDIS Arc

CISPR/B/187A/CDV

1 CISPR/B/188CDV, 2 .

“CIPSR/210/FDIS” Idle mode

가

6.1

(1) arc

1

: CISPR/B/223/2CD(:99- 5- 31)

CISPR/B(San Diego/Secretary)99- 02

May 31, 1999 ,

CISPR/B(San Diego/Secretary)99- 02

, CISPR/B(San Diego/Secretary)99- 02

arc

2

CD

5b

가 230MHz

300MHz 가

5b

30MHz

230MHz, 230Mhz

1,000MHz

CISPR/B(San Diego, Cecimo)1

Cecimo

가

CDV

가 300MHz

230MHz

5.5

5b

10m

30m

가

CDV

가 230MHz

5b

10m

가

(2) Sites
: CISPR/B/214/CDV(Closing date for voting: 98- 12- 31)
CISPR/B/225/RV
CISPR/B/225/RVC
Class
Group CDV가
Swedish National Committee

(3)
: CISPR/B/221/CC
CISPR/B(San Diego/Secretary)99- 03
CISPR/B(San Diego/Secretary)99- 03
IEC CDV

(4) 0 Hz 400GHz
: CISPR/B/218/CD(Closing date for comment: 99- 02- 01)
CISPR/B/226/CC
CISPR/B/28/CD 가
CISPR 11
B

(1) IEC
: CISPR/B/215/INF
Mr.Matejk working group

(2) IEC 60947- 4- 2 2
: CISPR/B/209/INF(17B/919/FDIS)
IEC 60947- 4- 2 2 1998 8

(3) arc - IEC 60947 Part 10 : EMC

: 26/172/CD

IEC 60974 Part 1

가

..

EMC

(4) CISPR 16- 1(1993) 2

: CISPR/A/244/FDIS

.

(5) - A1 :

: SC- 22G/WG7

Sanhet 22G/WG7(Cv)22

CISPR SC- B 22G/WG7

가

SC- 22G/WG7

E- mail

Mr. Sanhet

.

(6) ISM

Mr. Kerry

CISPR/B/(San Diego- Kerry)99- 01

.

.

(7) ISM

: CISPR/B(San Diego- Kerry)99- 02

.

(8)

CISPR 11

: CISPR/B(San Diego/Poland)99- 1

CISPR/B(San Diego/Poland)99- 2

.

working group

.

. **WG1**

: CISPR/B/WG1(Secretariat)98- 1

B WG1 Mr. Despre 1998 Frankfurt
B WG1 .

.

가 CISPR 가 Russian National
group B working .

.

.

CISPR C

• ,

1.

2. : CISPR/C/110/INF

3.

4. SC- C

4- 1 SC/C Cristescu 가 .

4- 2 C/110/INF , , .

4.3 C/78/CDV : CISPR
#18- 3 Ed. 2 , #18- 4

- (a) "Limits" , Guideline
- (b) , SC/C Steering Committee
- (c) a. c. d. c.
- (d) Generic Std. .
- (e) 18- 4 가 , guideline

4.4 CISPR Publication 18 .

CISPR #18

- (a) 18- 1 : , 18- 2 : , 18- 3 : ,
18- 4 :
(b) , 가

4.5 (NP) C/116/CDV(CISPR 26/CDV) ,
NP. project- leader

5. Working Group 1

5.1 SC/C WG01 가 .

5.2 Ad- Hoc , Ad- Hoc Member

- (a) Steering Committee
(b) CISPR #26 가 ,

(c) CISPR #26 uncertainty 가

(d) C/78/CDV: Limits Generic Std. , Product Std.
Steering Committee

(e) NP ,
, NP .

(f) 77/199/NP : EMC , TC77
,
.

(g) IEC TC가
CIS/C .

(h) CISPR Publication 18 Ad- Hoc Meeting

6. Working Group 2

6.1 WG01

가 .

6.2 SC/C , SC/C

,

,

.

(a) CISPR/C/116/CDV(CISPR26Ed.1)

(

1999 8 13) ,

.

(b) Publication 18

CISPR 18-3Ed.2

, SC/C

Ad-Hoc

가

.

(c)

,

,

.

(d)

,

가가

. ,

가 , C/WG01

(e) 30MHz

,

,

.

(f)

, 「

」 NP

.

「CISPR/C/116/CDV

uncertainty

」

CISPR/C/116/CDV

가 (可決)

TR(CISPR 26Ed.1)

NP

.

7.

SANGTOBETERUBURUK()가

, 2000

3 10

WG

가

.

CISPR D

•

1. SC/D

가.

Herbert Mertel

Don Heirman

• (CISPR/D/216rev/DA)

• 1998 7 13 15 Frankfurt

CISPR/D/206/RM

- CISPR/D/206/RM
- CISPR 12 type of antenna

- 7.5 , : "For NP 175," ,
- 11.2 , : : " Mr. Shearman
CISPR 12 EU (Directive) "
- 12.1.1 , : "CISPR 12" "CISPR/D"

(1) Frankfurt

CISPR/D/207/INF

. CISPR/D

- No more working group
- Maintenance team : existing doc.
- Project team : new job project maintenance team

(1) 1998 7 Frankfurt multiple meetings
CISPR/D .

(2) - CISPR 10
- CISPR/D/205/INF
- CISPR/D/213/INF
Baillif CISPR/D CISPR 10
CISPR/D/213/INF CISPR/S .

(3) Review Program of Work, Central Office database
- CISPR/D/225/PW
CO 가 . Baillif 가
. ; .

(4)
- Digital audio broadcast (DAB) ()
CISPR/D/218/INF

CISPR/D .

_____ : CISPR/H 가 .

- ()
: WG

. “simplification” .

WG1 WG2

(5) Maintenance Groups
- CISPR/D/219/INF

1 2 “Maintenance Team” 1 2 가가 .
Ballif ,
Maintenance Team

_____ : WG1 WG2 Maintenance Team .
CISPR 12, CISPR 21 CISPR 25 가

: CISPR/D “
Working Group ” 가

(6) CISPR/D 가

CISPR CISPR/D/226/INF
CISPR .
Baillif .

. CISPR 12 , -
- / / / /

; CISPR/D/217/INF

CISPR/D/217/INF WG

(1) (maintenance item)

(2) (Mr. Stecher)

(3) 3 (Mr. Schindler)

(4) 5.2 5.3 (Dr. Ackermann)

(5) 가 maintenance items(WG1)

- CISPR12(SAE J551- 5)
- 30MHz
- Annex E (WG1)
- Annex C (Calibration procedure)
- 1GHz (Finland 가)
- CISPR 12 Flow chart

WG1

CISPR12 Annex E WG1 .
Wagner Annex F .
 , .

. CISPR/D/WG1 - , 가

(1) 1998 7 13/14 Frankfurt CISPR/D/WG1 22

- CISPR/D/208/INF
1998 8 .

(2) CISPR/D/WG1

- CISPR/D/214/WG
- CISPR/D/222/WG

CISPR/D/222/WG (CISPR/D/214/WG
) . E- MAIL .

(3) (CISPR/A)

Anderson item Frankfurt .
 .

_____ :

. CISPR 21, 1985 : impulse

(mobile radio communication) ;

- (state of the work) Secretariat
- CISPR/D/209/CC
- CISPR/D/210/CDV (1999- 02- 01)
- CISPR/D/221/RVC

CISPR/D/209/CC (“ ”)

. CISPR 21 13

receiver rejection

SC/D CISPR/E .
(CISPR/D/210/CDV) (14, 4) (see
CISPR/D/221/RVC) 가 Technical Report
가 6 commentrk , . Baillif DIS
가 8 . 2
FDIS .

. **CISPR 25** (),
1 1995 - (state of the work) Secretariat
(1998- 08- 21)

- CISPR/D/211/RVN (new work item doc.199)
- CISPR/D/212/RVN (new work item doc.200)
- Finland/CISPR/D/200/NP (doc.200 - document
CISPR/D/212A/RVN)

가 :

- CISPR/D/211/RVN - new work item doc.199가 .
- CISPR/D/212A/RVN - new work item doc.200 .
WG2 .
- CISPR/D/215/CC (System voltage) - CD ()
- CISPR/D/217/INF WG2 CISPR 25 2
CD

. CISPR/D/WG2 -

(1) 1998 7 14/15 Frankfurt CISPR/D/WG2 15

- CISPR/D/224/INF

1999 3

(2) CISPR/D/WG2

- CISPR/D/223/WG

(3) Flow chart in CISPR 25

CISPR 12 flow chart CISPR 25

(1) ISO/TC22/SC3/WG3

- Dr. F. Ackermann

RF

- CISPR/D/220/INF

- CISPR SC H

- table (8)

. ISO 7637-1 - 2

, Part 2

Part 0

Part 1

ISO 11451

ISO 11452

CDs

DISs

1999

2000

. ISO 10305

ISO

10605

(2) EMC RFI

95/54/EC (72/245/EECrev.)

89/336/EEC

- Secretariat

- , release

Ficheux .

(3) ECE WP 29 - 95/54/EC ECE R 10

- Secretariat

- , release

Ficheux .

(4) RF .

(1 page 5 10.4)

.

- “ Emission measurement in a Reverberation chamber, OATs and
Anechoic chamber” - Galen Koepke, NIST, 325 Broadway, Bo

Koepke 가 “reserberation chambers”

SC- WG- numbering IEC system . ;
Baillif 가 .

.

(2000 6) Russia St. Petersburg
Russia .

. CISPR/D Chairmanship 2000

- Frederick Bauer CISPR
CISPR/D 가
CISPR 35
- SC/D secretariat Pou Andersen

- Bauer RFI
 , CISPR/D (CISPR 12, CISPR 21, CISPR 25)
 . CISPR 25 1 Bauer
 , CISPR 12 21
 Ackermann Bauer 가 가
 Bauer
 .
 .
 가 , San
 Diego 가

2. WG1

가.
 Mr. Bauer San Diego 가 ,
 .
 CISPR/D/WG1/248/DA 가
 :
 - CISPR/D/WG1(Matossian/Ficheux)99- 01
 - CISPR/D/WG1(San Diego/Jaquin)1 = CISPR/D(Jaquin)99- 1
 Subject : Radiated field limits below 30MHz
 - CISPR/D/WG1(San Diego/Andersen/Koepke)99- 01
 = CISPR/D(San Diego/Andersen/Koepke)1
 Subject : Emissions measurements in a Reverberation chamber OATS,
 and Anechoic Chamber
 - CISPR/D/WG1(SanDiego/Andersen)1= CISPR/D/WG1(San Diego/Andersen)26
 Subject : CISPR12 Clause 5.1.1.1 and CISPR25 Clause 4.5

- CISPR/D/WG1(SanDiego/Andersen)2= CISPR/D/WG1(San Diego/Andersen)27
Subject : Reverberation test method
- CISPR/D/WG1(San Diego/Andersen)3
= CISPR/D/WG1(Andersen/Bauer/Klouda)23
Subject : CISPR12 4th ed., Clause 5.2.1.3
- CISPR/D/WG1(SanDiego/Andersen)4= CISPR/D/WG1(San Diego/Andersen)24
Subject : Proposal to add an Annex to CISPR12 - Electronic vehicles
- CISPR/D/WG1(SanDiego/Andersen)5= CISPR/D/WG1(San Diego/Andersen)25

. 1998 7 13 15 Frankfurt

(CISPR/D/WG1/245/INF) (CISPR/D/WG1/249/INF)

.

1998 7 13/14 Frankfurt CISPR/D/WG1 22
(CISPR/D/WG1/243/- RM)

. (CISPR/D/WG1/245/INF)

(Item Frankfurt (243/RM)) :

- Item 7.1, : Mr. Andersen가 .
- Item 7.2, 30MHz : CISPR/D/WG1(San Diego/Jaquin)1 .
- Item 7.3, : Dr. Form comment .
CISPR/D/WG1(Shindler- Form)99- 1
- Item 7.7, : Mr. Andersen
, 가 Item
- Item 7.8.1, CISPR 12 5,6 : Andersen

CISPR/D/WG1(San Diego/Andersen)5

- Item 7.8.1, 7 : Item 7.5.2
- Item 8.1 NWI (CISPR/D/WG1(Andersen)24)
- Item 10.1, : CISPR/D/WG1/247/WD
- Item 10.2, 1GHz : Item 7.1

(1) New Projects

- (Digital Audio Broadcast : DAB)
(Mr. Beetlestone , Mr. Rusakiewicz)
- CISPR/D/WG1(Beetlestone- Rusakiewicz)1.
- (Mr. Schindler)

_____ : Item .

. CISPR/D/WG1

(CISPR/D/WG1/250WG)

* 1

. CISPR 12,5th edition -

- CISPR/D/WG1/247/WD

Dr. Ackermann CISPR 12 ,

WD CISPR/D .

Dr. Ackermann , :

- "motorboat" "boat"
- 4.3 , : "vehicles" "vehicles/boats/devices"
- 5.1.2.2 : "Note" "..., they shall meet the requirements ..."
- 5.3.2.5 : : "...tested in a way similar to that specified for boats with inboard engines."

_____ : 가 .

(1) (1 18GHz) Review

- CISPR/D/WG1(Andersen)21

Frankfurt Mr. Wirzenius Frankfurt

Mr. Andersen CISPR- 16
Green paper San Diego CISPR/A 가 가 .

(2) 30MHz(150kHz 30MHz)

- CISPR/D/WG1(Andersen)20 (based on ANSI C63.12)
- CISPR/D/WG1(Schindler/Wagner)99- 1

Subject : CISPR12, 5th Edition (Measurements below 30MHz)

- CISPR/D/WG1(Matossian/Ficheux)2
- CISPR/D/WG1(San Diego/Jacquin)1

Mr .Wagner Mr. Ficheux paper . Mr. Ficheux
CISPR/H Mr. Jacquin paper .
Mr. Andersen CISPR25
CISPR12
CISPR25
(Schindler/Wagner)99- 1 CISPR12
, Item maintenance item
CISPR/D/WG2

- _____ :
- CISPR12 20km/h 40km/h
 - 30MHz CISPR12
; CISPR/H 가
 - SAE procedure : CISPR12 O.K.
 - “30MHz ”Item 가
 - Working Group 2

(3) (3m method)
- CISPR/D/WG1(Schindler/Form)98- 1, CISPR/D/WG1(Schindler/Form)99- 1

Mr. Schindler CISPR/D/WG1(Schindler/Form)99- 1
CISPR/D/WG1(Schindler/Form)98- 1
,

_____ : CISPR/D/WG1(Schindler/Form)99- 1 , 5.2.3.4 Annex
H , CISPR/D/247/WD

(4) Appendix C (CISPR/D/WG1(Andersen)96- 4)

Mr. Andersen , Item
.

_____ : Item ; Annex C

(5) 5.2 5.3

- CISPR/D/WG1/247/WD

(가) 5 ,6

- CISPR/D/WG1(Andersen)25

4 , 7 가 . Mr. Andersen
CISPR/D/WG1(San Diego/Andersen)5 . boat vehicle
, 5 , 6 .

_____ : CISPR 12 가 .

() 7 ?

Mr.Karlsson 3m boat , .

_____ : 가 .

(6) 9kHz 가 oscillator

(4.3 , CISPR/D/WG1/247/WD)

(7) CISPR12 (CISPR/D/WG1/247/WD, Annex G)

Annex G box “Machine with internal
combustion engine of electric motor.” .

_____ : , 가 CISPR12 Annex G

(8)

(7) SAE J551/5 , Mr. Andersen New York Item
- CISPR/D/WG1(Andersen)24, (San Diego/Andersen) 4 .

() Mr. Rojas
- CISPR/D/WG1(Rojas) 1

Mr. Andersen .

_____ : CISPR12 25 , CISPR/D/WG1(Andersen)24
2 , Annex G.1 .

Mr. Andersen . CISPR12 가 .

(9) (CISPR12,

4th edition, 5.2.1.3)

- CISPR/D/WG1(Andersen- Bauer- Klouda)23, CISPR/D/WG1
(San Diego/Andersen)3 .

가
가? Mr. Lecca Mr. Ficheux
.

Mr. Karlsson CISPR/A가 ,
CISPR/D가 가 . Mr. Andersen

_____ : "In both of these ...
given in clause 4, excluding intentional narrow radiators."

."When assessing compliance in accordance with
clause 6 any emission exceeding the limits shall require investigation to
ensure that they are not attributable to the vehicle/boat/device." 가.

Mr. Karlsson "narrowband"
intentional emission 가 .

(10) CISPR/D/WG1(San Diego/Andersen)1

Mr. Andersen CISPR12 CISPR25
“Special consideration shall be given to overload, linearity, selectivity, and
the normal response to pulses”

_____ : CISPR12 5.1.1.1 . WG2
CISPR25 4.5 .

(11) CDV , CISPR/D/WG1/247/WD CISPR/D
가

Dr. Ackermann 8 15 CISPR/D/WG1/247/WD

CISPR/D

* 2

. Miscellaneous

(1) Reverberation Chamber
- CISPR/D/WG1(Andersen)22

Mr. Andersen .
(CISPR/D/WG1(San Diego/Andersen)2) CISPR/A TC77B

Poul Andersen e-mail .
. Mr. Seyerle anechoic chamber

Item

(2) Review

(3)

(1)

2000 St.Peterburg .

(2) 2000

Mr. Poul Andersen Mr. Frederick Bauer Working Group 1

.
가 , .

CISPR E

.

1. SC- E

가. CISPR SC- E

(,) (Amplifier) ,
(Associated Equipments)

.

(Product standards committee) .

. SC- E Mr. Nano
Mr. Borsero가 , (working group)
Mr. Kolk SC- E Mr.
Nano가 , '98 2 (working group 2)
TV .

. SC- E가 CISPR Publication 13(
) CISPR Publication 20(
) .

. CISPR Pub. 13(3 , 1996) 1
(1998) CISPR Pub. 20 (1998 4) .

.

,

가 .

.

CISPR Pub. 13 20

,

.

2.

가. SC-E CISPR 13, 20
, CISPR 13, 3 1996
, 가
.

가

가 .

. SC-E 가 CISPR 13
3 4 .

(1) CISPR 13(3)

- RF
-
-
-
-

(2) CISPR 20(3)

- (Immunity) ,
(Ferrite Core)
- FM

3. SC-E

가.

- .
 - CISPR/E/191/DA
 - (Working Group) Maintenance Team

- .
 - ISO/IEC Frankfurt (Germany)
 - (Minutes)

- CISPR/E/180/RM

- . CISPR/E/WG1 WG2
- CISPR/E/182/WG , CISPR/E/187/WG

- .
 - (1) CISPR/E/183/CD - CISPR 13 Ed. 4 :

- TV

- CISPR/E/188/CC ()

- * : CISPR E/WG1(Germany) 99- 1

CISPR/E/188/CC

: CISPR/E/183/CC CISPR/E/185/CD

NC		German comments Raithel/Zielke
(2)	<p>CISPR/E/183/CD 3 (Multifunction) (Multimedia) 가</p> <p>, TV ITE</p> <p>.</p> <p>(: 2가 가 . TV ITE</p> <p>가 .)</p>	
(3)	<p>가. “TV (ITE) ” 1 4</p> <p>.</p>	<p>: EN 55013/55020</p> <p>CISPR 13 ,</p> <p>.</p>
	<p>.</p> <p>3 . “3.6 : (: Cassete deck + CD player 가 FM/AM 가 가)</p>	<p>: EN 55013</p> <p>, ()</p>
	<p>“3.7 : ITE Interface 가 (ITE)</p> <p>(: 가 Set Top Box DVD /DVD-ROM Player, I/O 가 Digital Camcorder).”</p> <p>. 1 “</p> <p>Section 4.1</p> <p>” .</p>	<p>: EMC apparatus</p> <p>.</p> <p>가 (set -top boxes, Internet 가 TV) (Camcorders) .</p> <p>: 3.7 , “ ”</p> <p>가 .</p>

NC		German comments Raithel/Zielke
(6- 7)	“ 3.1 3.2 가 . ”	
(8)	“ “ ” “ Frankfurt CISPR SC-E WG1 .”	: German NC (UK 767.15) . : , 가 .
NL (1)	3.6 .	(Japan 3)
(4)	“ 4.1 가 . 가 . ITE (: CISPR 22) .”	: Japan 3
(9)	4.2 .	
(11)	“ , Tuner Units (outdoor units) TV ” .	
(12)	2 가 . ; “ RF (: Video tape player, Laser disc player” 가 Source : Frequency MHz:"30 to 2150" Limit value: "Harmonics 46"	

NC		German comments Raithel/Zielke
(14)	<p>5 tuner card" , 5</p> <p>5 , “ , PC tuner card" .</p> <p>5 , (outdoor units), , TV .</p>	
(6)	<p>40 47dB(μV/m) 가 PC tuner cards .</p>	
(5)	<p>6,7 .</p> <p>“ 6 - ” ()</p>	
(7)	<p>“ 900MHz 18GHz” .</p>	
(8)	<p>7 “ ” , 5.8.3 ” 2 15dB “ 가 .</p>	
(16)	<p>“ / RF TV ITU-R BT 471-1(2) TV color bar .”</p>	
(17)	<p>12 5.4.1 : “ 75 60dB(μ V), TV 70dB(μ V) .”</p>	
(18)	<p>5.2 12 6 “ : a) band II: 37.5 kHz 가 1kHz RF ” 5.4.1 12</p>	

NC		German comments Raithel/Zielke
(19)	<p>b)</p> <p>“b) , , CD : 0dB</p> <p>가 1kHz ”</p>	
(20)	<p>가 , , DVD 5.2 12</p> <p>7 c) “c)</p> <p>, , :</p> <p>가 1kHz</p> <p>TV color bar ” 가 가 c) d)</p> <p>d) e)</p>	
(9)	<p>(CISPR 13 3 5.4.2)</p> <p>:</p> <p>75</p> <p>60dB(μ V),</p> <p>TV ()</p> <p>70dB(μ V) .“</p>	
(22)	<p>TV</p> <p>“5.3.2 TV ”</p>	
(10)	<p>“ 가 RF .”</p>	
(12)	<p>“</p> <p>RF</p> <p>coaxial system</p> <p>가 .”</p> <p>“</p> <p>가 가 .”</p>	

NC		German comments Raithel/Zielke
(23)	<p>TV</p> <p>“TV 5.2</p> <p>(1)가 pick-up</p> <p>가 pick-up</p> <p>TV , 5.2 TV</p> <p>isolation</p> <p>: earth 75 common impedance</p> <p>isolation 가 0,15 30MHz</p> <p>isolation</p> <p>60 μ H</p> <p>가 toroidal RF chock</p> <p>가</p>	<p>:</p> <p>가</p>
(25)	<p>가 가</p> <p>가</p> <p>“ 가 가</p> <p>가</p> <p>.”</p>	
(15)	<p>5.7.4 “PC tuner card</p> <p>”</p>	<p>: UK 767.15 EN</p> <p>55013 A14</p> <p>,</p> <p>3</p> <p>PC-tuner card 가</p>

(2) CISPR/E/185/CD - CISPR 13 (1996)

- 0Hz 400GHz
- : CISPR/E/189/CC ()

. (circulation) :

(1) CISPR/E/185/FDIS - CISPR 20 (1998) : 1998

- 5.7 - screening (effectiveness)
- (voting) : CISPR/E/190/RVD

. (Working Group)

(1) CISPR/E/WG1

- CISPR/E/181/INF

(2) CISPR/E/WG2

- CISPR/E/xxx/INF*

. SC- E (publications)

(1) Issue of CISPR 13, Edition 3.1 (1998- 12)

(2) Issue of CISPR 20, Edition 4 (1998- 08)

(3) CISPR 20 (Revision)

- AHG (Draft Document)

. CISPR/E Frankfurt Steering Committee

- CISPR/E/244/INF , CISPR/E/xxx/RM*

. CISPR SC- E programme

- CISPR/E/xxx/PW

. National Committee

. Any other business

. (St. Petersburg, Russia 2000)

.

CISPR F

.가 ,

CISPR SC- F	,	,	가	,
	,	,		
		CISPR 14, 15	.	가
	(immunity)		.	
(1999)	CISPR SC- F	(San Diego)	(Bahia)	5
18	31	가	Mr. J. D. Coenraads()가	
Mr. M. C. Vrolijk()		Mr. W. Zuidinga()		6
9	2	5	3	.

1.

Mr. Don Heirman San
Diego
Mr. Herb Mertal 가 Coenraads 가
.

2.

(CISPR/F/281/DA,1999 2 19)
5 1 , 11 3 가
.

3.

(CISPR/F/240/RM, 98 12)

4.

99 4 30 CISPR/F/286/WG

5. CISPR 14

5.1 CISPR 14- 1 (93 1), CISPR 14- 1/A1(96 8) (97 1), CISPR 14- 1/A2 (98 12) .

5.2 CISPR 14- 2 (97 3)

5.3 CIS/F/255/CD : Power plugs with AC-DC Converter and the intended use of the artificial hand CIS/F/275/CC , CDV .

5.4 CIS/F/283/CDV : Toys emission (99 8 31)
가 .

5.5 CIS/F/284/CDV : Toys immunity (99 8 31)
가 .
CD .

5.6 CIS/F/274/CD : Appliances with earth connector and artificial hand
Mr. Flink (proposal)
artificial hand
item 5.3 (CIS/F/255/CD CDV) CDV

5.7 CIS/F/266/CDV : (Earthed floor standing equipment) CIS/F/289/RVC 27
100% FDIS

5.8 CIS/F/267/CDV : add : "similar radiators
가가 FDIS 가

5.9 CIS/F/268/CDV : Thermaostats and room heaters
CIS/F/290/RVC 2 24
thermostats N 10
(thermostats)
CISPR 14

5.10 CIS/F/249/CDV : Mod. of the click measurement procedure
CIS/F/282/RVC 5 17 NCs(National
Committees)가
CIS/F/266/CDV, F/268/CDV, F/249/CDV 3 FDIS

5.11 CISPR/F(San Diego/Germany)99- 1 : Automatic Measurement of
Discontinuous Disturbance CISPR/A CISPR 14
CISPR 16 . Mr.
Steinert (click)

CISPR A가

CISPR14- 1

6. CISPR 14

6.1 CIS/F/258/CD : Repetitive ignitors for cooking hobs to be
incorporated in cooking hobs(in cluding spare parts)

CIS/F/278/CC

CISPR 14

, 2NCs, 12NCs .

- 6.2** CIS/F/271/CD : extend the scope of CISPR 14-1
CIS/F/288/CC : NCS IEC
61000-3-2 IEC 61000-3-3

, .

- 6.3** CIS/F/218/NP CIS/F/232/RVN : radiated emission
measurements and battery powered equipment toys proposal (toys
emission toys immunity)
battery CISPR 14-1

.

7. CISPR 15

- 7.1** CISPR 15 (96 3), CISPR 15/A1 (97 6) CISPR 15/A2 (98 12
)

- 7.2** CIS.F/265/CDV : Starters, equitors and light regulating devices
CIS/F/291/RVC FDIS .

- 7.3** CIS/F/NP : Technical Report on Electronic Ballasts
CIS/F/269/RVN CD .

8. CISP15

- 8.1** CIS/F/256/CD : Terminal voltage of control terminals
CIS/F/276/CC argue가 CD NC

.

- 8.2** CIS/F.257/CD : Statistical evaluation CIS/F/277/CC
CDV 가

.

8.3 CIS/F/270/CD : Extend the scope of CISPR 15 CIS/F/287/CC
item 6.2 .

9. Microwave lighting

CISPR CISPR 15 .

10. CISPR/F/WG1 WG2

CISPR/F/WG1(Secr)98- 01 (1998 7)
CISPR/F/WG2(Secr)98- 02 (1998 7)

11.

11.1 CIS/F(San Diego/Germany)99- 02 : CISPR 14- 1 CISPR 16 .

11.2 CIS/F(San Diego/Germany)99- 03 : CIS/F257/CD
0, 15- 30MHz 12

11.3 CISFR/F(San Diego/TC61/1547/CD) : 가
EMC
가 ACEC ACOS .

12.

Russia St. Petersburg 2000 6 5 16 .

13.

CISPR/F/WG1

1.

2.

(CISPR/F/WG1(Secretary)99- 01, April 1999)

5 1 7 4 가

○ 가

- 5 : Different provision in CISPR14- 1 and CISPR 16- 1
: CISPR/F(San Diego/Germany) 99- 02
- 7.1 : Repetive ignitors for cooking equipment
: CISPR/F/WG1 (Kampet/Krug) 1- 99
- 7.2 : Measurements of leads to auxiliarry apparatus
: CISPR/F/WG1 (Kampet/Deter) 2- 99
: CISPR/F/WG1 (San Diego/Inoue) 99- 1
- 7.3 : Aqua stop value on washing machines and dish washers
: CISPR/F/WG1 (Kampet/Deter) 3- 99
- 7.4 : Statistical method of evaluation
: CISPR/F/WG1 (Kampet/Deter) 4- 99

3.

o : CISPR/F/286A/WG

o

4.

- o : CISPR/F/WG1(Secretary)98- 02(July 1998)
- o .

5. (SC) WG1

- o : CISPR/F(San Diego/Germany) 99- 02
- o 가 CD .

6. AHWG

- o 30 1000MHz
(clamp) . EUT
CISPR22 가
.

7.

7.1 Repetitive ignitors for cooking equipment

- o : CISPR/F/WG1(Kampet/Krug) 1- 99
- o CD .

7.2 Measurements of leads to auxiliary apparatus

- o : CISPR/F/WG1 (Kampet/Deter) 2- 99
CISPR/F/WG1 (San Diego/Inoue) 99- 1
- o CD .

7.3 Aquastop value on washing machines and dishwashers

- o : CISPR/F/WG1 (Kampet/Deter) 3- 99

o CD .

7.4 Statistical method of evaluation

o : CISPR/F/WG1 (Kampet/Deter) 4- 99

o CISPR/F/257/CD CISPR A
WG

8.

2000 6 5 17 Russia St. Petersburg

9.

가 .

CISPR/F/WG2

1.

WG

2.

(CISPR/F/WG2(Secretary)99- 01)

6 4 가 .

o 가

- 6.2 : Modification to CISPR15 clause 8.4.2

: CISPR/F/WG2(Norbert Witting) 99- 01

- 6.3 : Test requirements for emergency lighting luminaries
: CISPR/F/WG2 (San Diego/Macfarlane/Garett) 1
- 6.3 : Radiated disturbance measurements 30- 300MHz
: CISPR/F/WG2 (San Diego/Takano) 99- 01
- 6.4 : Measurement of radiated disturbances from PWM controls
: CISPR/F/WG2 (San Diego/Takano) 99- 02

3.

- : CISPR/F/WG2(Secretary)98- 02
- .

4. WG2

- : CISPR/F/286/WG

5. SC- F WG

- SC WG2

6.

6.1 CISPR 15 8.2

- Mr. P.
Archer() 가 .
- Mr. Archer , Mr. Garrett
() , Mr. La Fragola()
CISPR 14
- Mr. Archer가 CD

6.2 CISPR 15 8.4.2

- : CISPR/F/WG2 (Norbert Witting) 99- 01
- Mr. Witting Mr. Sisolefsky()
가
(wiring) 가
Mr. van Dam() .
- CD .

6.3

- : CISPR/F/WG2 (San Diego/Macfarlane/Garrett) 1
- Mr. Macfarlane()
(noise)
Mr. Archer(
) , Mr. Yandek() , Mr. van Dam()
가 .
- Mr. Macfarlane white
paper ,
.

6.4 30 300MHz

- : CISPR/F/WG2 (SanDiego/Takano) 99- 01
- Mr. Takano가 30 300MHz
.
- , Mr. van Dam, Mr. Coenraads, Mr. Inoue, Mr. Sisolefsky
.
- 30MHz 가
.

6.5 PWM

- : CISPR/F/WG2 (San Diego/Takano) 99- 02
- Mr. Takano PWM
.

- Mr. Takano .

7. EFL (EFL limits) AdHoc

- Mr. Garrett()가
 ,, Mr. Yandek()가 Grand Rapids
 ,
 - TV 10m
 가 . Frankfurt
 Philips 가
 12 Ad Hoc 가
 .
- Ad Hoc .

8.

- Mr. van Dam
 가
 .

Sub- committee G

. Sub- committee G

: 1999 6 1 2:00 - 5:00 pm

1999 6 2

: San Diego, U. S. A.

: Mr. Ralph J. Calcavecchio (, EMC Consultant)

: Mr. Alexander Frey ()

1.

2.

CISPR/G/156/DA .

3. (1998 7 6)

: CISPR/G/146/RM

IEC 2 Comment가

.

4.

: CISPR/G(San Diego/Sec)99- 3

Sub- committee Working
Group , , , e- mail .

5.

5.1 CISPR 22(1997) : ITE Emission requirements

: CISPR/G/143/CDV

Draft Amendment to CISPR 22 : Sub- Clause 10.4

EUT
가 . CISPR
22 1998 CISPR/G

: CISPR/G/1WG1(San Diego/Amemiya,Suzuki)01

1. .
2. AMN ISN Ground Plane .

5.2 CISPR 24(1997) : ITE Immunity

: CISPR/G/151/CD

Table 2: Immunity

Port Port - RF Continuous Conducted
Port .

6. CISPR 22: Emission Requirements for ITE

6.1 Extension of the scope to frequencies from 0 Hz to 400 GHz/
addition of requirements related to harmonics and voltage fluctuations in
public power supply networks.

: CISPR/G/153/CD
CISPR/G/164/CC

6.2 Extension of the Scope to ITE which has a function of radio transmission and/or reception

6.3 Limits and methods of measurement above 1GHz

: CISPR/G/147/CDV
CISPR/G/161/RVC

Conditional Testing Procedure :

EUT 1GHz 6.1
500Mhz~ 1GHz 가 6dB 가
가 200MHz , 1GHz .

Table 5 Limits for radiated disturbance of class A
and class B ITE at a measurement distance of 3m

Frequency range GHz	Peak limit dB(μ V/m)
1 to 2.7	50*
2.7 to 18	Under consideration

1- 2.7GHz Table 5 가 .
2- 2.7GHz 6dB 가
540MHz 2.7GHz .
2.7- 10.7GHz 7- 10.7GHz , 6dB
가 2.14GHz 10.7GHz .

Radiated Emission measurement above 1GHz

1. CISPR 16- 1 sub- clause 6.2 15.6 .
2. CISPR 16- 1 clause 22 .
3. CISPR 16- 2 sub- clause 2.6.3 .

6.4 CISPR 22

: CISPR/G/WG1&2(Kolk, Vrolijk)1
ITE .
CISPR 13 .
Field CISPR 13
Harmonics CISPR 13 .

: CISPR/G/WG1/SAN DIEGO/SELWYN

Clause 8 General measurement conditions 가 10.4
10.6 .

Clause 9.2 Artificial Mains Network
Couples Coupling .

7. Immunity Requirements for ITE

7.1 Test conditions and performance criteria for TTE for conducted RF disturbance at telecommunications ports and test set-up.

: CISPR/G/150/CD

Clause 6: . - New Annex H: Examples of specific test setup of ITE for immunity testing.

7.2 Proposal for conditions of immunity testing and criteria related to radio-frequency continuous conducted test at telecommunications ports.

: CISPR/G/151/CD

TC77/SC77B

IEC 1000-4-6 Level
Level TC77/SC77B .

Long Wire Antenna
CISPR/G/151/CD

가
(Electromagnetic Wave)

7.3 CISPR 24 .

ITE .
CISPR 20
terminals CISPR 20 .
CISPR 20 , CISPR 20 .

8. EMC

: CISPR/G/158/INF(IEC 100/80/INF)

9. PLC EMC

(PLC: Power Line Communication)

: CISPR/G(San Diego/Sec)99- 4

10. .

11. Any other business

ITE EMC testing cabling .

12. .

13. .

가

CISPR/G/WG3(San Diego/Yamaji)99- 01

CISPR/G/WG3(San Diego/Yamaji, Amemiya, Mori)99- 01
CISPR/G/WG3(San Diego/Yamaji, Amemiya, Katsuyama)99- 1
CISPR/G/WG3(San Diego/Yamaji, Amemiya, Katsuyama)99- 2
CISPR/G/WG3(San Diego/Yamaji, Amemiya, Katsuyama)99- 3
CISPR/G/WG3(San Diego/Yamaji, Amemiya, Katsuyama)99- 4
CISPR/G/WG3(San Diego/Ortkass)99- 1
CISPR/G/WG3(San Diego/Wright)1
CISPR/G/WG3(San Diego/Wright)2
CISPR/G/WG3(San Diego- Kerry)99- 01
CISPR/G/WG3(San Diego/Kolk, Vrolijk)99- 1
CISPR/G/WG3(San Diego/Storrs)01

Sub- Committee H

- CISPR/SC H : (Limits for the protection of radio services)
- - CISPR/SC H
 - 1998 2 가
 - , CISPR/H가
 - , 가
 - (generic standards)' CISPR (/
 - CISPR CISPR/A , IEC
 - TC77B ITU) 가
 -

1.

Telecom- CNET Mr. B. Despres 가

, Mr. D. Heirman

.

2.

- ; CISPR/H/2/DA

3. 1998

- 1998 7 23 CISPR ,
 , 가 . (: CISPR/H/1/RM)
- 4.2 가
 .
(; CISPR/H/4/INF)

4. (adhoc)

- 1998 1 BSI .
- Mr. C. Verholt() 9 adhoc
7 .
- - CISPR/H
 - CISPR/H /
 - CISPR 10
- ; CISPR/H/5/INF)

5. CISPR/H

- (; CISPR/H(San Diego/Australia)99- 01)
 -
- CISPR/SC H , ,
(; CISPR/H(San Diego/Germany)01) -
- (DAB) (; CISPR/H/San
Diego/Beetlestone)1) -
- 30 MHz (; CISPR/H(San Diego
/Jacquin)99- 1)
- 1GHz
(; CISPR/H/San Diego/(Oliver)99- 1)
- (MSF- 60 kHz)
(; CISPR/H(San Diego/UK)01) -
- CISPR 14- 1 CISPR 16- 2
(; CISPR/H(San Diego/Germany)99- 01)

6. CISPR 10

CISPR/SC H

- (Generic Emission Standards)
-
- EMC
- (; CISPR/H/5/INF CISPR/San Diego/Germany 02)

7. CISPR 23 CISPR/G/118/CD

- CISPR/H CISPR 23 ITE (CISPR/G/118/CD)
- ; CISPR/H(San Diego/Japan)1 -

8. IEC61000- 6- 3 IEC61000- 6- 4 EMC

- IEC61000- 6- 3 IEC61000- 6- 4 EMC CISPR/G
Class A ITE CISPR /H
가
(; CISPR/H(San Diego/Japan)2)
- IEC61000- 6- 3 IEC61000- 6- 4
IEC 1/2 IEC
(5 -> 2 , 10 -> 5 .)

9. adhoc CISPR/H

(; CISPR/H/5/INF)

- WG(Working Group) 1 3
- WG1 :
- 1 :
- 2 :
- 3 : ISM ISM

10.

- CISPR/H
; (1) , (2) , (3)
, (4) , (5) , (6) , (7)
, (8) , (9) ERP , (10) ERP , (12) ,
-
- : CISPR/H/3/INF, CISPR/H(San Diego)/Japan)3

11. CISPR/H

- CISPR/H

12.

13.

-

14.

77A :

1. WG01 :

가.

Ralf Gretsch WG 가
. Mr. Silvestri (77A/281/INF) . Mr.
Silvestri 61000- 4- 7 가

TR 61000- 3- 4 61000- 3- 12 가 가

• 61000- 3- 2 가

•

61000- 3- 2

•

•

CDV

•

•

•

• arc

가

0

61000- 3- 2

61000- 3- 9 (TR2) 가 가

61000- 3- 10 (TR2) 가 가

61000- 3- 2 가 TF 50 Hz
60 Hz 가

. GB 50 Hz 60 Hz

:

CD 2000- 01

Class D (fluctuating harmonics)

. CENELEC TC 210/WG6

WG

WG

TR

. (61000- 4- 7 61000- 4- 31)

Decision : reference 61000- 4- 7 1999 가
CDV .

. > 16 A 가
(61000- 3- 4 61000- 3- 12)

. 16 A 가
(61000- 3- 2)

- 61000- 3- 2 A1f4 : << >> 가 .
- 61000- 3- 2 A1f5 : << >> 가 .
- 61000- 3- 2 A1f6 : << >> 가 .

Decision : 4 :

-
-
-
-

CDV

2. WG06 :

가.

WG

Mr. Guy- Gerard CHAMPIOT

Mme N.

Baumier TF 가

Mme N. Baumier WG (77A/275/INF)

. - (61000- 4- 13)

San Francisco (task force)
Bordeaux task force Mr.
Spitzenberger CD 77A/147A/CDV 1999 가

: CD 3 1999 가

61000- 4- 14 (1999 2) (77A/263/FDIS 77A/268/RVD)

. DC (61000- 4- 17)

61000- 4- 17 (77A/271/FDIS 77A/280/RVD) 1999 6

. (61000- 4- 27)

CDV (77A/250/CDV) 83%
WG6 FDIS
가

: FDIS

. (61000- 4- 28)

77A/FDIS

. DC (61000- 4- 29)

77A/264/CDV . CDV .(가).

. WG 06

61000- 4- 11 : , , . SC 77B
SC 77A .

3. WG 08 : network

가.

Mr. Farrell WG 가
. Mr. Farrell 77A/276/INF

P- CD .

Mr. Ott(FR) 가 :

■ TC 77 CISPR

■ 2 9 kHz

Mr. Nielsens (DK)

Mr. Bodini (IT) 2kV
6kV 가 가 Mr. Ott

Mr. Berthet (FR) 2 9kHz

Mr. Finlay (GB) 0.2%

Mr. Nielsen (DK) 2 ∴

. LV (IEC 61000- 2- 2)

: 가 CDV .
■ : TC 77 CISPR .
■ .
. 2 9kHz

■

. MV (61000- 2- 12)

: 가 CDV .

■ : 가 TC 77 CISPR .

■

. 2 9kHz

■

. (61000- 2- 4)

77A/269/CD .

. WG08

61000- 2- 8 :

Decision : 61000- 2- 8 .

4. WG09 :

- Mr. Ott, TF 가 .

- R. Ott 77A/277/INF .

: CD 6 1999 가 .

5. Project team 61000- 3- 1

- 77A/226/NP (97 12) 77A/243/RVN .

61000- 3 .

Jean Weiler 가 Jean Weiler

가

•

EMI/C

,

EMC

가

가

.

2

CISPR

가

.

가

EMC

National Committee

item

project

.

가

.

new project

가

.

item

incentive

.

.

IEC TC 77B

: 1999 6 8 AM 9:00 - PM 5:00

1999 6 9 AM 9:00 - 12:00

: CA, San Diego Bahia 5

1.

2.

- o : Document 77B(San Diego/Secretary)1

3.

- o : Document 77B/230/RM
- o 1997 11 5 6

4.

- o ; Document 77B(San Diego/Secretary)6

5. SC 77B

- o : Document 77B/262/PW
Document 77B(San Diego/Secretary)4

6. WG7

- o -
- o IEC 61000-4-3 1
- o WG7

7. WG8

- (probes)
WG8
- : Document 77B(San Diego/Germany)10

8. WG9

- (electrostatic discharge)
- : Document 77B/264/INF

9. WG10

-
- ; Document 77B/268/INF
Document 77B(San Diego/Moehr)9
Document 77B(San Diego/Germany)11
Document 77B(San Diego/Germany)12

10. WG11

-
- : Document 77B/267/INF
Document 77B(San Diego/Germany)13

11.

- 61000-4 ()
- : Document 77B/263/INF

12. TEM JTF SC 77B/CISPR/A

- : Document 77B/263/INF

13. (Reverberation Chamber) JTF SC
77B/CISPR/A

- : CISPR/A/242/NP

14. AJWG

- SC28A, SC37A, TC64, SC77B, TC81

15. Maintenance cycle

- : Document 53/AC
Document 77B/257/INF
Document 77B/259/INF
Document 77B(San Diego/Secretary)5

16.

17.

18.

IEC

61000-4-3

1.1
1998- 11

1 :1995 1 :1998

(EMC)

4- 3:
-
, RF ,



IEC 61000-4-3: 1995+A1:1998

	.....	1
	.....	3
1.	.....	4
2.	.....	4
3.	.....	5
4.	.....	6
5.	.....	9
5.1	.....	9
5.2	RF.....	10
6.	.....	11
6.1	.....	12
6.2	.....	13
7	.....	15
7.1	.....	16
7.2	.....	16
7.3	.....	17
7.4	.....	17
8.	.....	18
9.	.....	20
A	RF.....	28
B	.....	34
C	.....	35
D	- TEM.....	36
E	.....	37
F	.....	38
G	.....	42
H	.....	43
I	.....	44

1000- 4- 3 IEC : 1995

4-3 : , -
 , RF,

1) IEC ()
 . IEC ,
 .
 IEC
 . IEC
 가 . IEC ,
 . IEC
 .

2) 가 IEC 가

4) IEC, 가
IEC, ,
.

5) IEC

6) $\frac{1}{\sqrt{2}} \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$ 가 가
 . IEC .

IEC 61000-4-3 65A :
 , IEC 65 :

1000- 4- 3 IEC : 1995

IEC 61000 4 3 1984 가 IEC
60801- 3 . 107 EMC
.

61000- 4- 3 (1995) 1(1998) [
77B/234, 77B/235/FDIS et 77B/238, 77B/239/RVD].

1.1 .

가 1 .

A I .

1000-4-3 IEC : 1995

IEC 61000 .

1 :
(,)
,

2 :

3 :
()

4 :

5 :

9 :

.

, RF .

1000-4-3 IEC : 1995

(EMC) -

4-3 : -
, RF

1.

IEC 1000-4

. ,
.
, 가 RF
.
RF .

-

. IEC
()

2.

IEC 1000-4

.
, IEC 1000-4

1000-4-3 IEC : 1995

가
가
. IEC ISQ

IEC 50(161) : 1990 (IEV) - 161 :

IEC/DIS 1000-4-6, (EMC) 4 : - 6 :
RF

3.

,
가
0.8GHz 3GHz
가
(, TDMA)

가

1000- 4- 3 IEC : 1995

4.

IEC 1000- 4

IEC50 (161)

4.1

4.2

RF

4.2.1

4.2.2

() 가

4.2.3

4.3

RF

4.4 ()

[IEV 161-04- 34]

4.5 (CW)

1000- 4- 3 IEC : 1995

4.6 (EM)

.

4.7 (Far field)

가

.

$$\lambda/2\pi$$

λ

.

4.8

“ ”

.

가

,

$$V/m, A/m, W/m^2$$

.

.

-

“

”

“

”

가

,

가

가

가

.

4.9

.

4.10 (Induction field)

$$d < \frac{\lambda}{2\pi}$$

/

,

λ

-

d

.

4.11 (Isotropic)

.

1000- 4- 3 IEC : 1995

4.12 (Polarization)

4.13

4.14

TEM

4.15 (Spurious)

4.16 (Sweep)

가

4.17 (Tranceiver)

가

4.18

4.19 RMS

RMS

RF

RMS

(1b),

RMS

$$V_{\text{maximum RMS}} = \frac{V_{p-p}}{2 \times \sqrt{2}} = 1.8 \text{ volts}$$

1000- 4- 3 IEC : 1995

4.20

가 RF .
TDMA가 .

4.21 TDMA()

가
RF ,
RF .

5.

5.1

가 1 .
: 80 MHz 1000 MHz

1

	V/m
1	1
2	3
3	10
X	
- X	

1 .
1kHz 80% . ()
1) 8 .
1- IEC 1000- 4- 3 IEC 1000- 4- 6 80MHz

.(H)

2- .

1000- 4- 3 IEC : 1995

3- IEC 61000- 4- 6

. IEC 61000- 4- 6 80MHz

5.2 RF

800MHz 960MHz 1.4GHz 2.0GHz
가 2 .

2 800MHz 960MHz 1.4GHz 2.0GHz

	V/m
1	1
2	3
3	10
4	30
X	
- X .	

(column) . ,
1kHz 80% .
가 8 .
가 , 1.4GHz
2.0GHz . ,
 .
 . 1 2 ,
가 .

1000- 4- 3 IEC : 1995

- 1- A RF
- 2- F
- 3- 2
.(I
.)
- 4- 800MHz
 , 2.4GHz
 LAN, (100mW)

6.

- : ()
가 . 가
- EM TEM ,
- *EMI* : 가
- RF : 1 kHz 80%
 . $1.5 \times 10^{-3} decade/s$
rf
(dwell time)

1000- 4- 3 IEC : 1995

가

- .
- : 가 ()
- () 15dB ..
- (B)
- , Log- periodic .
- Circularly polarized .
- *0.1 m* ,
- :
- 가
- .
- .
- :
- , .
- .

6.1

. 가

- . 가
- ,
- .
- . ,

1000- 4- 3 IEC : 1995

(Semi Anechoic)

2

C

6.2

가

IEC 61000- 4- 3

(3)

가

가

1.5m × 1.5m

0.5m × 0.5m

.(, 4)

가

.(5 6)

가

가

0.8m

, 가

가

, 1.5m × 1.5m

0.4m

()

1000- 4- 3 IEC : 1995

가 (, ,)
.
 $1.5\text{m} \times 1.5\text{m}$
.
 $1.5\text{m} \times 1.5\text{m}$, 가
가
1m
가 3m . Biconical
Log- periodic
.
3m
가 75% - 0dB
+6dB (, 16 12
)
.
 $0.5\text{m} \times 0.5\text{m}$,
.
-
가 - 0dB +6dB
. 6dB 가
+6dB +10dB , - 0dB 가
- 0dB +6dB 3%
.
a) (4) 16 .

1000- 4- 3 IEC : 1995

- b) 1% 가 3V/m 10V/m ()
가 .
- c) 15 .
- d) 16 , V/m 가
25% (16 4) .
- e) $\pm 3\text{dB}$.
- f) 가 가 .(- 0dB +6dB .)
- g) . (, 80W가 9V/m ,
3V/m 8.9 W가 .)
- h) , a) g) .
3V/m 10V/m ,
a), d), e), f) h)

가 , 가

7

가 .

1000- 4- 3 IEC : 1995

가 ,
.

,
가 .

가
가 .

가 5 6 .

7.1

0.8m

7.2

0.1m .

. 0.8m

1000- 4- 3 IEC : 1995

7.3

- 1m
- 3m
- 1m
- 가 3m , r.f. 1m가

EMI

7.4

(over- testing)

1000- 4- 3 IEC : 1995

(under- testing)
가

8.

D

Biconical

(Spot)

80MHz

1000MHz

Calibration

. (6.2 .)

r.f

가

가

80MHz 1000MHz

80%

1kHz

1.5×10^{-3} decades/s

1%

- “

1%

”

가

1.01(1%

)

1000- 4- 3 IEC : 1995

- 가 ;
- ;

가 가 .

, , .

9.

가 IEC 61000- 4

.

.

:

- a) ;
- b) 가 ;
- c) 가 ;
- d) () 가 ;

IEC 61000- 4 가

.

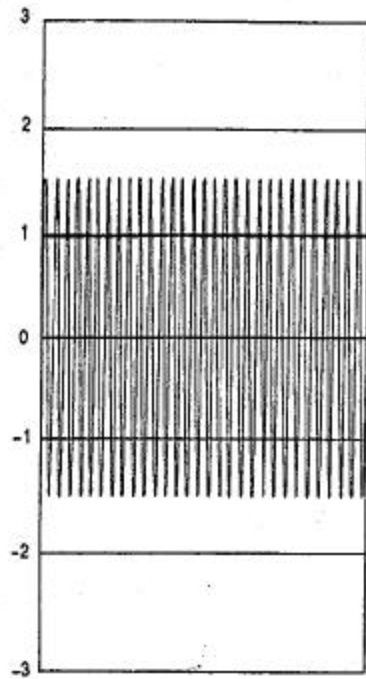
,

.

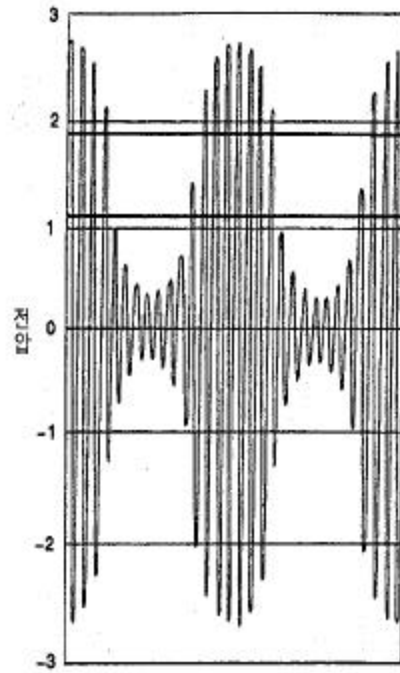
가 ,

.

1000- 4- 3 IEC : 1995

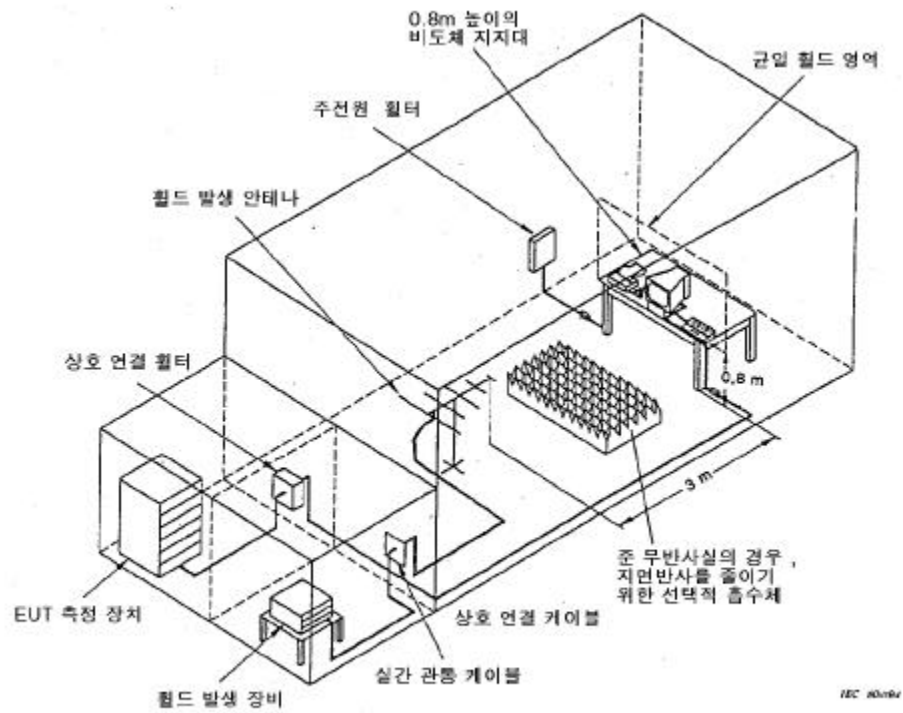


a) 무변조 RF-신호
 $V_{p-p} = 2.8 \text{ V}$
 $V_{rms} = 1.0 \text{ V}$

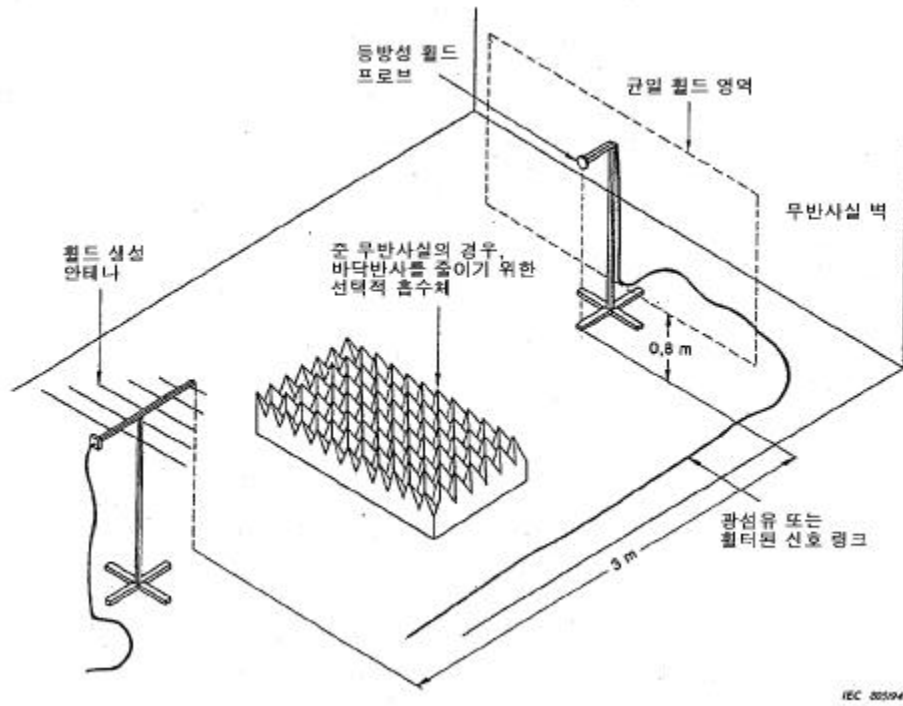


b) 변조 RF-신호 80% AM
 $V_{p-p} = 5.1 \text{ V}$
 $V_{rms} = 1.12 \text{ V}$
 $V_{maximum RMS} = 1.8 \text{ V}$

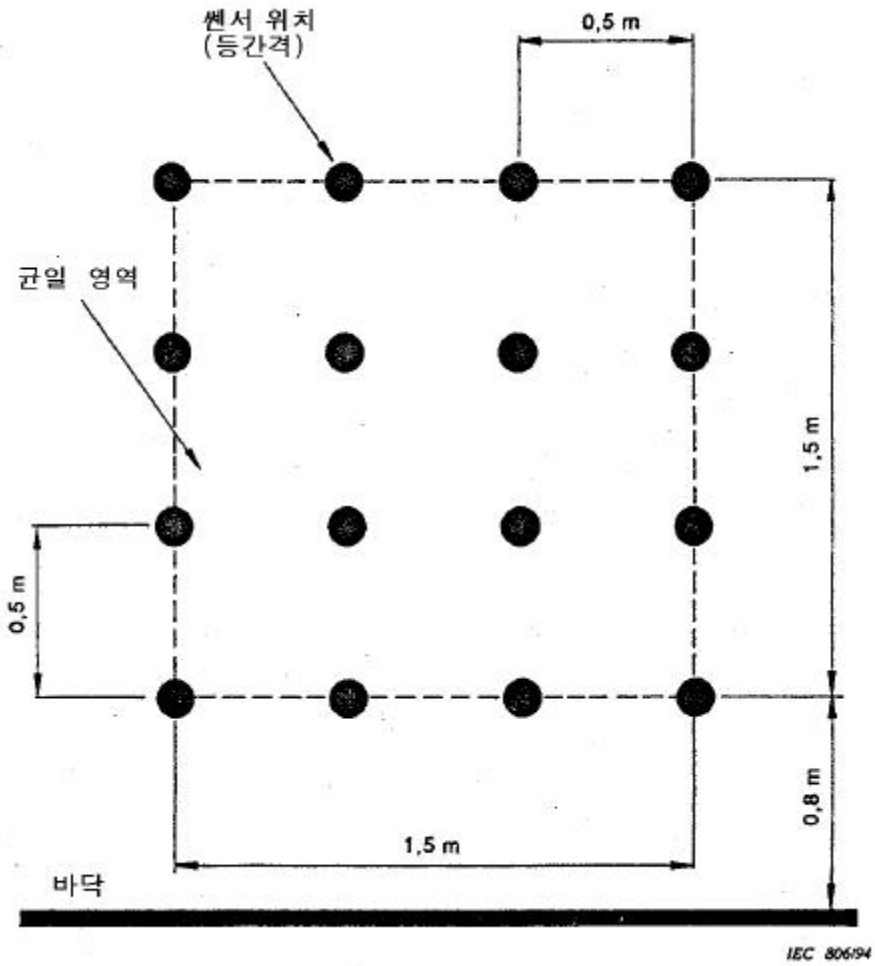
IEC 1 669/98



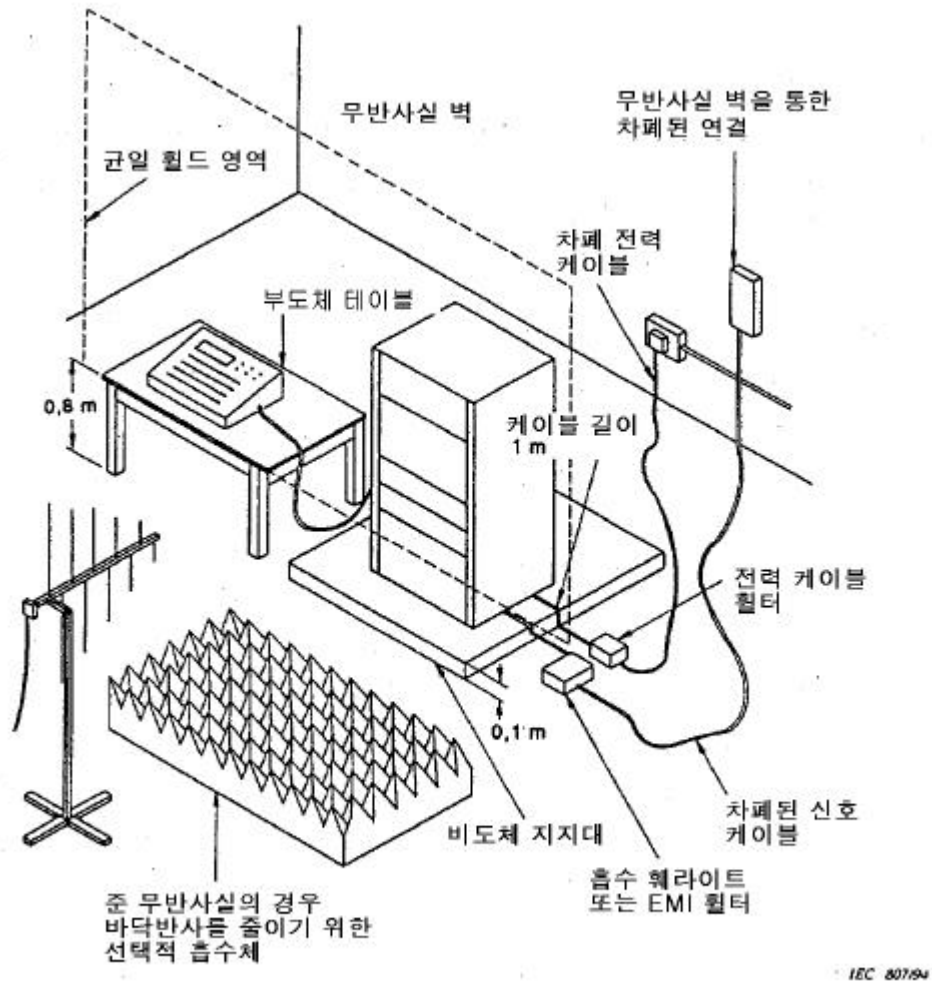
주-벽과 천정에 부착된 흡수체는 명확화를 위해 삭제되었다.

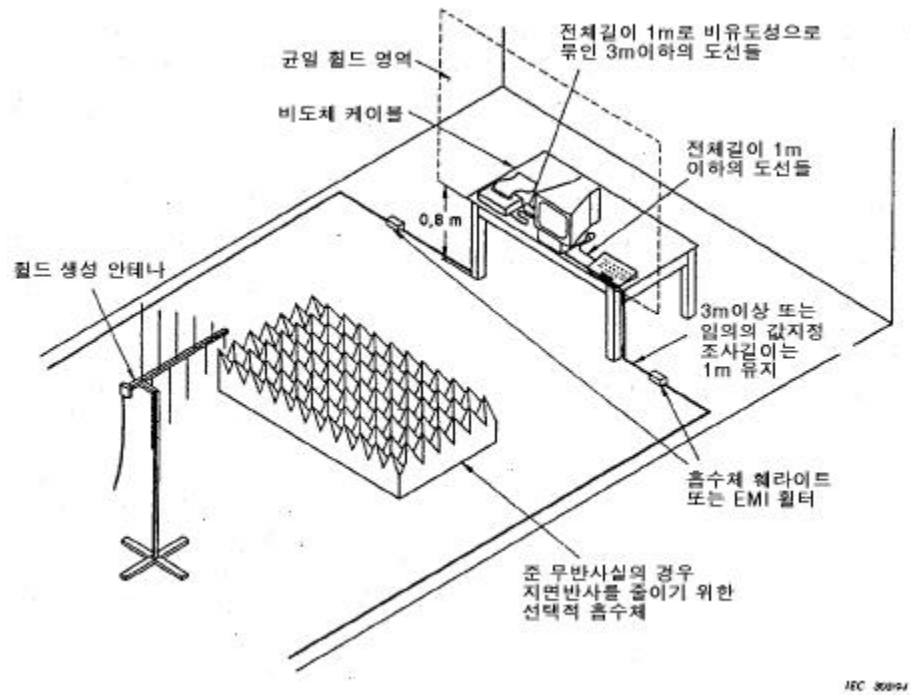


1000- 4- 3 IEC : 1995



4 - ,





1000- 4- 3 IEC : 1995

A
()

RF

A.1 가

800MHz

.
.

- , 1kHz 80% AM
- , 1:2 duty cycle, 200Hz 100% AM
- RF ,
 , GSM 200Hz 1:8 duty cycle , DECT 100Hz
1:24 duty cycle .. (GSM DECT I)
- RF , ,
GSM 200Hz 1:8 duty cycle (2Hz
) (8Hz)

A.1 .

1000- 4- 3 IEC : 1995

A.1 -
(GSM DECT I)

AM	<p>1. RMS , 가</p> <p>2. TDMA () 가</p> <p>3. IEC 61000- 4- 6</p> <p>4.</p> <p>5. , ,</p> <p>6. (, , ,)</p>	<p>1. TDMA</p> <p>2. 2 -</p> <p>3.</p>
AM	<p>1. TDMA</p> <p>2.</p> <p>3. (RF)</p>	<p>1. TDMA</p> <p>2. -</p> <p>3.</p> <p>4. 가</p>
RF	<p>1. TDMA</p> <p>2. (RF)</p>	<p>1. -</p> <p>2. (, GSM, DECT) 가</p> <p>3.</p> <p>4. 가</p>

A.2

가

- a) 1kHz 80% AM
 b) 200Hz duty cycle 1:8 “GSM” RF
 c) 100Hz duty cycle 1:2 “DECT” RF ()
 d) 100Hz duty cycle 1:24 “DECT” RF ()

A.2 A.3

A.2 - (1)

(2)		1kHz 80% AM	200Hz duty cycle 1:8 “GSM” RF	100Hz duty cycle 1:24 “DECT” RF
		dB	dB	dB
(3)	가 21Hz- 21kHz	0 (4)	0	- 3
	가	0	- 4	- 7
(5)	가	0 (4)	- 3	- 7
	가	- 1	- 6	- 8
(6)	가	0 (4)	+1	- 2
	가	- 1	- 3	- 7
1- 2- : (()) RMS (4) 3- 900MHz DECT duty cycle 1:24 1:2 0.5m PVC 4- 가 0dB 5- 900MHz RF 6- 900MHz RF				

A.3 - (1)

(2)		1kHz 80% AM dB	200Hz duty cycle 1:8 “GSM ” RF dB	100Hz duty cycle 1:24 “DECT ” RF dB
TV (3)		0 (4)	- 2	- 2
		+4	+1	+2
		+19	+18	+19
RS232 (5)		0 (4)	0	-
		>+16	>+16	-
RS232 (6)	()	0 (4)	0	0
	(RS232)	>+9	>+9	>+9
(7)	DC 2%	0 (4)	+3	+7
SDH (8)		0 (4)	0	-
1- () RMS (4) . 2- () . 3- 900MHz RF . 가 . 4- 0dB 5- 900MHz RS232 RF . 6- 900MHz RS232 RF . 7- 900MHz RF . 8- SDH= (Synchronous digital hierarchy). 935MHz .				

1000- 4- 3 IEC : 1995

- 30V/m AM,
(duty cycle 1:2) .
- ;
 - 75 2Mb
 - 125 twisted pair cable 2Mb
 - 가 , RS485
 - 가 (train display system)
 -
 - 2/34Mb
 - (10Mb/s)

A.3 2

2 ,
2 .
 , GSM DCS 1800 120ms(8Hz
)
(DTX) 2Hz 가 가 .

A.4

, RMS
 ,
 가 , AM
 가 .
 TDMA ,

1000- 4- 3 IEC : 1995

·
·

-
- , , 가 .
-
- .

80% AM
가
·

1000- 4- 3 IEC : 1995

B ()

B.1 Biconical (20MHz - 300MHz)

3
가
가
1430mm, 810mm, 830mm

B.2 (log - periodic) (80MHz - 1000MHz)

가
VSWR
60mm, 1500mm, 1500mm

B.3 (circularly polarized antenna)

가 3dB 가

B.4 (ridge)

, 1,000MHz

1000- 4- 3 IEC : 1995

C
()

r.f.

(peaks) (troughs)

() 가 , 가

가 r.f. 가

가

1000- 4- 3 IEC : 1995

D
()

- TEM

dc 150MHz (0.3m × 0.3m
× 0.3m)
(lateral) 가

r.f

2m

TEM 가 , dc 200MHz
(

GTEM)

TEM

TEM

IEC 61000- 4- 3

가

1/3

1000- 4- 3 IEC : 1995

E
()

E.1 가 .

 가
 r.f. . 가
 .

 가 .

E.2

 가 가
 . .

1000-4-3 IEC : 1995

F
()

F.1

radiated power:) . ERP(effective

$$E = k \frac{\sqrt{P}}{d} \quad (\text{F.1})$$

E (RMS) (V/m);
k , 7;
P (ERP) (W);
d (m).

가 .
ERP , F.1
k= 3 .

F.2

가
가

1000- 4- 3 IEC : 1995

가 , RF 가
가 .
.

5 ,
.

- 1 : . 1km /
/

- 2 : 가
(1W)가 .

- 3 : 가 , 1m
(2W)가 가
, ISM 가 가 .

- x : x ,
.

F.3 RF

. ,
.
.(
가
.)

1000- 4- 3 IEC : 1995

가

가 .

2 가 , 가 . (,)

가 F.1 .

가 F.1 . $k = 7$ 80% AM

F.1

	V/m	RMS V/m				(3)	
			2W GSM m	8W GSM m	$\frac{1}{4}$ W DECT m	1 (1)	2 (2)
1	1	1.8	5.5	1.1	1.9	-	-
2	3	5.4	1.8	3.7	0.6	a	-
3	10	18	0.6	1.1	0.21)	b	a
4	30	54	- 0.21)	0.4	0.11)	-	b
1 -	가						
2 -	가						
3 - 9							
1)	가	F.1 .					

..

- GSM , 4 (

1000- 4- 3 IEC : 1995

ERP 2W).

3 2 (

ERP 5W 8W). GSM ERP

- ERP가

EMC 가

- A RMS

RMS

F.1

- F.1 $k = 7$

$\pm 6\text{dB}$

- F.1 가

1000- 4- 3 IEC : 1995

G
()

F

ISM

1000- 4- 3 IEC : 1995

H
()

IEC 61000- 4 IEC 61000- 4- 6

, 가 .

IEC 1000- 4- 6 230MHz 가 .
26MHz 가 .

가 .

. :

- ;
- ;
- ;

1000- 4- 3 IEC : 1995

I ()

I.1

I.1 I.2 EMC

- **CT- 2 (Cordless Telephone, second generation):** 가 ;
- **DCS 1800 (Digital Cellular System):** 가 ;
- **DECT (Digital Enhanced Cordless Telecommunications):** 가 ;
- **DTX (Discontinuous Transmission):** 가 ;
- **ERP (Effective Radiated Power):**
- **FDMA(Frequency Division Multiple Access):** ;
- **GSM (Global System of Mobile Communication):** ;
- **NADC (North American Digital Cellular) :** - 54
D- AMPS ;
- **PDC(Personal Digital Cellular System):** ;
- **PHS(Personal Handy Phone System):** ;
- **TDMA(Time Division Multiple Access):** 4 ;
- **TDD(Time Division Duplex):** ;

I.1 -

	GSM	DCS 1800	DECT	CT - 2	PDC	PHS	NADC
	890MHz 915MHz	1.71GHz 1.784GHz	1.88GHz 1.96GHz	864MHz 868MHz	940MHz 956MHz 1.429GHz 1.453GHz	1.895GHz 1.918GHz	825MHz 845MHz
	TDMA	TDMA	TDMA/ TDD	FDMA/ TDD	TDMA	TDMA/ TDD	TDMA
	217Hz	217Hz	100Hz	500Hz	50Hz	200Hz	50Hz
duty cycle (duty ctle)	1:8	1:8	1:24 (1:48 1:12)	1:12	1:3	1:8	1:3
ERP	0.8W; 2W; 5W; 8W; 20W;	0.25W; 1W; 4W;	0.25W	<10mW	0.8W; 2W	10mW	<6W
	2Hz(DT X) 0.16Hz- 8.3Hz ()	2Hz(DT X) 0.16Hz- 8.3Hz ()					
- CT - 3 DECT							

1000- 4- 3 IEC : 1995

I.2 -

	GSM	DCS 1800	DECT	CT - 2	PDC	PHS	NADC
	935MHz 960MHz	1.805GHz 1.88GHz	1.88GHz 1.96GHz	864MHz 868MHz	810MHz 826MHz 1.477GHz 1.501GHz	1.895GHz 1.918GHz	870MHz 890MHz
	TDMA	TDMA	TDMA/ TDD	FDMA/ TDD	TDMA	TDMA/ TDD	TDMA
	217Hz	217Hz	100Hz	500Hz	50Hz	200Hz	50Hz
duty cycle	1:8 8:8	1:8 8:8	1:2	1:12	1:3 3:3	1:8	1:3 3:3
ERP	2W 320W	2W 200W	0.25W	0.25W	1W 96W	10mW 500mW	500W
	2Hz(DTX) 0.16Hz- 8.3Hz ()	2Hz(DTX) 0.16Hz- 8.3Hz ()					
- CT - 3 DECT							

IEC

61000- 4- 14

1
1999- 02

EMC

(EMC)

4- 14 :

-



		3
		5
1.		6
2.		6
3		7
3.1		7
3.2	(sources)	7
4.		8
5.		8
6.		11
6.1		11
6.2		11
6.3		11
7.		11
8.		12
8.1		12
8.2		13
9.		13
A ()		18
		20
1 -		16
2 -		17
3 -	가 ()	17

61000- 4- 14 IEC:1999

(EMC)-

4- 14 : -

- 1) (IEC : International Electrotechnical Commission)
(IEC National Committees) . IEC ,
 . IEC
 ;
 가 IEC 가
 , IEC
 . IEC (ISO: International Organization for standardization)
 가
- 2) IEC 가
 IEC 가
- 3) IEC ,
 IEC
- 4) IEC 가 IEC
 . IEC
 가
- 5) IEC , IEC
 가
- 6) . IEC
 IEC 61000- 4- 14 77A

61000- 4- 14 IEC:1999

IEC 77 :

IEC 1000- 4- 14 IEC61000 4- 14 . IEC 107
EMC 가 .

FDIS	
77A/263/FDIS	77A/268/RVD

A .

61000- 4- 14 IEC:1999

IEC 61000

1 :

(,)

,

2 :

3 :

()

4 :

5 :

6 :

9 :

, “ -
” (: 61000- 6- 1).

61000- 4- 14 IEC:1999

(EMC)

4- 14 :

1.

IEC 61000- 4- 14 (EMC) .
 ,
 .

IEC 61000- 4- 14 (+) (-) .
가 .

(flicker) .
(lighting luminance fluctuations)

(per phase) 16 A .
400 Hz .
IEC .

가 , ,
 ,
 .

2.

IEC 61000- 4- 14

61000- 4- 14 IEC:1999

. , IEC 610004- 14
가

.
가 . IEC ISO
가 .

IEC 60050(161):1990, *International Electrotechnical Vocabulary(IEV) - Chapter 161:Electromagnetic compatibility*

IEC 60068- 1:1998, *Environmental testing - Part 1: General and guidance*

IEC 61000- 2- 4:1994, *Electromagnetic compatibility(EMC) - Part 2: Environment - Section 4: Compatibility levels in industrial plants for low-frequency conducted disturbances*

3

3.1

.
:
- (:)
-
-
- (ripple) 가

3.2 (sources)

(domestic appliances)가 . ,
.

:

- a) :
- 1) (resistance welding machines);
 - 2) (rolling mills);
 - 3) 가 가 ;
 - 4) (arc furnaces);
 - 5) (arc welding plant);
- b) (:);
- c) (step) ((tap voltage))

supply network) (public

4

IEC 61000- 4- 14 가 .
IEC 60050(161) .

4.1

(device) (equipment) 가 [IEV 161- 01- 20]

4.2

[IEV 161- 08- 05]

5.

가

61000- 4- 14 IEC:1999

가 .

, 1

.

.

$$U_n, U_n - 10\% U_n, U_n + 10\% U_n$$

- U_n

:

1: .

2:

$$\Delta U = 8\% U_n \quad . \quad 2 \quad .$$

3: (:)

$$\Delta U = 12\% U_n \quad . \quad 3 \quad .$$

1, 2, 3 A .

1 :

$$U_n, U_n - 10\% U_n, U_n + 10\% U_n$$

1

	U_n	$U_n - 10\% U_n$	$U_n + 10\% U_n$
1			
2	$\Delta U = \pm 8\% U_n$	$\Delta U = + 8\% U_n$	$\Delta U = - 8\% U_n$
3	$\Delta U = \pm 12\% U_n$	$\Delta U = + 12\% U_n$	$\Delta U = - 12\% U_n$
x	x	x	x
-	"x" .		

T t $T = 5s, t = 2s$ (1c).

t_f t_r :

- f_n (: 50 Hz 5ms) $\pi/2$
(1b).
(phase) $\phi = 270^\circ$
, $\phi = 0^\circ$ (zero crossing) .
- f_n (: 50 Hz 0.1 s)
(1c).

$\Delta U/5$

x .
.
 ,

2

.
 - .

6.

6.1 (Test generator)

가 .

6.2

2-

	$U_n \pm 25\%$
	$\pm 1\%$
	0V 250 μs
	EUT .
/	5%
	1ms
(interphase) (3)	2.5 °
	f_n 2.5% (50Hz 60Hz)
- IEC 61000- 4- 11 가 . $U_n +25\%$.	

6.3

가 .

EUT가 2

7.

3 .

61000- 4- 14 IEC:1999

가 .

3 EUT .

8.

, .

;

- EUT ;
- 가 (,) ;
- EUT ;
- EUT ;
- ;
- ;

EUT ,

.

, 가 .

EUT .

가 .

8.1

IEC 60068- 1 .

: 15. C 35. C

: 25 % 75%

: 86 kPa 106 kPa (860 mbar 1060 mbar)

- .

61000- 4- 14 IEC:1999

8.2

EUT 가 가 .
 $2 \times 60s$ (2).
.
.

3 , .
가 ϕ 가 .

9.

가
.
.

EUT (.)

- a) .
- b) 가 .
- c) .
- d) () ,
가

가 .

(acceptance test)

.

, 가 , , .

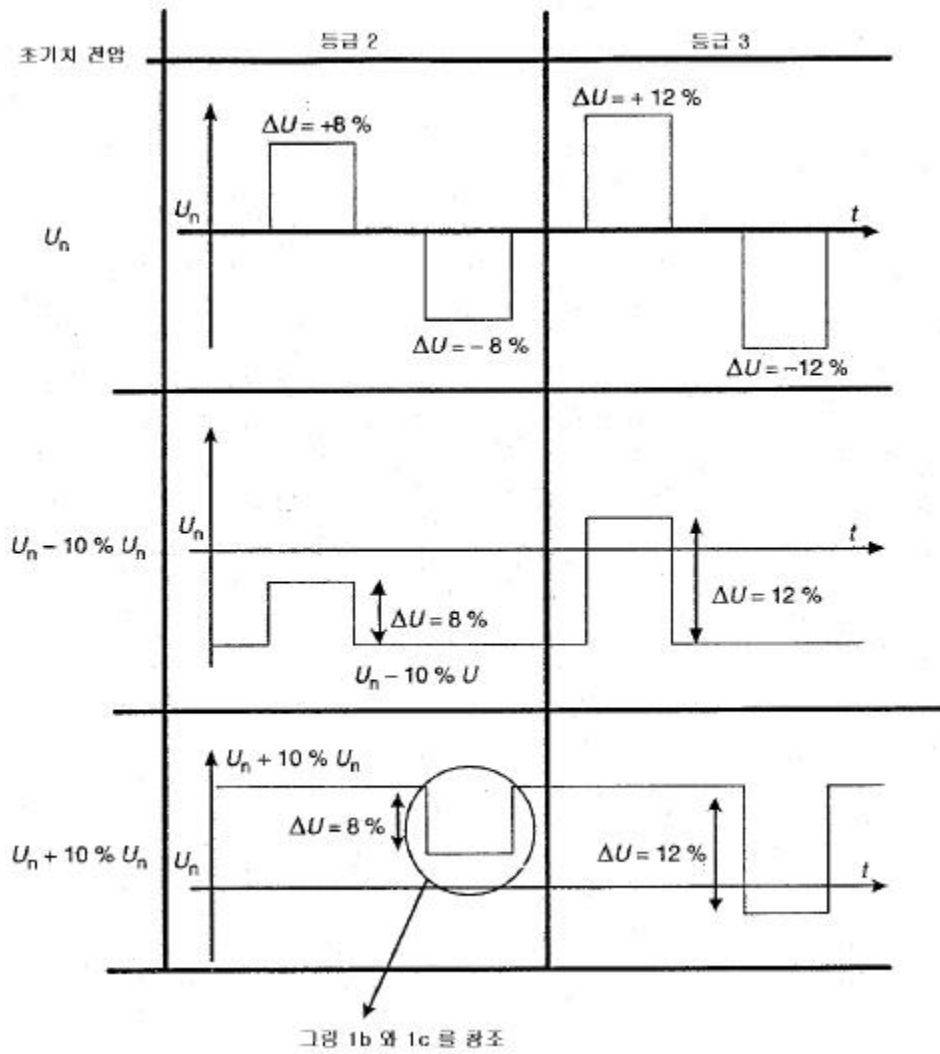
EUT 가 , EUT .

, (; 가)

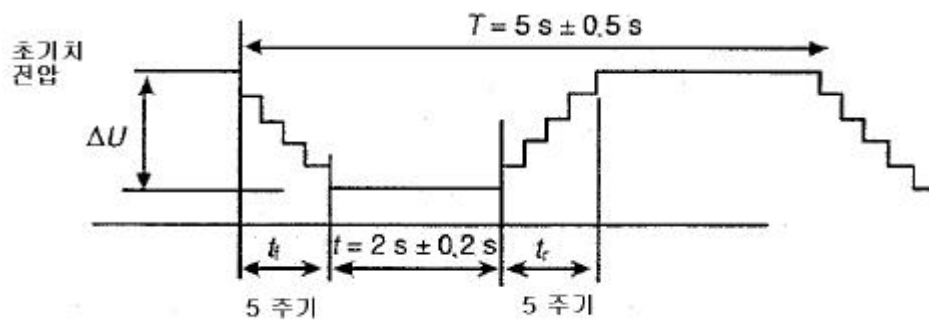
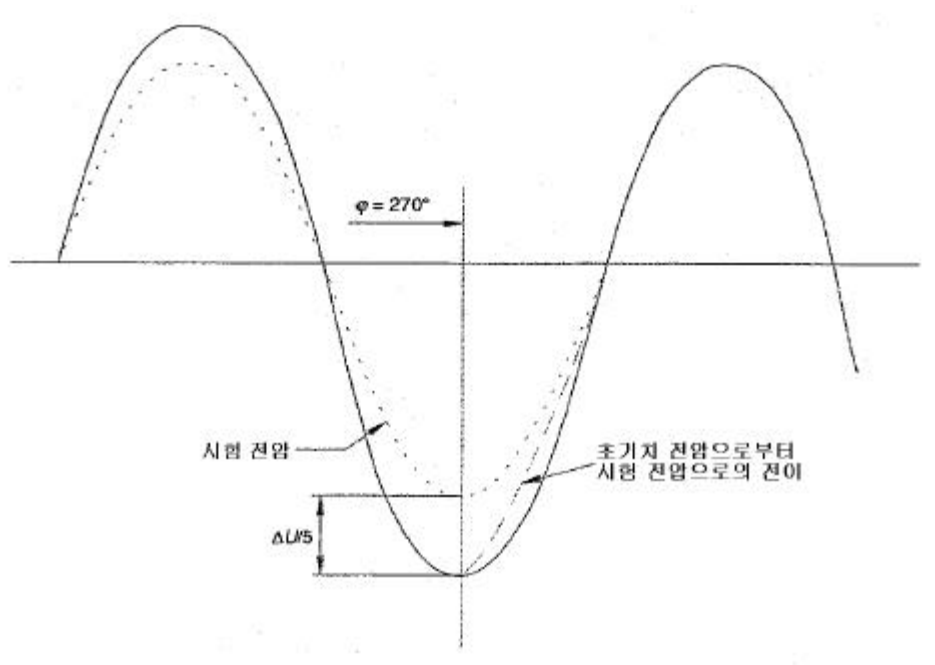
. 가

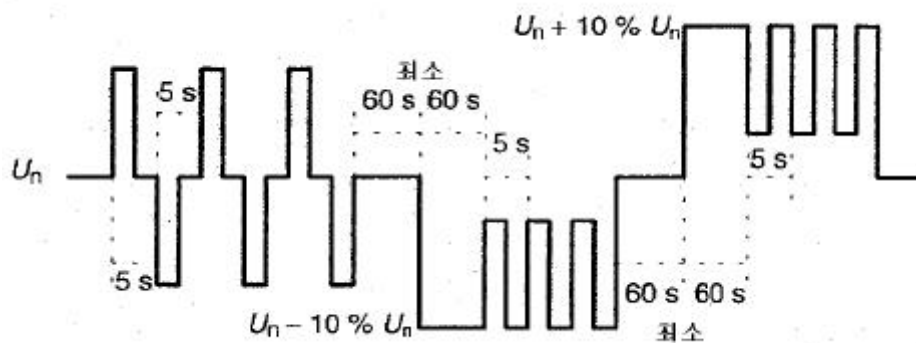
.

.

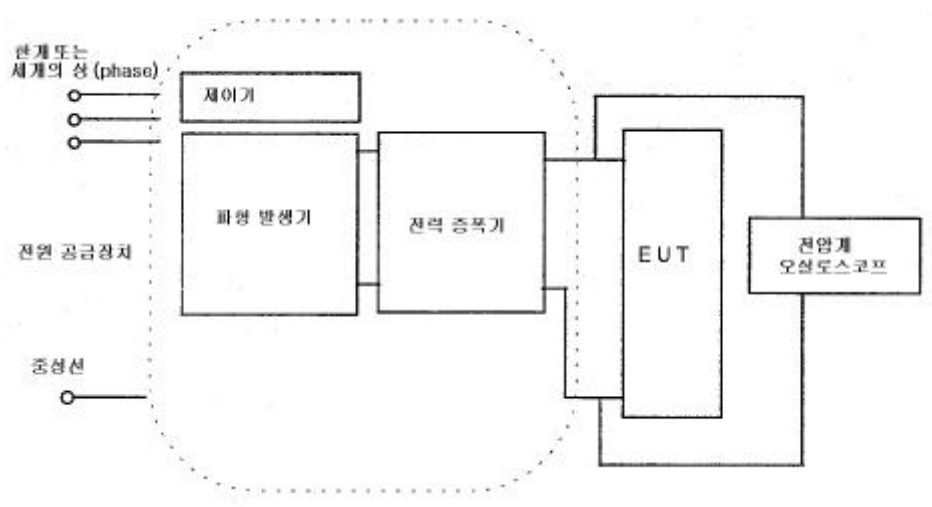


1a





2



3

가

()

A

()

IEC 61000- 2- 4

1

1

가

1

1 - 1 , UPS(uninterruptible power supplies),

가

2 - , 1

2

2

,

(

PCCs)

(IPCs)

2

;

,

2

3

3

IPCs

.

3

2

가

3

:

61000- 4- 14 IEC:1999

- ;
- 가 ;
- 가 ;
- 가 ;
- (bus - bar) - (arc - furnace)
3
().
가
.

61000-4-14 IEC:1999

IEC 61000-2-1:1990, *Electromagnetic compatibility(EMC) - Part 2: Environment - Section 1: Description of the environment - Electromagnetic environment for low-frequency conducted disturbances and signalling in power supply systems*

IEC 61000-2-2:1990, *Electromagnetic compatibility(EMC) - Part 2: Environment - Section 2: Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems*

IEC 61000-4-1:1992, *Electromagnetic compatibility(EMC) - Part 4: Testing and measurement techniques - Section 1: Overview of immunity tests - Basic EMC publication*

IEC 61000-4-11:1994, *Electromagnetic compatibility(EMC) - Part 4: Testing and measurement techniques - Section 11: Voltage dips, short interruptions and voltage variation immunity tests - Basic EMC publication*

CISPR/IEC

61000- 6- 3

(1 , 1996. 12)

COMITE INTERNATIONAL SPECIAL DES PERTURBATIONS RADIOELECTRIQUES
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

()

Electromagnetic Compatibility (EMC)

Part 6 : Generic Standards

**Section 3 : Emission standard for residential,
commercial and light-industrial
environments**

(EMC)

6 :

3 : , ,



Reference number
CISPR/IEC 61000-6-3 (1996)

/

CISPR/IEC 61000-6-3 1 (1996. 12)

(EMC)

6 :
3 : , ,

CEI 1996 - .
가 ,
.

: 3 rue de Varembe Geneve
Suisse

Telefax : + 41 22 919 0300, e-mail : inmail()iec.ch
IEC Web site http : /www.iec.ch
IEC

IEC CISPR
IEC CISPR .
, (Revised edition) (Amendment)
IEC/CISPR (National Committee) IEC
IEC (Bulletin)
IEC (Yearbook)
IEC ()

IEC 50 : (IEV)
, 가 가
IEV
IEV, 902 (chapter 902)

IEC (Graphical Symbols)
(Letter Symbols), (Signs)
- IEC 27 :
- IEC 617 :

IEC 27 IEC 617

CISPR
3. 4 , CISPR

1

2

3

4

5

6

7 /

8 가

9

1 - Emission

1 - (port)

A

(EMC)

6 :

3 : , ,

1) IEC 가 (IEC)
. IEC ,

IEC
;

,
가
. IEC , ,
. IEC (ISO)

2) 가
IEC 가

3) , ,

가

4) IEC 가
가 IEC
가 IEC
가

5) IEC , ,

6) . IEC
가

FDIS ()	
CIS/1082/FDIS	CIS/1085/RVD

•

(EMC)

6 :

3 : , ,

1.

0Hz 400GHz

EMC

가 가

2.

(Edition)

가 . IEC ISO

IEC 50(161) : 1990 (IEV) 161
 IEC 1000-3-2 : 1995 (EMC) 3
 2 (가 16A)
 IEC 1000-3-3 : 1994 (EMC) 3
 3 16A

CISPR 14 : 1993. 가 ,
 CISPR 22 : 1993
 1(1995)

3.

1. 가 10m
 TV

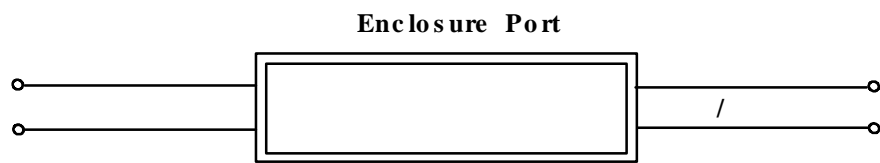
2. 가
 가

4.

EMC EEC , IEC 50(161), IEC, CISPR
 (89/336/EEC) 가

가 .

____(port) : (1)
)
____(Enclosure Port) : 가



____ 1 (Port) ____

5.

, , , .

.

- , 가 ,
- , ,
- , ,
- , , ,
- , , , ,
- , , ,

, .

6.

(EUT) 가
(EUT)
EUT CISPR22 (port)
EUT
(EUT) ,
(Basic Standard)

7. /

7.1 /

/ ,

7.2 / 가

가 ,

8.

1 가
가

9.

가

1 A.1

가 가

가

(CISPR 14, CISPR 22, IEC 1000-3-3)

				()	
	30 230MHz 230 1000MHz	10m 30dBμV/m 10m 37dBμV/m ()	CISPR 22 Class B	1	가
	0kHz 2kHz		IEC 1000- 3- 2 IEC 1000- 3- 3	2	가
	0.15MHz 0.5MHz	66dBμV - 56dBμV () 56dBμV - 46dBμV ()	CISPR 22 Class B		
	0.5MHz 5MHz	56dBμV - 46dBμV -			
	5MHz 30MHz	60dBμV - 50dBμV -			
	0.15MHz 30MHz	 :	CISPR 14		
. 1. 9kHz , 2. IEC 1000- 3- 2 IEC 1000- 3- 3 , IEC 1000- 3- 2 IEC 1000- 3- 3					

A

()

·
·

A.1

, , · ·	0.15MHz ~ 0.5MHz	40dBμA - 30dBμA 30dBμA - 20dBμA	CISPR 22 1 CLASS B		150
	0.5MHz ~ 30MHz	30dBμA 20dBμA			

CISPR/IEC

61000- 6- 4

(1st Ed.)

(1 , 1997. 1)

**COMITE INTERNATIONAL SPECIAL DES PERTURBATIONS RADIOELECTRIQUES
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE
()**

Electromagnetic Compatibility (EMC)

Part 6 : Generic Standards

**Section 4 : Emission standard for industrial
environments**

(EMC)

6 :

4 :



**Reference number
CISPR/IEC 61000-6-4(1997)**

CISPR/IEC 61000-6-4 1 (1997. 1)

(EMC)

$$\begin{array}{rcl} 6 & : & \\ 4 & : & \end{array}$$

CEI 1996 - 가 , .

: 3 rue de Varembe Geneve Suisse

Telefax : +41 22 919 0300, e-mail : inmail()iec.ch

IEC Web site [http : /www.iec.ch](http://www.iec.ch)

IEC

CISPR

IEC CISPR

IEC/CISPR (Revised edition) (Amendment) (National Committee) IEC

IEC (Bulletin)

IEC (Yearbook)

IEC ()

IEC 50 : (IEV)

가 가

IE V

IEV, 902 (chapter 902)

IEC

(Graphical Symbols)

(Letter Symbols), (Signs)

- IEC 27 :
- IEC 617 :

IEC 27 IEC 617

CIS PR

3. 4

CISPR

1

2

3

4

5

6

7 /

8 가

9

1 - Emission

1 - (port)

A

(EMC)

6 :

4 :

1) IEC 가 (IEC)
. IEC ,

IEC ,
;
. IEC , ,
. IEC (ISO)

2) 가
IEC

가
3) , ,
가

4) IEC 가
가 IEC 가 IEC
가

5) IEC , ,

6) IEC가

CISPR/IEC 61000-6-4 CISPR
EN 50081-2 : 1993 CENELEC
110 : EMC 가
가 .

FDIS ()	
CIS/1083/FDIS	CIS/1086/RVD

A .

(EMC)

6 :
4 :

1.

5
0Hz 400GHz
EMC
CENELEC
R110- 002 : 1993 「

2.

(Edision)
가
IEC ISO

CISPR/IEC 1000- 6- 3 : 1996 (EMC) 6 , 3 ,
 ,
 IEC 50(161) : 1990 (IEV) 161
 CISPR 11 : 1990 , , (ISM)
 CISPR 14 : 1993. 가 ,
 .
 CISPR 22 : 1993
 1(1995), 2(1996)

3.

,
 .
 가 가
 가 .
 .

1. 가 30m
 가 TV
 .
2. 가
 가 .

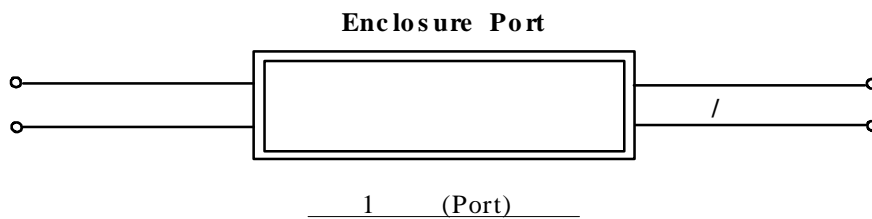
4.

EMC EEC , IEC 50(161), IEC, CISPR
 . (89/336/EEC) 가 .
 가 .

____(port) :

(1)

_____(Enclosure Port) : 가



5.

1

•

- , , (ISM) 가 - (class A)
- 가
- 가 , 가

가 , 가

•

6.

,

가

$$\cdot \quad (\text{EUT})$$

EUT CISPR22

(port)

.

EUT
(EUT)

(Basic Standard)

7. /

7.1 /

가 (CISPR/IEC1000- 6- 3)
,
,
가
/

7.2 / 가

가

8. 가

1
가
가

9.

가
1 A.1

가 가

가
(CISPR 11, CISPR 14, CISPR 22, IEC 1000-3-2, IEC 1000-3-3)

				()	
	30 230MHz 230 1000MHz	30m 30dB μ V/m 30m 37dB μ V/m ()	CISPR 11	1	CISPR11 10dB 10m .
	0.15MHz 0.5MHz	79dB μ V - 66dB μ V -	CISPR 22 Class B	2 3	
	0.5MHz 5MHz	73dB μ V - 60dB μ V -			
	5MHz 30MHz	73dB μ V - 60dB μ V -			
<p>1. .</p> <p>2. 5 () . 30</p> <p>. 5 30</p> <p>20log30/NdB .(</p> <p>N)</p> <p>CISPR14 .</p> <p>3. 1000V .</p>					

A
()

. ,
.

 A.1

	0kHz ~ 2kHz		IEC1000- 3- 2 IEC1000- 3- 3		
, , , , ,	0.15MHz~ 0.5MHz				
	0.5MHz ~ 30MHz				

CISPR

14- 1

²
1998- 12

가



가

- 1) C.I.S.P.R. C.I.S.P.R. C.I.S.P.R.
- 가 .
- 2) C.I.S.P.R. C.I.S.P.R. C.I.S.P.R. .
- 3) C.I.S.P.R. 가 가 C.I.S.P.R.
- . C.I.S.P.R.
- 가 가 .
- 가 , ,
- F가 .
- 3 1985 2 2(1989)(1) 3
- .

6	
CISPR/F(CO)70 71	CISPR/F(CO)81 82
CISPR/F(CO)84	CISPR/F(CO)85

C.I.S.P.R.

.

가 ,

가 .

9 KHz- 400 GHz .

가 .

가

1

R.F. 가 , ,

RF .

- RF IEC, CISPR

- , , : CISPR 15

- , : CISPR 13, 20 (7.3.5.4.2);

- : IEC XX()

- RF : CISPR 11

- : CISPR 11(1.3

)

- , 가 , : CISPR 22;

- : CISPR 12

- 25A 가

1.2 9 KHz 400GHz .

CISPR 15 IEC:1996

1.3 가

/ .

1.4

,

RF 가 . 가 .

2.

.

IEC 50(161): 1989, - 161 :

CISPR 16: 1987, CISPR

CISPR 16- 1: , 1 (1989)

CISPR 16- 2: , 2 (1989)

IEC 60335- 2- 76 : 1997, 가 - 2 :

- CISPR 16(1987) CISPR 16- 1 CISPR 16- 2가 .

3

3.1.1 IEC 50(161) <:1989, - 161 :
> 3.2 3.7 .

3.1.2 CISPR 16, 1 2 (1989) .

RFD

RFD

(EUT) RFD

RF 가

3.2 : 200 ms ,
200 ms . .

.(3)

3.3 : .

- .

3.4 **T** : (7.4.2.1) ()
, ()
)

3.5 **N** : ;
(7.4.2.3)

3.6 L_q : CISPR 14 4.1.1
N(4.2.2.2) 가 L
4 가 .

3.7 4 : T 1/4 L_q
.
, 1/4
 L_q .(7.4.2.6)

4

, 148.5 KHz 300MHz
.

4.1

가 ,
.
, ,
,
.
- ,
.(4.1.1 5.1.1)

4.1.1 148.5 KHz - 30 MHz ()

- 1979 (WARC) 1 148.5 KHz .
148.5 KHz가 , 150 KHz
.

1 . 4 ,
.
,
.

4.1.1.1 2, 3
(neutral) .

4.1.1.2 가 ,
가 4, 5 “ 가 ”
.
/ 가
.

, 2m
,
.
.
- 가 , 5.2.4
가 5.2.3 .

4.1.1.3 6 11
.
(,
) 가 4
5 .

1- 148.5KHz - 30MHz (1 2)
가

1	2	3	4	5
(MHz)	dB(μ V)	dB(μ V)	dB(μ V)	dB(μ V)
0.15- 0.50	66- 56	59- 46	80	70
0.50- 5	56	46	74	64
5- 30	60	50	74	64

1	6	7	8	9	10	11
	700W		700W 1000W		1000W	
(MHz)	dB(μ V)	dB(μ V)	dB(μ V)	dB(μ V)	dB(μ V)	dB(μ V)
0.15- 0.35	66- 59	59- 49	70- 63	63- 53	76- 69	69- 59
0.35- 5	59	49	63	53	69	59
5- 30	64	54	68	58	74	64
가 , 가 .						

4.1.1.4

- a) (1 4 5)
- b) (1 2 3)
- c) (1 4 5)
- , 가
- 가 2m
- 가

IEC 60335- 2- 76 , D 가

2m

4.1.1.5 ()

1 2 3

가

2m ,

2m

, 1 4 5

4.1.2 30MHz - 300MHz ()

2 .

5 .

2 - 30MHz - 300MHz

	가							
1	2	3	4	5	6	7	8	9
			700W		700W 1000W		1000W	
(MHz)	dB (pW)	dB (pW)	dB (pW)	dB (pW)	dB (pW)	dB (pW)	dB (pW)	dB (pW)
30- 300	가		가		가		가	
	45- 55	35- 45	45- 55	35- 45	49- 59	39- 49	55- 65	45- 55
가 , 가 .								

4.1.2.1 2 2 3 4.1.2.2 4.1.2.4

4.1.2.2 3.1.2.3 3.1.2.4 , 2 2 3
() .

4.1.2.3 2 4 9
 . (,)

4.1.2.4 , , ,
9kHz
30MHz 300MHz
 .

4.2

5.1.1 CISPR 16(1989) 1 2 , 가

C

4.2.1 3.2.2 3.2.3 ,
N

30 MHz - 300MHz

- 30 MHz

30 MHz

4.2.2 148.5 KHz - 30MHz ()

4.2.2.1 1

a)

b) 2 2

c) 30 N 가

4.2.3

-

4a,4b,4c

4.2.2.2 L_q , 4.1.1 ,

L , 가

44 dB , $N < 0.2$

$20\log(30/N)$ dB , $0.2 \leq N < 30$

-

3a, 3b, 3c

A.1

A.2

4.2.2.3 N 7

L_q

4.2.3 가 :

4.2.3.1 (, , , ,
) , 7.2.4

L_q N 5 , N
4.2.3.4 .
4.2.3.2 가 가 ,
4.2.2.1 .
600ms ,
, 4.1.1 .
4.2.3.3 ,
가 .
1)
2)
3)
4) 가 가
(),
, , , ,
,
,
, 7.2.3 7.3.2.4c .
R.F 가 ,
.
4.2.3.4 N 5 , (,
10ms) (A A.1 A.2)
,
, 4.2.2 .
4.2.3.5 N 5 ,
, 200ms ,
2 가 ,
200ms 가 .
(,) , 4c 가
가 .

4.2.3.6 3 , , , 가 가 .

a) 가 15 .

2 .

b) 10ms 1/4 .

L 44dB .

4.2.3.7 A A.2 , $N = n_2 \times f / T$ (n_2 T , 3.3) f A, A.2 .

4.2.3.8 (electric fence) V- 50 250 가 , 16 dB .

4.2.4 4.2.2 4.2.3 A .

A , A

4.2.2 4.2.3 .

5 (148.5 KHz - 30 MHZ)

7 .

5.1 가 .

5.1.1 가 CISPR16, 1 2 .(1989); 가 CISPR16, 1 4 .(1989)

5.1.2

V- RF
CISPR16, 1 (1989) 11 V- 50 /50 μH
가 V- RF
(5.3)
가 50 V-

5.1.3

(5.2.3.2)
(5.2.4.4). (, V-
25A)
1500
(CISPR16, 1 12)
가
(RF 50/60 Hz) 가 .(500pF
15 k)

5.1.4

510 ± 10% 220pF ± 20% RC
(M) ; (CISPR16 ,
1 ,1989) RC RC

5.1.5

CISPR16, 1 (1989) 14
가 ,

, CISPR16, 1 (1989) .

5.2

5.2.1

- CISPR16, 2 3 A .

5.2.1.1

() ,
V- . 5.2.2
, 0.8m V- .
V- ,
0.8m 0.3m- 0.4m ,
1m .
V- ,
가 , 0.1m
V-
, 1m V-

5.2.1.2

, 5.2.1.1

5.2.2 V-

5.2.2.1

2m × 2m 0.4m, V-
0.8m .
0.8m ,
0.4m .
() /

- .
- ,
- () , $0.1\text{m} \pm 25\%$
- () ;
-
- V- ;
- V- (CISPR 16-2) ;
- 0.5m 2m- 2m 가
- .

5.2.2.2

- 5.2.2.1 .
- 5.1.4 가 .
- 5.2.2.2.2- 5.2.2.2.4
- M 가 .
- RC
- .
- .
- 5.2.2.2.1** 가 , .
- RC M .
- 5.2.2.2.2** 가 , (8b B
- D) 가
- C 60mm 가
- 60mm
- A가 RC
- M .
- 5.2.2.2.3** 가 가
- , (8b B D)
- 가 ,
- 가 C 60mm .
- 가 60mm
- . (A) , B D C
- RC M .
- 5.2.2.2.4** II 가 A, B C(

) , A B . A B
C RC M .
- IEC 536() 0, 0I,
II, III .

5.2.2.3

5.2.1 , V- 0.8m
.
.
0.1m 가
.
가 , 5.2.2.1 .

5.2.3

1 5.2.4
.
2 가
.
5.2.2.1 , 가 1m
가 2m
,
.

5.2.3.1

가 5.2.2 .
a)
0.8m 가 ,
5.2.1.1 .
가 0.8m , 가 가 가
.
가 0.8m , 0.3m - 0.4m 가
0.8m 가
가 .

- 가 , .
- b) 가 , 가 .
- 가 , 가 .
- c) 가 , 가 .
- 가 .
- 가 , 가 .
- 가 .
- 가 , 5.2.2.1 .

5.2.3.2

- 가 , 5.1.3 .
- 가 .
- 가 , .
- 가 .

5.2.4

- 5.2.4.1 5 .
- 0.5m 1m 가 .
- 가 , .

- 5.2.4.2 가 , .
- V- .
- V- .

- 5.2.4.3 5.2.2.1 5.2.2.3 .

- 5.2.4.4 , 5.1.3 .

- 5.2.4.5 가 .

- a) 가 0.5m- 1m .
- 가 , 0.3m - 0.4m 가 0.8m .
- 가 .
- b) 5.2.4.4 , 가 .

5.3

가 ()
20dB .
20dB , .
가 ,
- , 가
.

6 (30MHz- 300MHz)

7 .
30MHz .
가
가 .

CISPR 16, 1 13 .

6.1

6.1.1

CISPR 16, 1 (1989) 2 ;
CISPR 16, 1 (1989) 4 .
- 가 ,

6.1.2

CISPR 16, 1 (1989) 13 .

6.2

6.2.1 0.4m

가 .

6.2.2

6.2.3

$\frac{\lambda_{\max}}{2} + 0.6\text{m}$

가

2

6m

가

6.2.4

6m

RF

가

(CISPR16, 1, 1989)

6.3

6.3.1

6.3.1.1

(loose end)

가

6.2.3

6m

.(6.2.3)

6.3.1.2

- 0.25m

- 0.25m

가

가

(

가

.(, 6.3.2 .)

6.3.2

6.3.2.1 6.2

·
() ,
·

6.3.2.2 , (

- , 가 ,
·

6.3.2.3 가 , 가

· ,
.(,
RF 가 .)

6.4 가

.(CISPR16, 1 , 1989)

7

·

7.1

7.1.1 , 7.2 7.3

·
가 , ·

7.1.2 , ,

·

7.1.3 , 가

·

7.1.4 ·

가 ,
0.9- 1.1 160 KHz- 50 MHz ;
가 ·

가 가

7.1.5

7.2.5.1 , 148.5 KHz- 30MHz 30MHz- 300MHz

가

7.1.6 15- 35

7.2

7.2.1

()

가

7.2.2

7.3

5.1.3 ,

(148.5 KHz- 30MHz)

6.3.2.2 , 30MHz- 300MHz

7.2.3

A.2

7.4.2.3

7.2.3.1

, 5

가

(off)

N

15

7.2.3.2 가 , 30

30 , 가 가

7.2.3.3 N ,
4 가 ,

7.2.4 , ,

- (50 ±
10)% 가 N

가 , 가
가
가 (,) ,
가
가

1 7.3.4가
2 가 , 7.2.4 7.3.4.14
3 4.2.3.1

7.2.5

- 4.1.2.4 , 30- 300MHz

7.2.5.1

가
가
가
160 KHz 가
150- 240KHz)

7.2.5.2

25A 가
가 가

7.2.5.2.1 7.2.5.1

가 ,
.

7.2.5.2.2 가 ,
가 25A 가
.

7.2.5.2.1

가 .

- .

7.2.5.2.1

. 가 ,
 , , ,
.

가 ,
 , 가
 , .

7.3

7.3.1 가

7.3.1.1

7.3.1.1.1 7.3.1.1.2 7.3.1.1.3 가 , 가
 , . 5.2.1.1 ,
가
.

7.3.1.1.2

7.3.1.1.1

30 MHz- 300MHz

.(가).
(integrated lead)

: 6.3

가 2m , 5.1.3
(148.5KHz- 30HMz) .(가)
1 4 5 .

7.3.1.1.3

, 7.3.1.1.1 7.3.1.1.2 . 1
4 5 .

- 7.3.1.1.4** 가 ,
 . ,
 .
 가 0.4m 가
 , ,
 . , .
- 7.3.1.2** .
- 7.3.1.3** .
- 7.3.1.4** (), ,
 . 7.1.5 .
- 7.3.1.5** .
- 7.3.1.6** .
- 7.3.1.7**
 .; 가 가 가
 . 7.3.4.14 .
 가 7.1.5가 가 .
- 7.3.1.8** 7.3.1.2 .
 7.3.4.14 .
- 7.3.1.9** .
 가 . 가
 .
 N 1/2 .
 - , 가
 .
- 7.3.1.10** .
 . ,
 90 . N 가
 .
 - 7.3.1.12 .
- 7.3.1.11** 7.3.1.10 .
- 7.3.1.12** 0.7m × 0.7m 가 140g/ m² 175 g/ m²
 ,
 .
 . 가 N

$$\cdot \quad (25 \pm 5)$$

7.3.1.13 가 .

7.3.1.14 7.1.2 .

7.3.1.15

7.2.3.1 7.2.5.1

7.3.1.16 -

7.3.1.16.1

7.3.1.16.2

가 (가)

가

278mm 310mm 가 . 80 g/m² .

7.3.1.16.3 .

7.3.1.17

7.3.1.17.1

7.3.1.17.2

. N 7.2.3.3 .

7.3.1.18

7.3.1.19

7.3.1.20

7.3.1.20.1

가 가 가
, 7.3.4.14 .

7.3.1.20.2

가 가
, .

7.3.1.20.3 7.3.1.20.1

7.3.1.20.2 가
, (15 ± 5) , (30 ± 5) 가
. , 가
.

7.3.1.20.4

가 () ,
5m ± 0.3m , 1m
가 , 4m
, 8m .
가
가 (5.2.1, 5.2.2 5.2.3)
V- ()
) 0.8m .

7.3.2

7.3.2.1

7.3.2.1.1

, 15
. 가 가 .

7.3.2.1.2

가 , 가
. 가 ,
가 가
.

7.3.2.1.3

.

a) ; 148.5 KHz- 30 MHz

,
가 . 0.4m
, 가 0.3m- 0.4m .

가 , 가

가 , 가

b) : 30 MHz- 300MHz

가 6.2.4

7.3.2.2 가 ;

,

,

가

,

7.3.2.3 가 7.3.2.2 가

.

7.3.2.4 , ,

a) , ,

() 가

b) 가 , N (50 ± 10)%

-

c) (,) (

) :

.

7.3.2.5 , N 가 ;

:

7.3.2.6 (,) 7.3.1.7

.

7.3.2.7 가

가

, 6 N .(

.)

700W 가 .

7.3.2.8 가

7.3.2.9 50
가

7.3.2.10 .

7.3.3

7.3.3.1

,
 .

7.2.3.1 7.2.5.1 .

7.3.3.2 .

7.3.3.3

.

7.3.3.4 .

7.3.4

. N $(50 \pm 10)\%$
 - $(50 \pm 10)\%$ - ,
가 - .

7.3.4.1

(,)
가 . N $(50 \pm 10)\%$ -
가 (가
가) .

7.3.4.2 , ,
 . 가 ,
 .

- :30mm

- :10mm

- :10 mm

7.3.4.3 , , , , 가 , -

- (feeding-bottle heater), , 가
 . 20- 100 (60)
 N .

7.3.4.4 가
 N .

7.3.4.5 가
 . ;
 N .

7.3.4.6 가
 .

7.3.4.7 가 , , (heating drawer),
 .

7.3.4.8 , , ,
 .

- CISPR11 .

7.3.4.9 : 10 ms N 5 ,
 4.2.3.4 .

24 h old(10cm×9 cm×1cm)

7.3.4.9.1 7.3.4.9.2 .

7.3.4.9.1 .
 - 가 ,
 가
 - 가
 N .

a) N :
 ,
 , (t_1) 3
 . 30
 (t_1+30) .
 N .

$$N=120/(t_1+30)$$

b) 가

N 4.2.2.2 L_q

.

L_q 7.4.2.6 4

가 . 20

.

가 .

7.3.4.9.2

(30)

N

7.3.4.10 (, ,): 가

N1

(1m×0.5m) , 가

N2

L_q , N=N1+N2

7.4.2.6 4 가

7.3.4.11 , ,

N 0.66 (50±10)% -

7.3.4.12 가

7.3.1.13 (, , (bedwarmer),

) 0.1mm (

) (50±10)% -

N

7.3.4.14 (, ,

)

(50±10)% - 가

N

가

가

가

가 (, ,) ,
가 가 .
 , 가
- 4.2.3.1 .
7.3.5 ,
가 , . :
가 2 ,
() , 4.2.3.3 .
7.3.5.1
가 가 , 가 가 ,
N 1/6 .
가 , 7 , 가
10 N
40 N .
7.3.5.2
가 가 , 40
가 N .
- ,
.
7.3.5.3
가 .
가 가 N .
40 N .
- ,
가 .

N2 (가 가
) . 40
N2가
N1
, N3
N2
, N1+N3

7.3.5.4

7.3.5.4.1

30). (가 가
40

7.3.5.4.2

가 가
1
1
40

- CISPR 13

7.3.6

7.3.6.1

7.3.6.1.1 , , (.)

7.3.6.1.2

7.3.6.1.3

7.3.6.1.4

7.3.6.3

7.3.6.1.5 7.3.6.3

7.3.6.2

7.3.6.2.1

7.3.6.2.2

2m × 1m

7.3.6.2.3

7.3.6.3

7.3.6.3.1 148.5 KHz- 30 MHz :

7.3.6.1 7.3.6.2

4m

0.4m

0.4m

0.3- 0.4m

V

(5.1.2). 1 2 3

5.1.3

5 1 4 5

7.3.6.3.2 30- 300MHz

2m × 1m(7)

7.3.6.1 7.3.6.2

/

가

가

2 2 3

7.3.7 가

- , 7.3.7.1- 7.3.7.3 30- 300MHz

7.3.7.1

2 2 가 가 ,
 2 2 가 n_2 (, 7.4.2.3
) 0.1
 가 ,
 10ms N 5 , 4.2.3.4
 (t_1) 가 n_2
 3 . 30
 (t_1+30) , N 120/ t_1+30 .

7.3.7.2

10 nF (가 6
) RC 250 (300
 V- 50 μ H
 50) 가
 500
 16dB 가
 15 °
 가 가
 a.c d.c
 V-
 가 ,

7.3.7.3

4.2.3.3(,
 .) .

7.3.7.3.1

가
2 10 200ms
, 1 2 10ms
, N 5 4.2.3.4

10 ms 200 ms , 4.2.2.2
N=2 L_q L_q 가
L 24 dB 가
 L_q , 2 40
4 가 (7.4.2.6)

7.3.7.3.2

가
, 10 가
a) 가 200ms
b) 가 200ms
c) 2

, 1 2
a) 10ms
b) 2 N 5

4.2.3.4

a) 10ms
b) 2 N=2 L_q
 L_q 가 L 24 dB
가
 L_q , 2 40
4 가 (7.4.2.6)

7.3.7.4 : 2 K

-

7.3.7.5) CISPR 15 (,

7.3.7.6 .

7.3.7.7

- 30- 300MHz .(4.1.2.4)

V- ,
5.2.4 .

. 4.1.1.2 . 가

,

가 ,
.

,

가 .

.

- 가 ; 1 4 5 .

7.3.7.8

- 30- 300MHz .(4.1.2.4)

V- ,
5.2.4 .

,

.

가 .
.

7.3.7.9

- 30- 300MH .(4.1.2.4)

V- , 가
5.2.4 .

,

가 .

.

5.1.3 , 7.2.2 .
4.1.1.4 .

7.3.7.10 ()

18 N ;
.

- a) : , , ,
b) 가 ;
1; (); (); ; ;
; (); ;
2; ; ;
- , 18
.; 가 , .

가 .

7.4

7.4.1

7.4.1.1 15 .

7.4.1.2 가 , 15 2dB

- a) (,) ,
.; 1 .
b) (,),
(7.4.1.1)

7.4.1.3 148.5 KHz- 30 MHz , 가 .

,

160 kHz, 240 kHz, 550 kHz, 1 MHz, 1,4 MHz, 2 MHz, 3,5 MHz, 6 MHz, 10 MHz, 22 MHz, 30 MHz

$\pm 5\text{MHz}$

7.4.1.4 30 MHz- 300 MHz ,
가 .

,

30MHz, 45MHz, 65MHz, 90MHz, 150MHz, 180MHz, 220MHz, 300MHz.

$\pm 5\text{MHz}$

7.4.1.5 30- 300MHz ,

45MHz, 90MHz, 220MHz

가 2dB

, 가 2dB ,

, .

- .

7.4.1.6

,
 .
 .

7.4.1.7 가 ,
 .

7.4.2

7.4.2.1 , (7.4.2.2) T .

, .

1) 40 40

2) 120

, 40 40

. 120

40 ,

.

가 , 가 ,

7.4.2.2 7.2. 7.3 N .
 , 148.5- 500KHz 150KHz 500KHz- 30MHz
 500KHz 가 N .
 가 가

- , CISPR 16, 2 (1989) 5 .

7.4.2.3 N .
 N $N = n_1 / T$. n_1 T
 (4.2.3.7) , N $N = n_2 \times f / T$.
 n_2 T , f A, A.2

7.4.2.4 4.2.2.2 L_q

7.4.2.5 , N

150 KHz, 500KHz, 1.4 MHz 30 MHz

7.4.2.6 T , 4
 가 L_q 가 .
 N , T 1/4
 가 L_q .

1 4 B .
 2 C .

8 CISPR

8.1 CISPR

8.1.1 CISPR 가 , ,

.

8.1.2

80% 80% 가

.

8.2.2.3 , 80% - 80%

.

8.2

;

8.2.1

8.2.1.1 8.3 가 가

8.2.1.2 (8.2.1.3)

8.2.1.3 8.2.1.2 ,

.

8.2.2

8.2.2.1

8.2.2.2

.

8.2.2.3 가 , .

, 가

가 .

가 가 , .

가 가 , .

8.3

8.1.2

, .

8.3.1 t

. 5 ,

4 3 .

$$\overline{X} + K s_n \leq L$$

,
 \overline{X} n

$$S^2 = \sum (x - \overline{x})^2 / (n - 1)$$

, X_n .
L
k , 80% 80% 가 가 t
 .

X_n, \overline{X}, S_n^2 L .(dB(μ V), dB(μ V/m) dB(pW)).

n	3	4	5	6	7	8	9	10	11	12
k	2.04	1.69	1.52	1.42	1.35	1.30	1.27	1.24	1.21	1.20

8.3.2

7
가 n , 가 가 c
 .

n	7	14	20	26	32
k	0	1	2	3	4

8.3.3 8.2.1 8.2.2 ,
 ,
 .

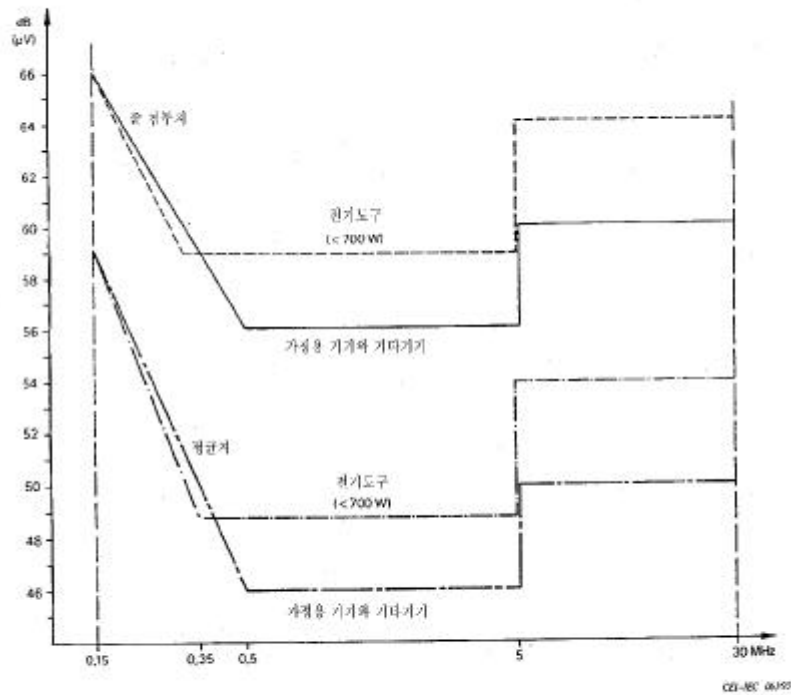
- , CISPR 16 9 () .

8.4

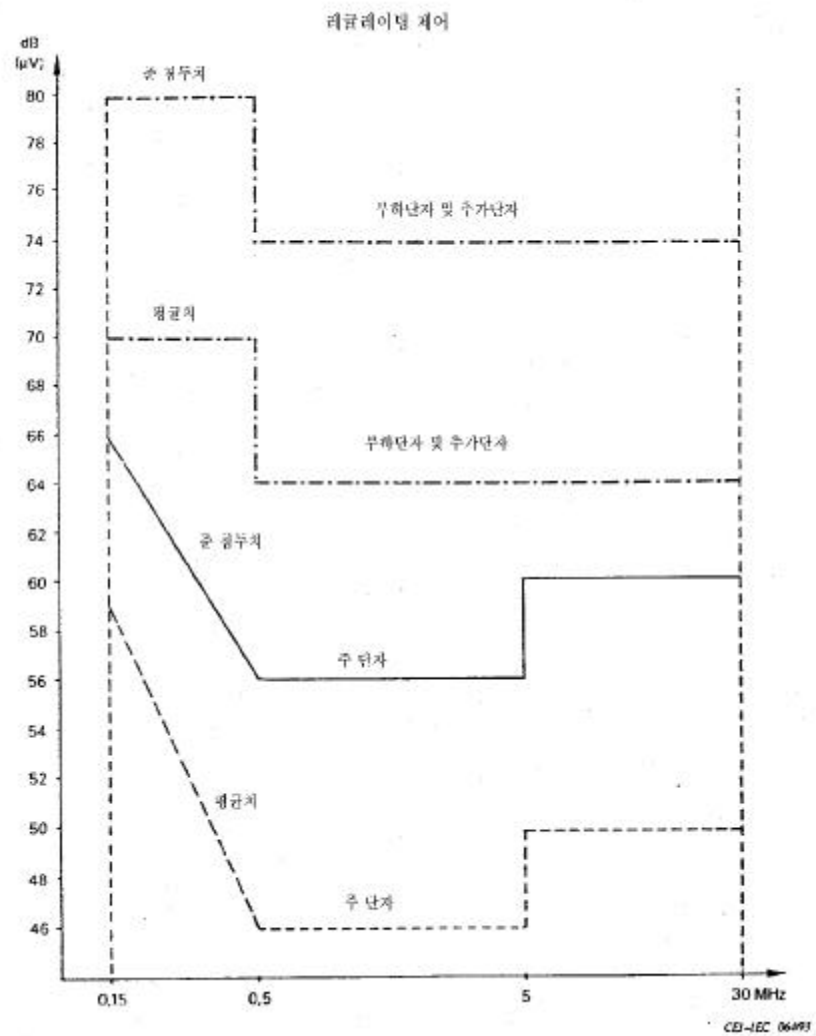
가 , 8.2.2.3
 .

8.3.1 .

가정용 기기와 전기도구



• 전기도구 : 700 W ~ 1 000 W : +4 dB
 > 1 000 W : +10 dB





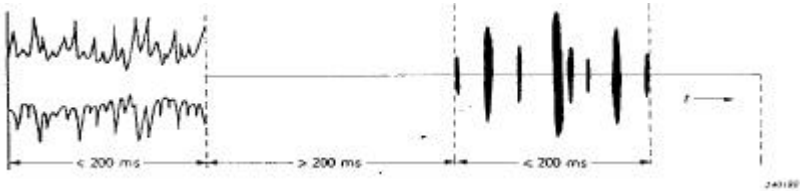
3a

200 ms



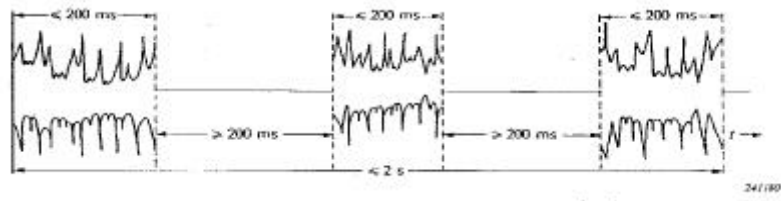
3b

200 ms 가 200ms
200ms



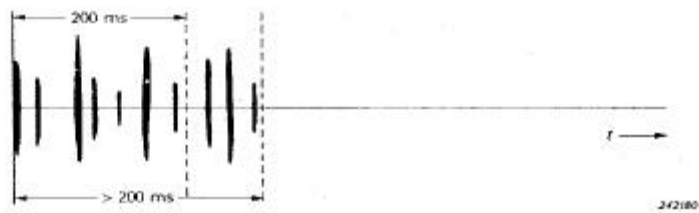
3c

가 200ms
200ms



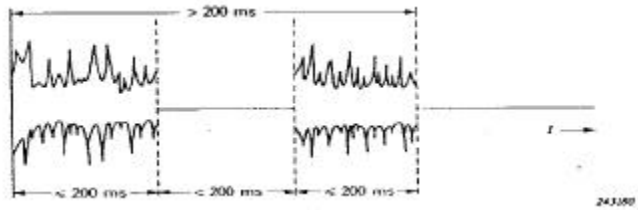
4a

2s



4b

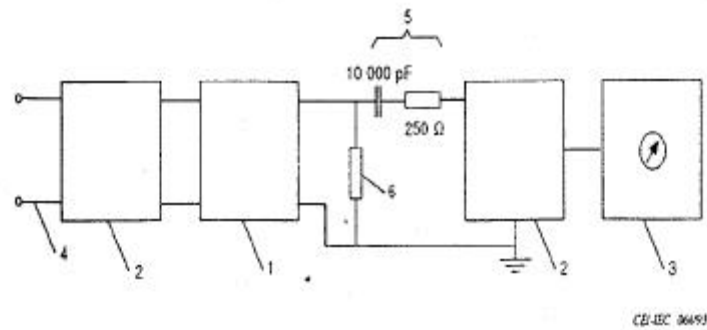
200ms 가 200ms 200ms



4c

200ms 가 200ms 가

4 - (4.2.2.1).
4.2.3.2, 4.2.3.5, 4.2.3.6



- 1
- 2 V- (4.1.2)
- 3 CISPR 16 CISPR
- 4 ,
- 5 가
- (V- 50 250 300 .)
- 6 가 500 (5 가)
- V- 가 . V-

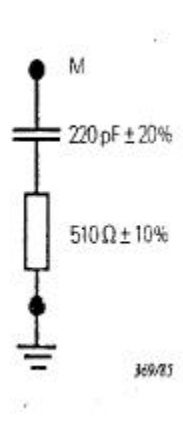
6 -

(7.3.7.2)

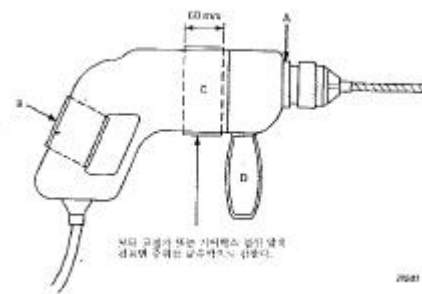
1 (0.15 MHz - 30 MHz) , 가 가 X 1m

(30 MHz - 300 MHz) , / 가
6m .

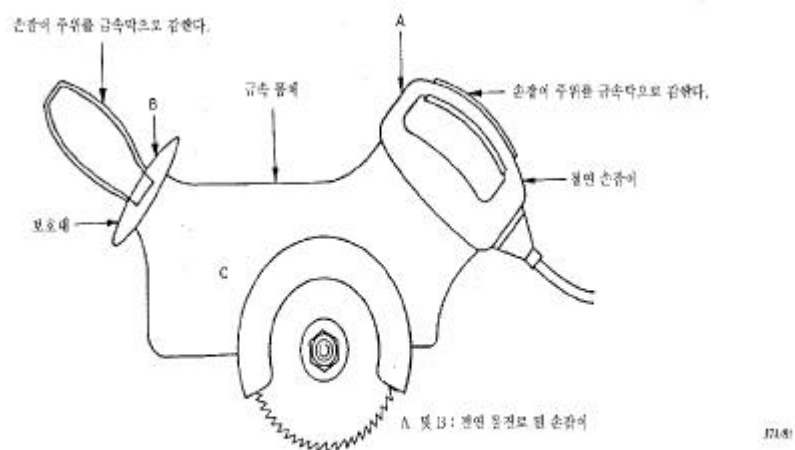
2. A 가 0.1m .



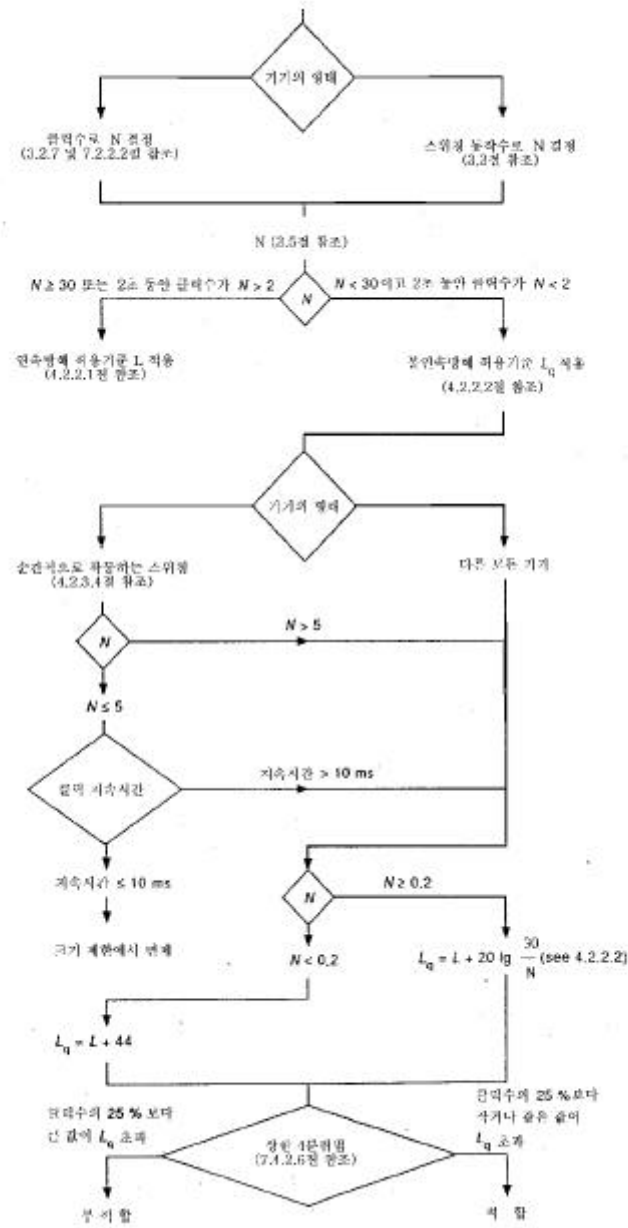
8a - RC



8b -



8c -



IEC 06701

A
()

20lg 30/N

A.1 - 2.2 4.2.3.4(, N)

	7.3.4.13		7.3.4.10
	7.3.4.13		7.3.4.3
	7.3.4.3		7.3.4.3
	7.3.4.3		7.3.4.2
	7.3.4.14	,	7.3.4.14
	7.3.4.8		7.3.4.6
	7.3.4.2		7.3.4.3
	7.3.4.2		7.3.4.2
	7.3.4.11		
	7.3.4.2	,	7.3.4.5
	7.3.4.14		
	7.3.4.3		
	7.3.4.14	,	
	7.3.4.2	,	7.2.4
	7.3.4.3		
	7.3.4.8		7.3.4.9
	7.3.4.8		7.3.4.8
	7.3.4.13		7.3.4.8
	7.3.4.3		7.3.4.13
,	7.3.4.10		7.3.4.7
,	7.3.4.10		7.3.1.10
			7.3.4.4
148.5 KHz- 30 MHz (가			
) 1 1 .			
20lg(30/N) dB(μ V), 0.2 ≤ N ≤ 30			
* () , 4.2.3.1 A.2			

A.2 - N
f

		f
	7.2.4	1
	7.3.1.9	0.5
	7.3.4.1	0.5
	7.3.4.1	0.5
	7.3.4.11	0.5
	7.2.3.1	0.66
	7.2.3.1	1
	7.2.3.2	1
	7.2.3.3	1
148.5 KHz- 30 MHz (가) 1 2 . 20log(30/N) dB(μ V), 0.2 ≤ N ≤ 30		

4.2.3.1 .

B

()

4

(7.4.2.6)

()

;

40

:500 KHz

:56 dB(μ V)

1	2	3	4	5	6	7	8	9	10
*	*	*	—	*	—	*	*	—	*
11	12	13	14	15	16	17	18	19	20
*	*	*	*	*	*	*	*	*	*
21	22	23	24	25	26	27	28	29	30
*	*	*	*	*	*	*	*	*	*
31	32	33	34	35	36	37	38	39	40
*	—	*	*	—	*	*	*	*	*
41	42	43	44	45	46	47	48	49	50
*	*	—	*	*	*	*	*	*	—
51	52	53	54	55	56				
—	*	*	*	—	*				

* ;

- ; ()

- (T)= 35

- (n₁)=47

N =47/35 =1.3

20lg(30/N) =20lg(30/1.3)= 27.5 dB

500 KHz : L_q=56+27.5=83.5 dB(μ V)

L_q :

47/4=11.75, 11

L_q

.

: 500 KHz

L_q : 83.5 dB (μV)

1	2	3	4	5	6	7	8	9	10
*	—	*	—	—	*	*	—	—	*
11	12	13	14	15	16	17	18	19	20
—	—	—	—	—	—	—	*	*	*
21	22	23	24	25	26	27	28	29	30
—	*	—	*	—	—	—	—	—	—
31	32	33	34	35	36	37	38	39	40
—	—	—	—	—	*	—	*	—	—
41	42	43	44	45	46	47	48	49	50
*	*	—	—	—	—	—	—	—	—
51	52	53	54	55	56				
—	—	—	—	—	—				

* ; L_q

- ; L_q

- (T)= 35 ()

- L_q =14

- 11 .

C

()

C.1

CISPR16, 1

- 2

- 11

- 14

CISPR16, 2

5.3

C.1.1

A)

B)

a)

)

b) 가

c)

9

C.1.2

가

.(3.5)

7

가

(3.4)

)

(4.2.3.7)

N

(Subjective)

,

N(3.5)

가

N

가

(200ms

(3.3)

$20\lg 30/N(N)$, N 6dB
4.2.3

L_q , N $20\lg 30/N$.
 L_q ,
 L_q (200ms)

4 .(B)

, 가

a) - 가? L_q

가?

b) - 10ms 가?, 10ms

200ms 가?, 200ms 가?

c) (,) - 200ms 가?, 200ms

가?, 2 가 가?

d) (N) - 가?, 30

가?, 2 가?, 5 30 가?,

0.2 5 가?, 0.2 가?

C.2

가

, 가

, i.f

i.f

C.2

C.2.1 r.f

가 , r.f

0dB

r.f

- 가 .(, 100Hz) CISPR 가

0dB

r.f

i.f

C.2.2 ()

C.1

가

i.f

가

,

0 dB

0 dB

C.2.3**C.2.3**

i.f

, i.f

(C.2.1)

CISPR

(C.2.2)

가

i.f

,

V-

.

-

,

(4.2.3.4) ,

10ms

N

5

,

/

V-

, CISPR

C.2.4

N

.

f(3.5

A.2

)

N

.

T

N

.(3.4)

C.3**C.3.1**

150 KHz- 30 MHz

V-

V-

i.f

i.f

(C.2.1)

0 dB(C.2.1)
가 .
, 2
2 2
(4.2.2.1), “2 ”
.
.
가 ,
∴
- 10 ms : 1ms/cm- 5ms/cm
- 10 ms 200ms :
20ms/cm- 100ms/cm
- 200ms : 100ms/cm
1 5% , 5%
가 가 .(C.1)
2. 가 , 가 40
가 ,
.
.
4.2.2.2 (.)
, L_q .
44 dB , $N < 0.2$
 $20 \lg(30/N)$, $0.2 \leq N \leq 30$
N C.2.4 .

C.3.2

i.f . /
. CISPR 16, 2

150 KHz- 30 MHz

V-

V-

가 . , 가

L_q

. 4.2.3.2, 4.2.3.5

4.2.3.6

L_q 가

, 4.2.2.2

. C.3.1

C.3.3

가

7.4.2.6

4

L_q

L_q

가

1/4

가 .

CIS PR

14- 2

¹
1997- 02

가 ,
EMC

2 :
-



.....	1
.....	2
1	2
2	3
3	4
4	5
5	5
5.1	5
5.2	6
5.3 0.15MHz 230MHz	7
5.4 0.15MHz 80MHz	8
5.5 80MHz 1000MHz RF	9
5.6 ()	9
5.7	9
6.	10
7	11
7.1	11
7.2	12
8	13
9 가	14
9.1 가	14
9.2 가	14
9.3	15
10	15

가 ,

2 -

- 1) (IEC : International Electrotechnical Commission) (IEC National Committees) . IEC , IEC 가 IEC 가 IEC (ISO : International Organization for standardization) . IEC
- 2) IEC 가 (consensus) 가
- 3) 가 ,
- 4) IEC , IEC 가 가 IEC . IEC 가 가
- 5) 가 가 . IEC
- 6) IEC ,
- CISPR F가 CISPR 14-2 : 가 , ,

CISPR	
FDIS	
CISPR/F/201/FDIS	CISPR/F/206/RVD

- TV , ,
-
-
-

1.3 0Hz- 400Hz .

1.4 [ex, IEC 335]

- () .
- .. 가 .

1.5 , .

- 가 가 .

2

가 , . IEC

ISO .

IEC 50(161) : 1990 (*IEV*) - 161 :

IEC 1000-4-2 : 1995 (*EMC*) - 4 : - 2 :

- *EMC*

IEC 1000-4-3 : 1995 (*EMC*) - 4 : - 3 :

RF

IEC 1000-4-4 : 1995 (*EMC*) - 4 : - 4 :

/

IEC 1000-4-5 : 1995 (EMC) - 4 : - 5 :

IEC 1000-4-6 : 1995 (EMC) - 4 : - 6 : RF
,

IEC 1000-4-11 : 1996 (EMC) - 4 : - 11 :
, - EMC

CISPR 11 : 1993 , , (ISM) RF

CISPR 14 : 1993 가
,

CISPR 16-1 : 1993 - 1 :

3

EMC IEC50 (161) IEC CISPR
,

, :

3.1 :
,

3.2 : 가 (1 .)

3.3 : 가

3.4 : 가 ()

4

4.1 : 가 , , , ,
(UV IR)
(, ,)

: , , , (가)

4.2 : 가 15MHz
가 , , ,
(: UV , IR ,)

- 15MHz .

4.3 : , 가
15MHz 가
(가)

. 가 2
.

4.4 :

5

5.1

1 , IEC 1000-4-2

1-

	8kV 4kV	IEC 1000- 4- 2
- 4kV		

. 20 (10 10) 가
 , IEC1000- 4- 2

. 1

5.2

2, 3, 4 IEC1000- 4- 4 , 2 , 2

2-

	0.5kV () 5/50 ns T_r / T_d 5 KHz	IEC 1000- 4- 4
- , 가 3m		

3- d.c

	0.5kV () 5/50 ns T_r / T_d 5 KHz	IEC 1000- 4- 4
-		

d.c /

4- a.c.

	1 kV () 5/50 ns T_r / T_d 5 KHz	IEC 1000- 4- 4

a.c. / .

5.3 0.15 MHz - 230 MHz

IEC 1000- 4- 6 5, 6, 7 .

80 MHz - 230 MHz

.

- , 230 MHz .

. , 가

.

5-

RF 1 KHz, 80% AM	0.15 MHz 230 MHz 1V(r.m.s)() 150	IEC 1000- 4- 6
- , 가 3m .		

6- d.c.

RF 1 KHz, 80% AM	0.15 MHz 230 MHz 1V(r.m.s)() 150	IEC 1000- 4- 6
1. 2. , d.c. 가 3m .		

d.c. / .

7- a.c.

RF 1 KHz, 80% AM	0.15 MHz 230 MHz 3V(r.m.s)() 150	IEC 1000- 4- 6

a.c. / .

5.4 0.15 MHz - 80 MHz

IEC 1000- 4- 6 8, 9, 10 .

, 가 .

8-

RF 1 KHz, 80% AM	0.15 MHz 230 MHz 1V(r.m.s)() 150	IEC 1000- 4- 6
- 가 3m .		

9-

RF 1 KHz, 80% AM	0.15 MHz 230 MHz 1V(r.m.s)() 150 :	IEC 1000- 4- 6
- .		

d.c. / .

10-

RF 1 KHz, 80% AM	0.15 MHz 80 MHz 3V(r.m.s)() 150	IEC 1000- 4- 6

a.c. / .

5.5 80 MHz - 1000 MHz RF

IEC 1000-4-3 11 RF . , 가 .

11-

RF 1 KHz, 80% AM	80 MHz 1000 MHz 3V/m(r.m.s)()	IEC 1000-4-3

5.6 ()

IEC 1000-4-5 12 .

12-

	1,2/50(8/20) T _r / T _d μs 2 kV 1 kV	IEC 1000-4-5

가 .

- : 1 kV
- : 1 kV
- : 2 kV
- : 2 kV

12 가 .

5.7

IEC 1000-4-11 13 .

13-

	(% U_T)	()	
	0	0,5	IEC 1000- 4- 11 가 .
(% U_T) 60 30	40 70	10 50	
U_T			

6.

EMC

, .

A: .

, 가 () 가

, , 가 ,

.

B: .

, 가 () .

가 , , ,

가 , .

C: , .

14-

()				
	A	B ²⁾	C1 ³⁾	C2 ³⁾
(,) () (, ,) () ()	10% ¹⁾	-	+	-
	10% ¹⁾	-	+	-
	10% ¹⁾	-	+	-
	10% ¹⁾	-	+	-
	-	-	+	-
	10% ¹⁾	-	+	-
	10% ¹⁾	-	4)	-
	-	-	5)	5)
	-	-	7)	-
	6)	-	7)	-
	6)	-	7)	-
	6)	-	7)	-
	6)	-	7)	-
	6)	-	7)	-
	6)	-	7)	-
	6)	-	7)	-
<div>-</div> <div>+</div> <div>1)</div> <div>2)가B</div> <div>.</div> <div>3)C</div> <div>C1:</div> <div>C2:</div> <div>4)</div> <div>5)</div> <div>6)가,</div> <div>7)</div>				

7

7.1

7.1.1

5

7.1.2

7.1.3

2

7.2

7.2.1 *I*

I

7.2.2 *II*

II

- | | | |
|---|--------|---------|
| - | B(5.1) | |
| - | B(5.2) | |
| - | A(5.3) | 230 MHz |
| - | B(5.6) | |
| - | C(5.7) | |

- B(5.1)
- B(5.2)
- A(5.4) 80 MHz
- A(5.5) EM
- B(5.6)
- C(5.7)

8

8.1 가 가
 ,
 가 CISPR 14 . 가
 (,) , 50% .

1 | ±0, 5| , (hob)
 가 .
 ,

8.2 , 가 .
 가 , 가

8.3 ()
ESD, , .

8.4 , e.m
 가 , 3

8.5 가 가

가 , , .

- , CISPR 16 .

9.3

, 가 가 가 .

10

가 EMC EMC .

CISPR

15

1998- 12



	.....	1
1.	.....	3
2.	.....	4
3.	.....	4
4.	.....	4
4.1	.....	4
4.2	.....	5
4.3	.....	5
4.4	.....	6
4.5	.....	7
5.	.....	8
5.1	.....	8
5.2	.....	9
5.3	.....	9
5.4	.....	10
5.5 가	.....	12
5.6	.....	12
5.7 UV IR	.....	13
5.8	.....	14
5.9	.....	15
5.10	.....	15
6.	.....	16
6.1	.....	16
6.2	.....	16
6.3	.....	16
6.4	.....	16
6.5	.....	17
6.6 가	.....	17
7.	.....	17
7.1	.....	17

7.2	.....	18
7.3	.....	19
7.4	.....	19
8.	.....	20
8.1	.....	20
8.2	.....	22
8.3	.....	22
8.4	.....	23
8.5	.....	23
8.6 가	.....	24
8.7 UV IR	.....	24
8.8	.....	24
9.	.....	25
9.1	.....	25
9.2	.....	25
9.3	.....	26
9.4	.....	26
9.5 가	.....	26
9.6 UV IR	.....	26
9.7	.....	26
9.8 CISPR 16-1	.....	26
10 CISPR	.....	26
10.1 CISPR	.....	26
10.2	.....	27
10.3 가	.....	27
10.4	.....	28
A (Low - capacitance) - ,	.....	41
B	.....	47
C () (LLAs)	.....	52

- 1) (IEC : International Electrotechnical Commission)
 (IEC National Committees) , . IEC ,
 . IEC
 가 IEC
 . IEC ,
 . IEC (ISO : International Organization for standardization)
 .
- 2) 가
 IEC 가
- 3) IEC , 가
- 4) IEC 가 가
 C.I.S.P.R. . IEC
 가 가
- 5) IEC ,
 .
 CISPR F(가 , ,
)

FDIS	
CISPR/F/254/FDIS	CISPR/F/273/RVD

1.

RF (

) .

- 가

- UV IR

—

- 가

- ()

•

—

- RF IEC CISPR

) - .

—

—

—

9kHz 400GHz .

/

•

가 .

2.

가
가
. IEC ISO 가
IEC 50(161) : 1990, (IEV) - 161 :
IEC 50(845) : 1987, (IEV) - 845 :
IEC 155 : 1993,
IEC 598 :
CISPR 11 : 1990, , (ISM) RF
CISPR 16-1 : 1993,
- 1 :

3.

, IEC 50(161)
가
)- “ ” “ ”
..

4.

4.1

4.2, 4.3 4.4

가 .

)- (The World Administrative Radiocommunications Conference : WARC) 1979 1
 148,5kHz .
 148,5kHz 가 , 150kHz

4.2

150kHz 1605kHz 1 .

1.

(kHz)		(dB)	
150	160	28	
160	1400	28	20*
1400	1605	20	
*			

4.3

4.3.1

9kHz 30MHz 2a

2a.

		dB(μV)*	
9 kHz	50 kHz**	110	-
50 kHz	150 kHz**	90	80***
150 kHz	0.5 MHz	66	56***
0.5 MHz	2.51 MHz	56	46
2.51 MHz	3.0 MHz	73	63
3.0 MHz	5.0 MHz	56	46
5 MHz	30 MHz	60	50
* (transition frequency)		가	
** 9kHz 150kHz		“ ”	
*** 50kHz 150kHz 150kHz 0.5MHz		가 가	
- 9kHz 150kHz		가, 56 dB (μV) 46 dB (μV) 2.51MHz	
3MHz			

4.3.2

150kHz 30MHz

2b

2b.

MHz		dB(μV)*	
0.15	0.50	80	70
0.50	30	74	64

4.4

9kHz 30MHz

2m, 3m

4m

3

2m

가 1.6m

3m 가 1.6m 2.6m
 , 4m 가 2.6m 3.6m
 .

3.

		dB(μ A)*					
		2m		3m		4m	
9kHz	70kHz	88		81		75	
70kHz	150kHz	88	58**	81	51**	75	45**
150kHz	2.2MHz	58	26**	51	22**	45	16**
2.2MHz	3.0MHz	58		51		45	
3.0MHz	30MHz	22		15		9	
**							

*** *							
가							
)							
9kHz		150kHz					

4.5

(International Telecommunication Union :
 ITU) ISM (ITU No. 63(1979))
 4

6.765MHz 6.795MHz, 13.553MHz 13.567MHz, 26.957MHz 27,283MHz

)- ISM 가

4. ISM

MHz	MHz	10m dB(μ V/m)	ITU
6.780	6.765 6.795	100 ()	524*
13.560	13.553 13.567	100 ()	534
27.120	26.957 27.283	100 ()	546
40.680	40.660 40.770	100 ()	548
433.922	433.050 434.790	100 ()	661*, 662(1)
915	902 928	100 ()	707 (2)
2,450	2,400 2,500	100 ()	752
5,800	5,725 5,875	100 ()	806
24,125	24,000 24,250	100 ()	881
61,250	61,000 61,500	100 ()	911*
122,500	122,000 123,000	100 ()	916*
245,000	244,000 246,000	100 ()	922*
* 가			

5.

5.1

5.3 5.9 .

가 ,
가 ,
 . (, 5.4.1 2)
()
 . on/off
 , , 가 .
(,)

5.2

4.5

.

.

- 4

-

4

4.3

- 3

5.3

5.3.1

.

5.3.2

,

.

가

) -

5.3.3

1

.

- 15mm, 25mm, 38mm

- 28mm, 32mm

- 15mm, 25mm, 38mm U

- 15mm

- 12mm

2

4

5.3.4

5.3.2 5.3.3

2a

.

100Hz

3

2b

5.4

5.4.1

1. (5.4)

가 . 가

2. (5.4)

가

5.4.2

5.4.2.1

가 가 . :

가

5.4.2.2

가

2a 2b

5.4.2.3

(<500Hz)

. RF ,

2a 2b

5.4.3

5.4.3.1

5.4.3.2

5.3.2

2a 2b

5.4.3.3

a) 2a 2b

b) 가 ,
가

, 2a ,
3 .

5.4.4

5.4.4.1 5.3.3

1

5.4.4.2

2a

100Hz

3

2b

5.4.5

，
，
2a
100Hz
3

5.5 가

가
가
가 2a
100Hz
3

5.6

5.6.1

“ ”
， ，
， ，
(5.6)
()

(5.6)

5.6.2

- ()
- 가
-
-
-

, (5.6) (

) , .

5.6.3

.

5.6.4

5.3.2 .

5.6.5

5.3.3 ,

1 .

5.6.6

5.6.4 5.6.5 2a

.

100Hz 가 ,

3

.

가 .

,

.

2b

5.7 UV IR

5.7.1

,

가

(5.7)

CISPR 11

5.7.2 IR

()

5.3.2

5.7.3 UV

5.3.3

UV

1

UV

가

5.7.4 UV / IR

5.7.2 5.7.3

UV IR

2a

100Hz ()

3

가

,

2b

5.8

5.8.1

-

-

-

(5.8)

.

,

.

) -

CISPR

D

5.8.2

가 가
가
2a , 3
.

5.8.3

5.8.4

, 5.3

5.9

5.10

5.10.1

5.10.2 5.10.3

,

- :

,

- : (),

-

5.10.2 ,

2a
가 100Hz 가
, 3 .
, 2b
.

5.10.3 ,
가 100Hz 가
3 .

6.

6.1

, 6.2 6.6
.
7, 8 9 ,
.

6.2

가 (, IEC 598
) .

6.3

$\pm 2\%$.
.

6.4

. 15°C 25°C
.

6.5

6.5.1

6.5.2

- 2
- 100

6.5.3

- 5
- 15
- 30

6.6 가

IEC 155 , 5000pF ± 10%

가

가

가

7.

7.1

7.1.1 5.3.3 5.6.5

- U 1
- 2
- 3

(dummy) 7.2.4 .

25mm , 38mm
 , 25mm
 가 38mm .

7.1.2 5.4.4

12mm

$\pm 2\text{mm}$.

, (7) .

7.1.3 5.7.3 UV ,
 (7) .

7.2

7.2.1 RF

RF 가 $50\ \Omega$

7.2.2 - (*balance-to-unbalance*)

- RF
 , A .

7.2.3

CISPR 16-1 , $50\ \Omega/50\ \mu$
 $H+5\ \Omega$ ($50\ \Omega/50\ \mu H$) .

7.2.4

1,2,3 r.f.
 , 4a, 4b, 4c, 4e, 4f .

가

7.2.5

가 0.1m 0.5m

7.3

6.6 가

(multi- lamp)

150 Ω ()

가

7.4

7.4.1

U_1 가
 U_2 .

7.4.2 U_1
 $U_1(2\text{mV} \sim 1\text{V})$.
 U_1 2 ,
 가 . ,
 A .

7.4.3 U_2
 U_2
 가 ,
 U_2 .

7.4.4 $20\log \frac{U_1}{U_2} \text{dB}$.
)-
 .

7.4.5 1, 2 , 7.3
 , (,
) 가 ,
 가 .

8.

8.1

8.1.1

5

6

$$\left(\frac{V}{0.8m} \right)^3 = \frac{a-b}{2} \times 0.8m \pm 20\%$$

8.1.2

(150kHz ~ 30MHz) (5)
 1,500 Ω
 . (CISPR 16-1 12)

8.1.3

가 ,
 가 ,

8.1.3.1

9kHz ~ 30MHz 가

9kHz, 50kHz, 100kHz, 160kHz, 240kHz, 550kHz, 1MHz, 1.4MHz, 2MHz, 3.5MHz, 6MHz, 10MHz, 22MHz, 30MHz

8.1.3.2.

150kHz ~ 30MHz

가

160kHz, 240kHz, 550kHz, 1MHz, 1.4MHz, 2MHz, 3.5MHz, 6MHz ,10MHz, 22MHz, 30MHz

8.1.4

가 .

8.2

6a .

가 , 가 .
가 , 가 .
가 , V .

가 가

(가) ,
, 2m × 2m 0.4m

V

0.4m

0.8m

가 ()

8.3

8.3.1

5 .

, , 0.5 1m .

,
 .
 , 8.1.3.1 , ,
 , , 8.1.3.2
 .
 8.3.2 가
 , /
 5 가
 8.1.3.
 .
 8.4
 8.4.1 8.3.1.
 8.4.2 가 가
 12mm ± 2mm 가
 .
 ,
 V
 .
 8.5
 6b
 12mm ± 2mm 가 ,
 V
 가 , V
 .
 가
 . 6,6
 .
 가

8.6 가

가

가

6c

7

V

0.8m

V

, 2.51MHz 3.0MHz

가

(lampholder)

2m × 2m

0.4m

0.8m

(V-)

0.8m

V-

1m

V-

가

8.7 UV IR

가

8.1 8.2

-

,

-

.

5

가

,

15

가

8.8

8.1 8.2

가

.. :

-

,

가

,

가

()

- 가 가
 ,
 12mm ± 2mm ,
 .

- ,
 가 ,
 가 가
 , 가
 .

9.

9.1

9.1.1

B
B.1 .

9.1.2

(1 V/A) CISPR ()
 .

9.1.3

.

9.1.4

가 ,
 .

9.2

.

.

9.3

8.4.2

9.4

8.5

9.5 가

가

9.6 UV IR

8.7

9.7

, 8.8

가

9.8 CISPR 16-1

CISPR 16-1

B C

10 CISPR

10.1 CISPR

10.1.1 CISPR

가

10.1.2

80% 80% 가

10.2

a) 10.3.1 10.3.2 가

b) . (10.3.2)

가 . (b)

10.3 가

10.3.1 , ,

$$\bar{x} + ks_n \leq L$$

\bar{x} n .

$$s_n^2 = \sum_n (x_n - \bar{x})^2 / (n - 1)$$

x_n

L

k 80% t- (non-central t-distribution)

. 80% 80%

. k n .

x_n, \bar{x}, s_n L . (dB)

5 - t- k

n	3	4	5	6	7	8	9	10	11	12
k	2.04	1.69	1.52	1.42	1.35	1.30	1.27	1.24	1.21	1.20

10.3.2

, , .

$$\bar{x} - ks_n \leq L$$

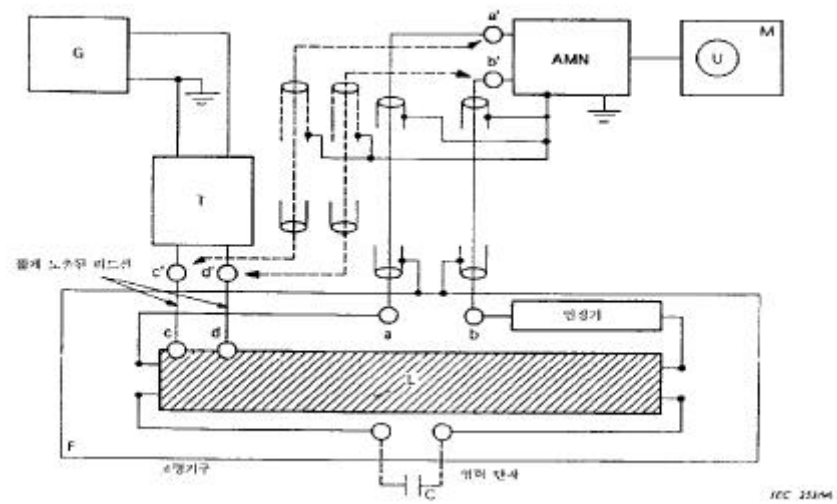
\overline{x}, s_n x_n 10.3.1
 k 80% 가 80% 가
 $t-$. k n

10.3.1
 x_n, \overline{x}, s_n L .(dB(μ v) dB(μ A))

, 5
 , 가 , 5 ,
 , 5 가
 . (.)

10.4

가 가
 가
 5 , 12
 . 5
 3 4 .

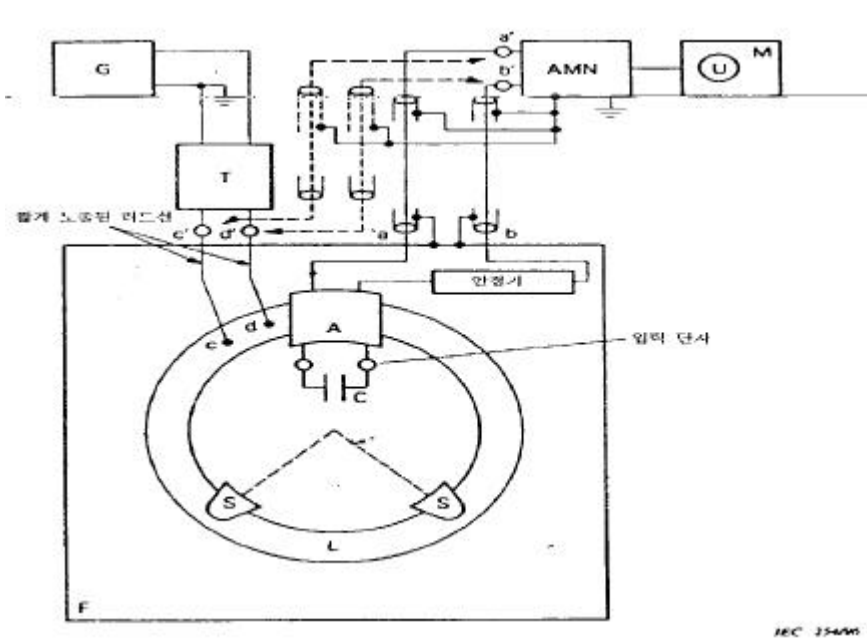


G	=	r.f	
T	=	-	
AMN	=	50 /50μ H + 5 (50 /50μ H)	CISPR16- 1

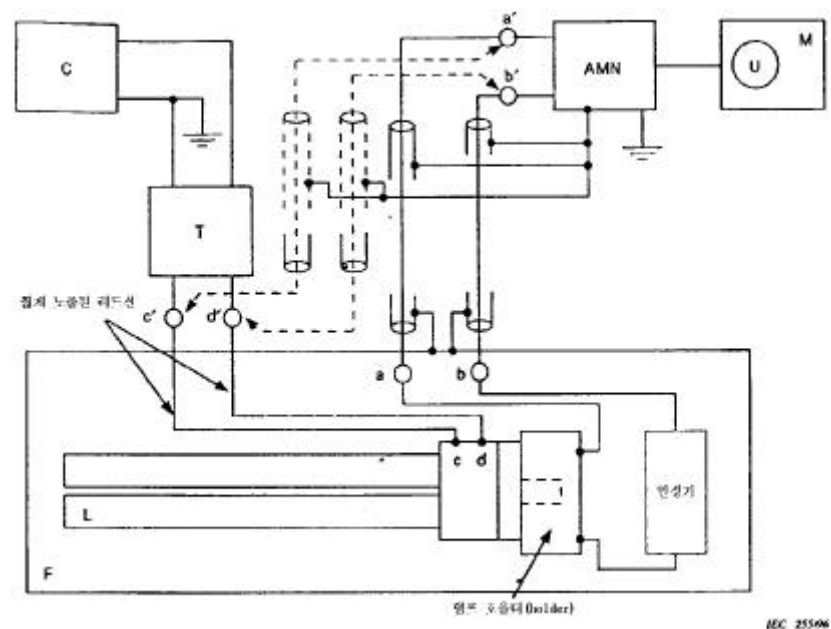
M	=r.f	
L	=	
F	=	
C	=	
a- b	=	
a' - b'	=AMN	
c- d	=	L r.f
c' - d'	=T	
a- a' b- b'	=	(75) AMN
	F	50cm
c- c' d- d'	=	100mm

- U . U

1 U

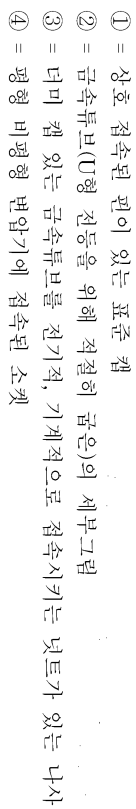


G	=	r.f
T	=	-
AMN	=	50 /50 μ H + 5 (50 /50 μ H) CISPR16- 1
M	=	r.f
L	=	
F	=	
C	=	
A	=	
S	=	
a- b	=	
a' - b'	=	AMN
c- d	=	L r.f
c' - d'	=	T
a- a' b- b'	=	(Z ₀ = 75 Ω) AMN
		F 50cm
		.
c- c' d- d'	=	100mm



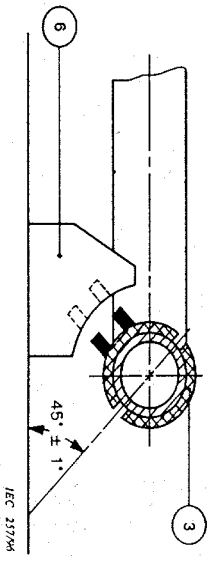
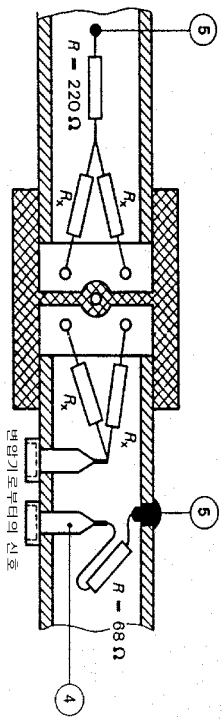
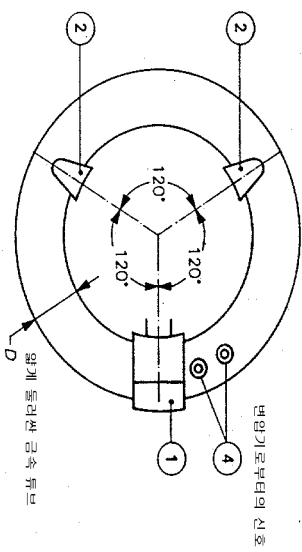
G	=	r.f	
T	=	-	
AMN	=	CISPR16-1	$50 / 50 \mu H + 5 (50 / 50 \mu H)$
M	=	r.f	
L	=		
F	=		
C	=		
a-b	=		
a'-b'	=	AMN	
c-d	=	L	r.f
c'-d'	=	T	
a-a' b-b'	=		$(Z_0 = 75 \Omega)$ AMN
		F	50cm
c-c' d-d'	=		100mm

3 가



주-특별한 언급이 없으면 치수의 오차는 마지막 자리수에서 ± 1 , 치량의 오차는 $\pm 5\%$ 치량의 R_x 값은 4.8Ω

그림 4a-직선형 U형 터미 전등의 구조



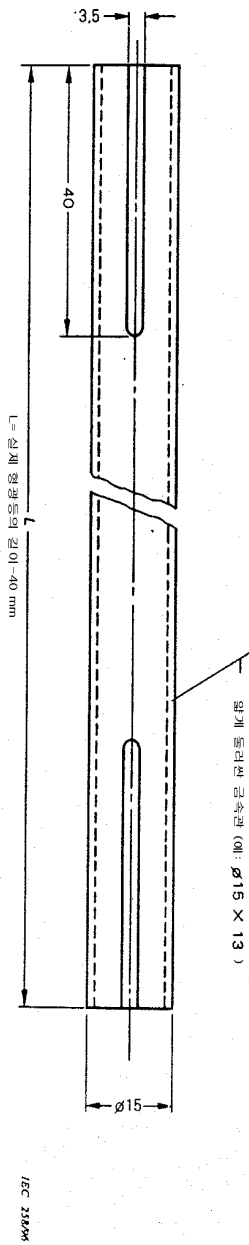
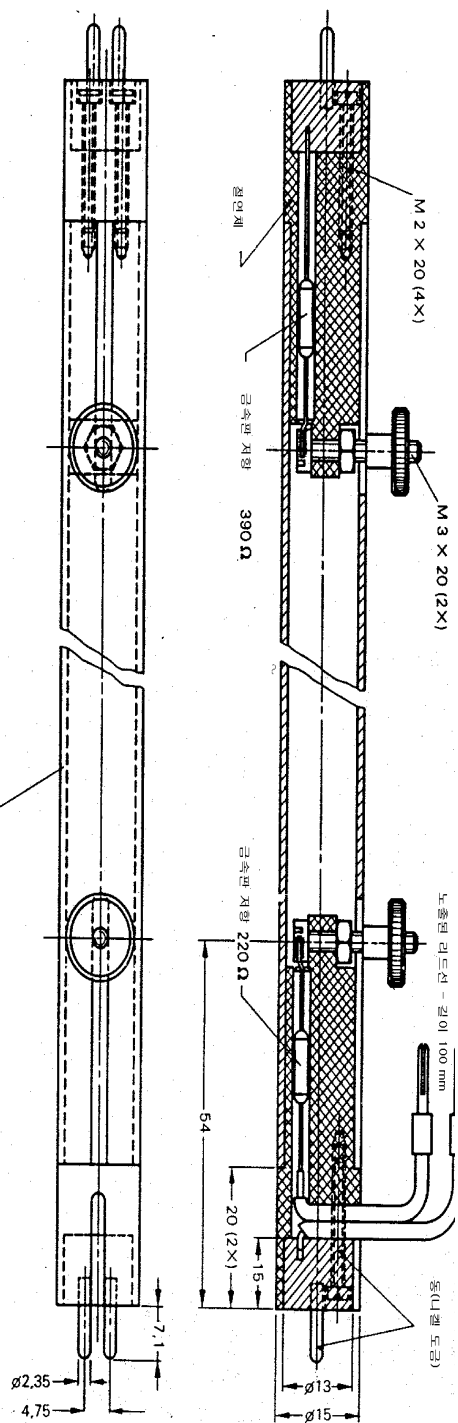
- ① = 상호 접속된 핀이 있는 정격마개
- ② = 절연체의 지지대
- ③ = 금속 튜브에 접속되는 커넥터 ①의 세부도
- ④ = 평형/비평형 변압기에 접속된 소켓
- ⑤ = 금속튜브에 연결된 리드선
- ⑥ = 조명등의 소켓

형광등의 정격직경	(mm)	28	32
금속튜브의 직경 D	(mm)	20±0.5	28±0.5

주-특별한 언급이 없으면 치수의 오차는 마지막 자리수에서 ±1, 저항의 오차는 ±5%

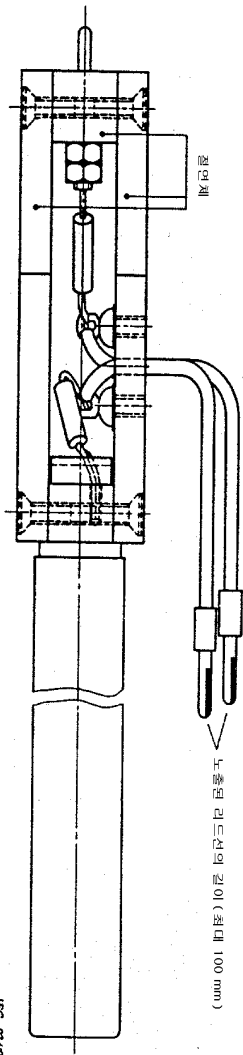
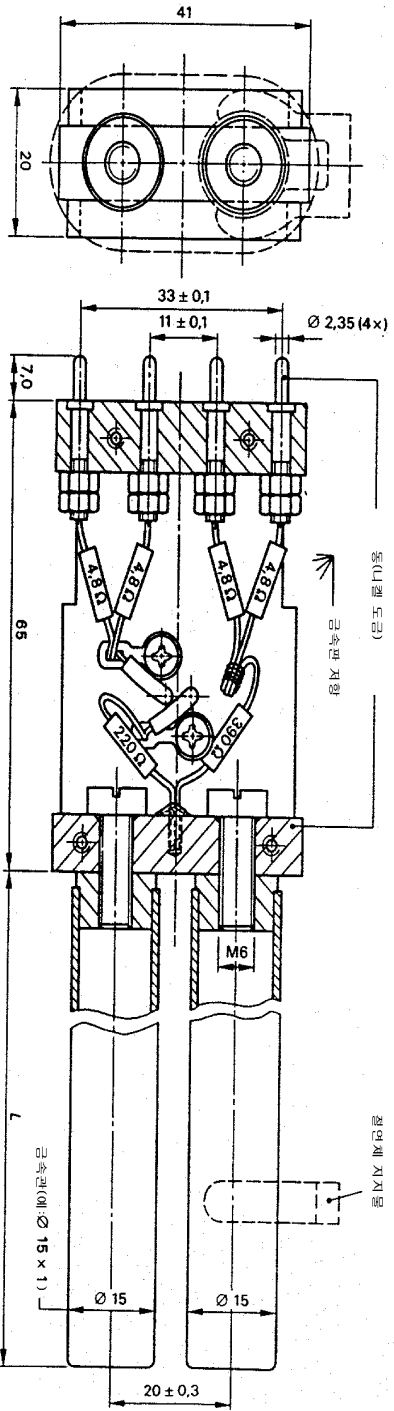
저항 R_x 는 48Ω

그림 4b - 원형 더미 전등의 구조



주-특별한 언급이 없으면 치수의 오차는 마지막 자리수에서 ± 1 , 저항의 오차는 $\pm 5\%$
 L= 실제 형광등의 길이 - 40mm

그림 4c - 15mm 형광등용의 더미 전등



IEC 97493

주-특별한 언급이 없으면 치수의 오차는 마지막 자리수에서 ± 1 , 치형의 오차는 $\pm 5\%$

그림 4d - 15mm 단일 켈 형광등용의 더미 전등

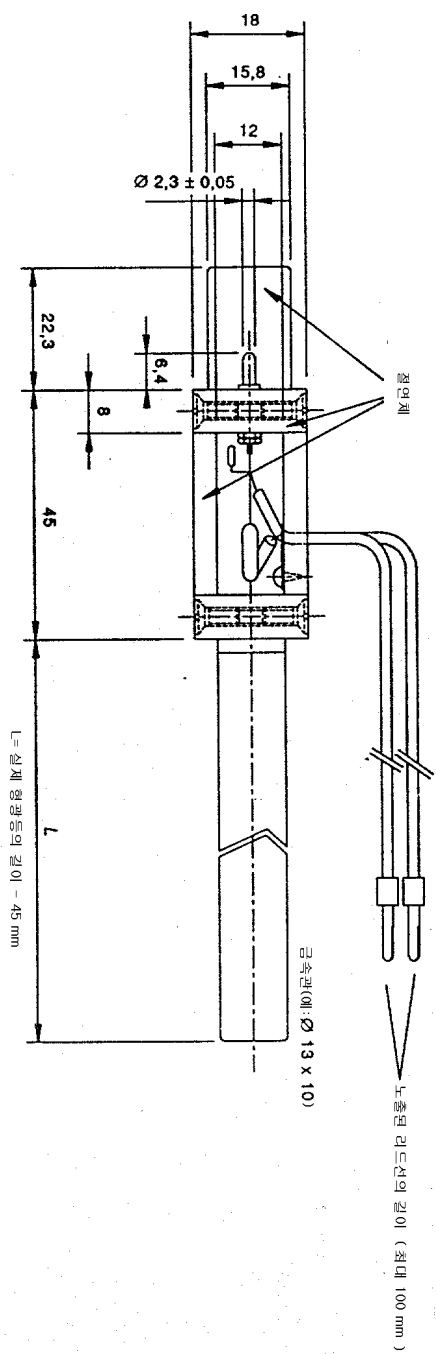
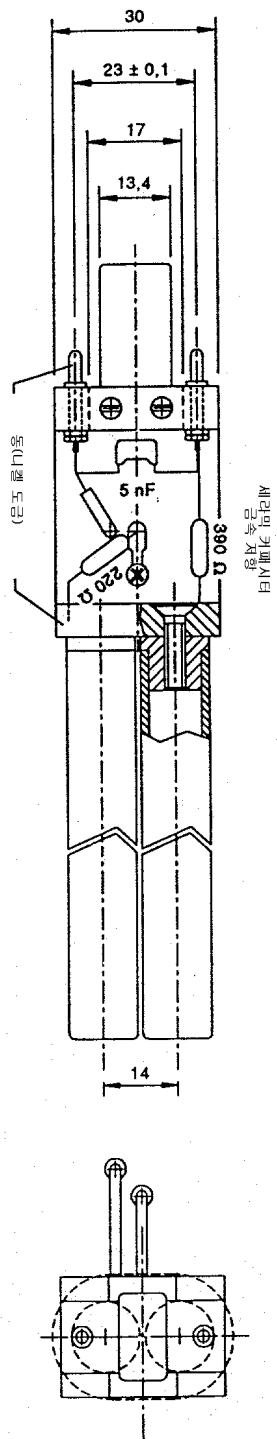
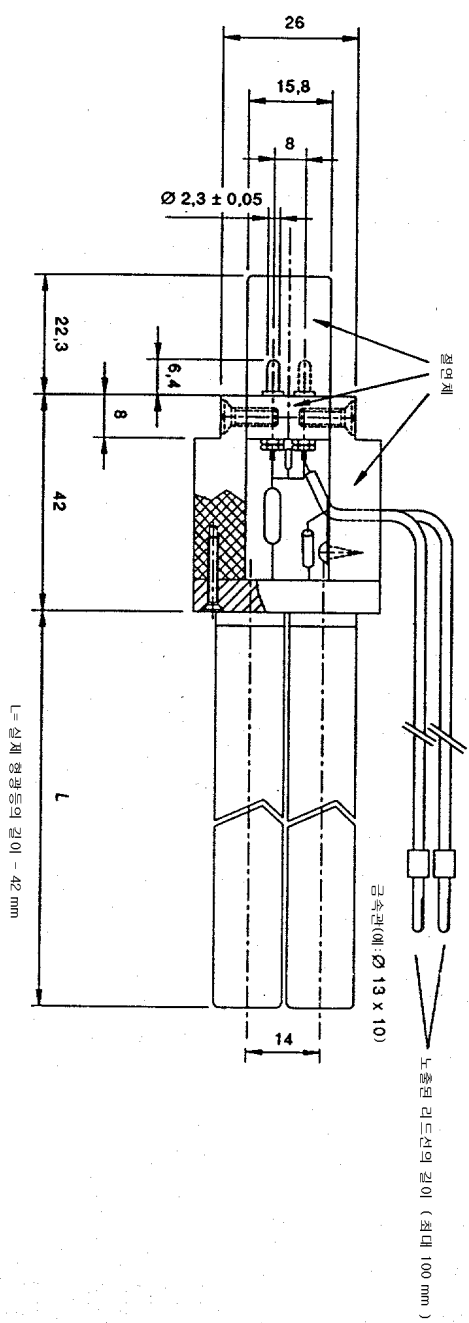
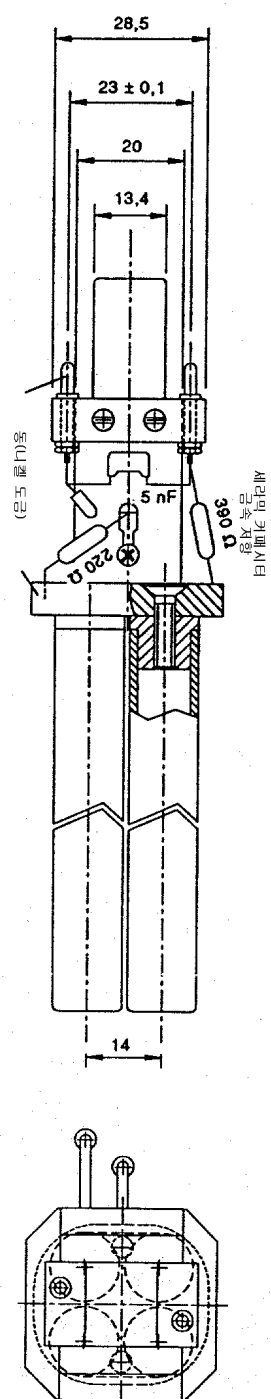
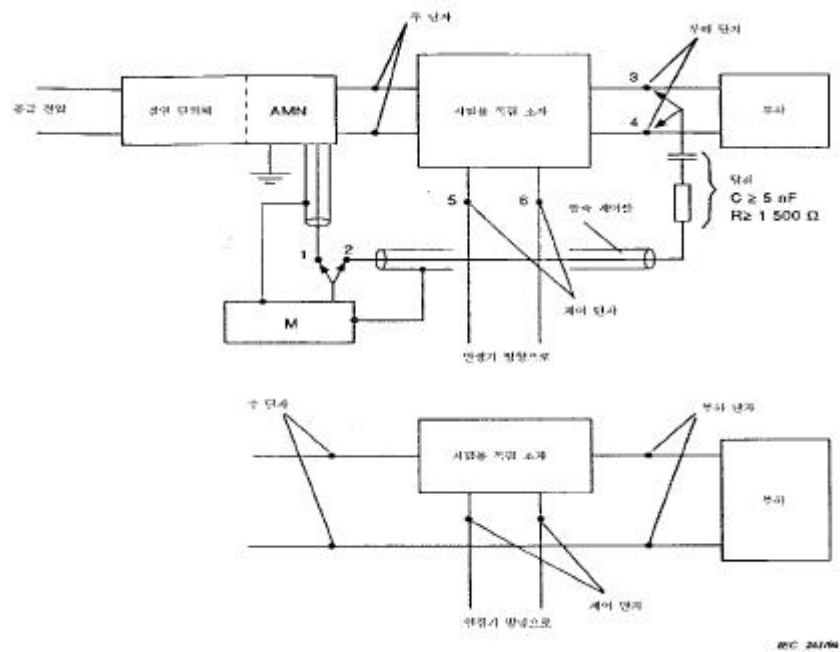


그림 4c - 직름이 12mm인 형등이 튜브를 갖는 직선형의 단일 캡 형광등의 너미 전등



IEC 250/35

그림 4f - 직선형 단일 캡이 장착되고 12mm거리를 갖는 네 개의 원통으로 구성된 형광등을 위한 네미 조명



AMN = 50 /50 μ H - 5 (50 /50 μ H) CISPR16-1

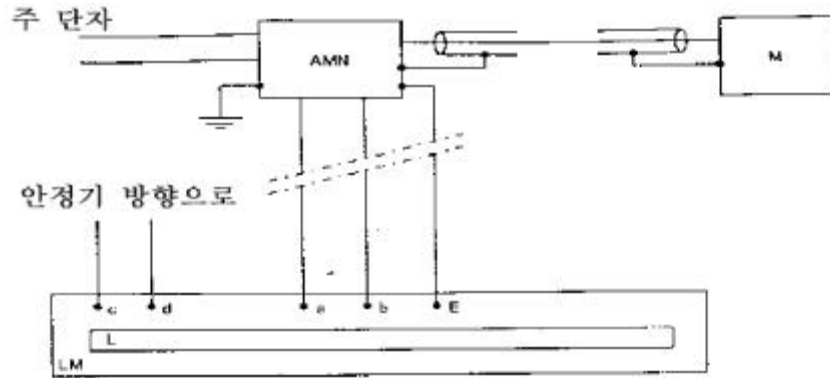
M = CISPR

1
2
3_4
5_6 ()

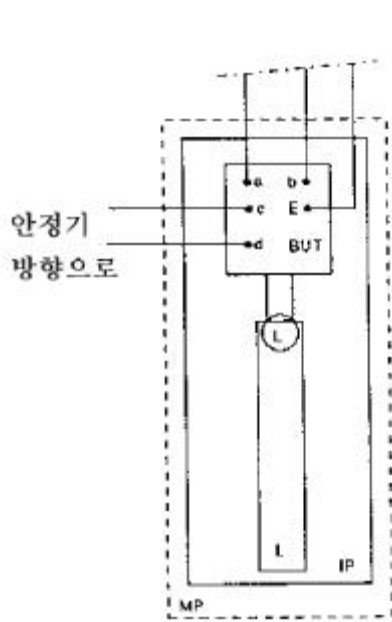
1 V
2 2m
3 가 2 1 V CISPR

4 2 가 ,

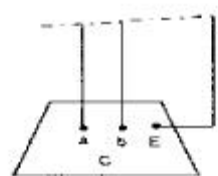
5 , ,



6a -



6b -



6c - 가

AMN =
CISPR16-
1

50 / 50 μ H + 5

+ 5 (50 / 50 μ H)

M = CISPR

LM =

L =

BUT =

IP =

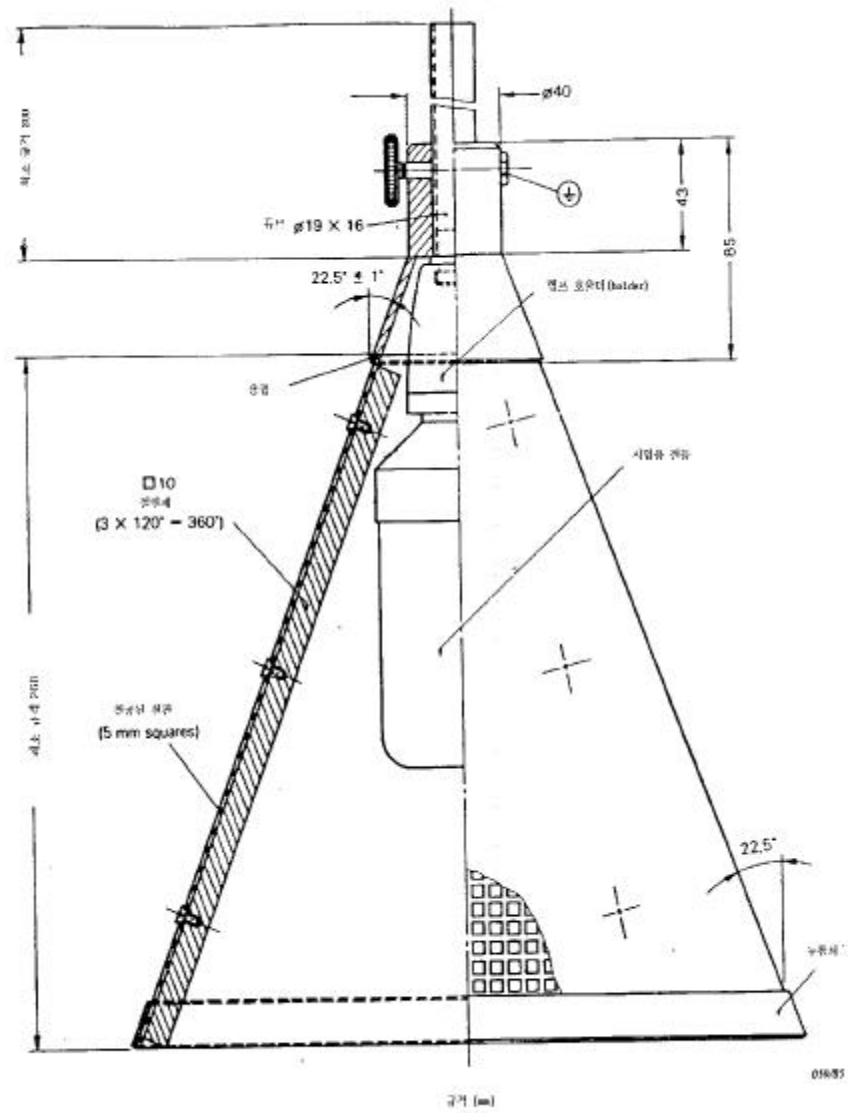
MP =

C =

a - b =

c - d = ()

E =



1
2

± 1

가

7 가

A
()

(Low - capacitance) - ,

A.1

가 .

가 A.2a, A.2b, A.2c, A.2d

A.2

A.2.1 50 , 10 °
150 ± 10% .

(A.1)

(1M)가 , 150
2

V_2' (A.1b

) V_2'' (A.1c) r.f

2 V_1 (A.1a) 43dB

A.2.2 A.1 150kHz 1605kHz .

A.2.3 . 가

, . (A.2d
)

A.3 가

가 .

a) 150kHz 1605kHz 0.5dB
가 .

b) 5.4.2

U_1

, 1V

.

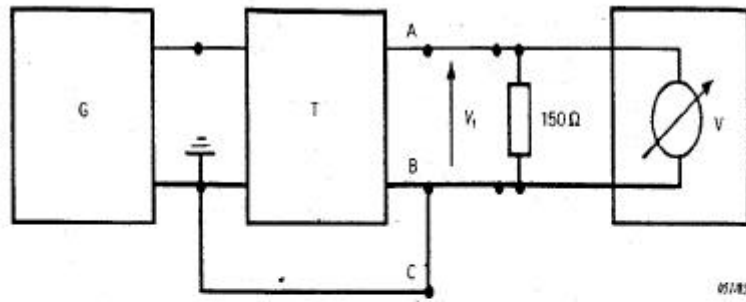


Figure A.1a

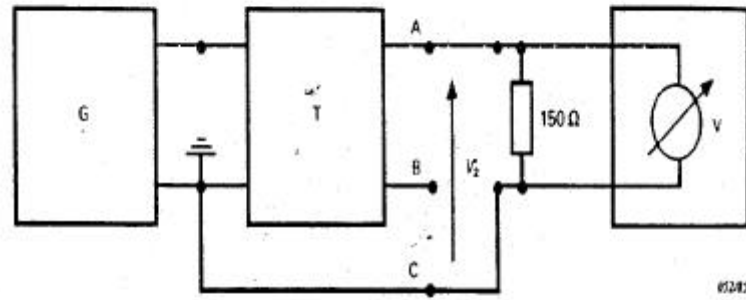


Figure A.1b

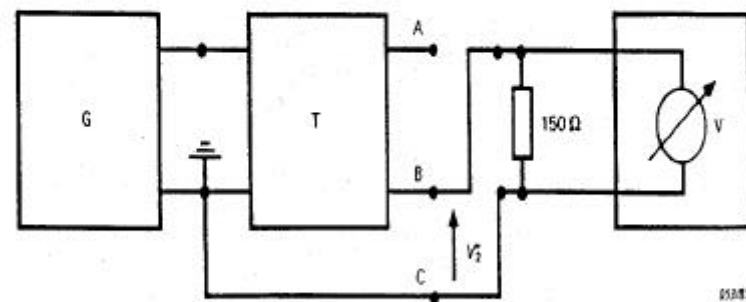
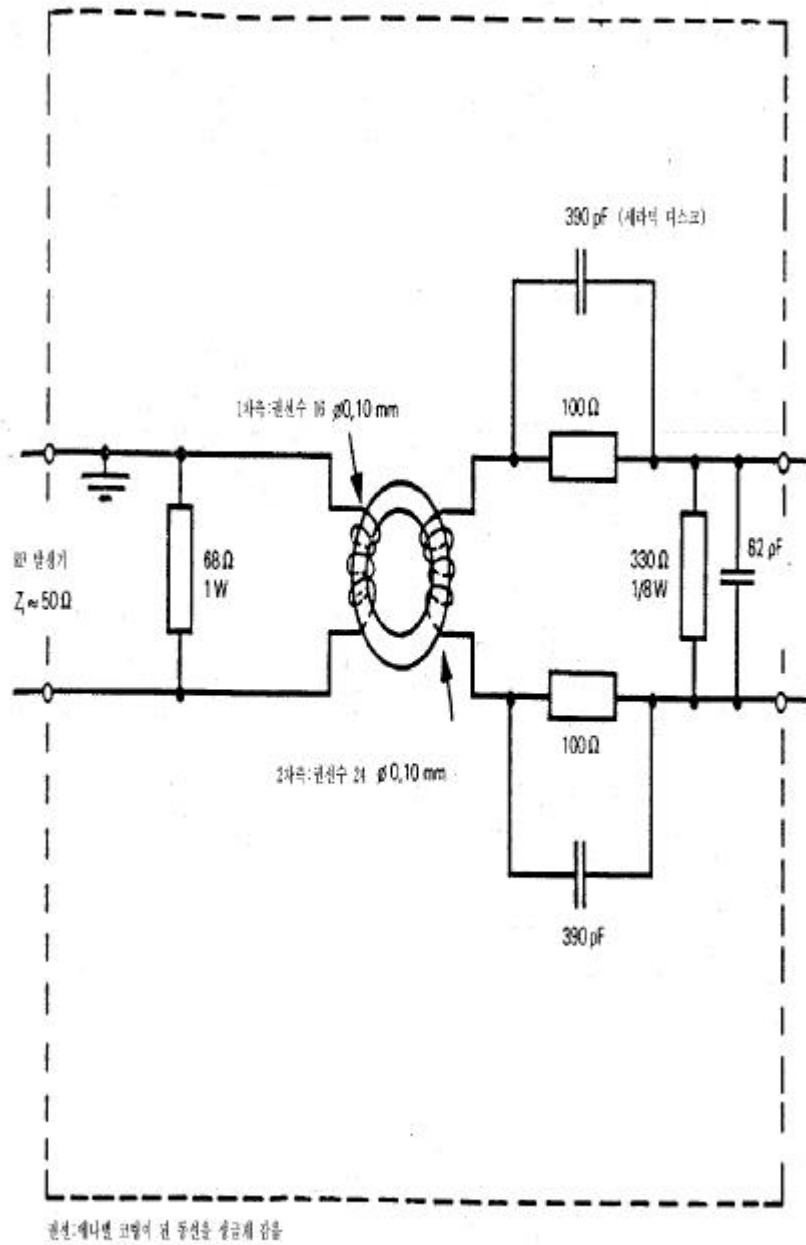
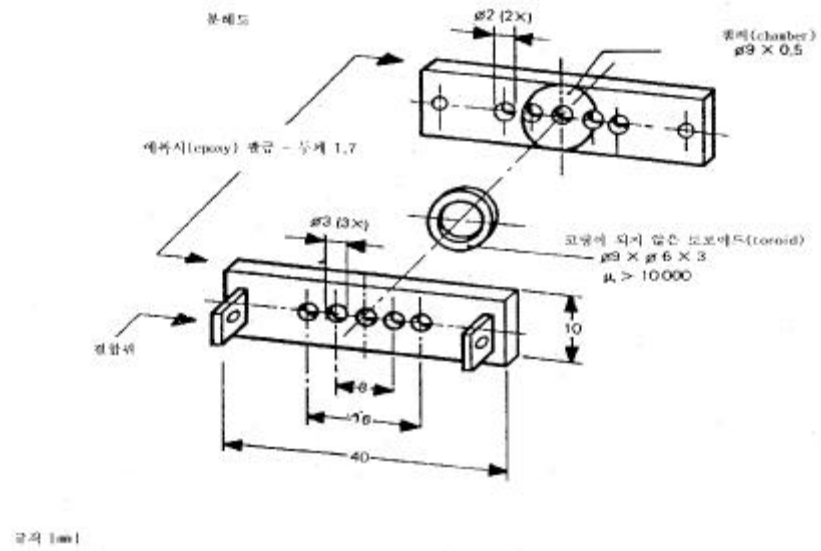


Figure A.1c

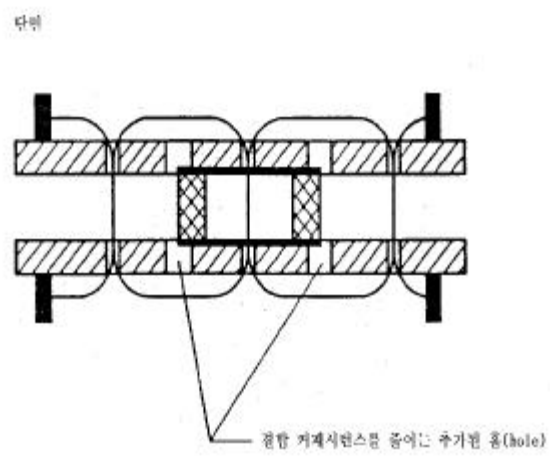
A.1-



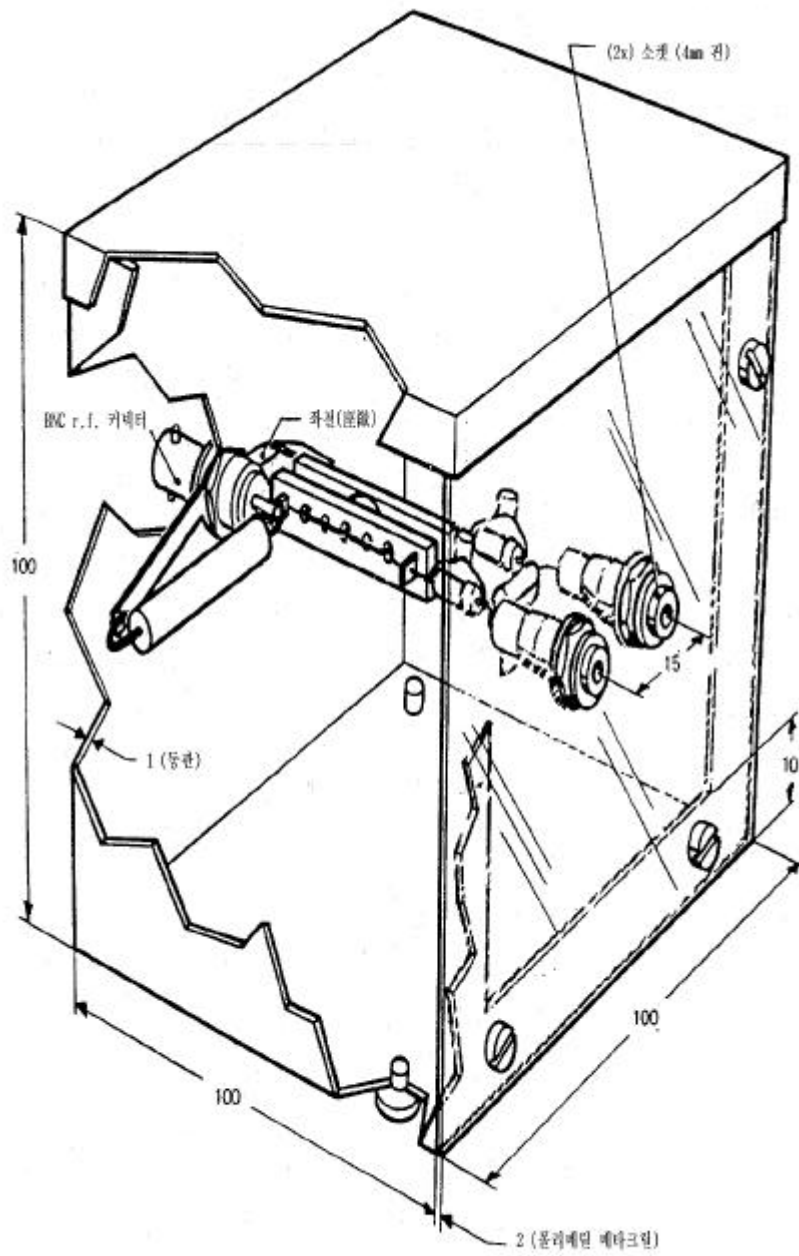
A.2a-



A.2b-



A.2c-



A.2d-

B ()

B.1

.

B.2

B.1 .

2 (B.2, B.3) .

(

, RG223/u), (collet lock) BNC .

(10MHz $R_s > 100\Omega$, 30mm 12

ferroxcube 3E2)가 .

B.3

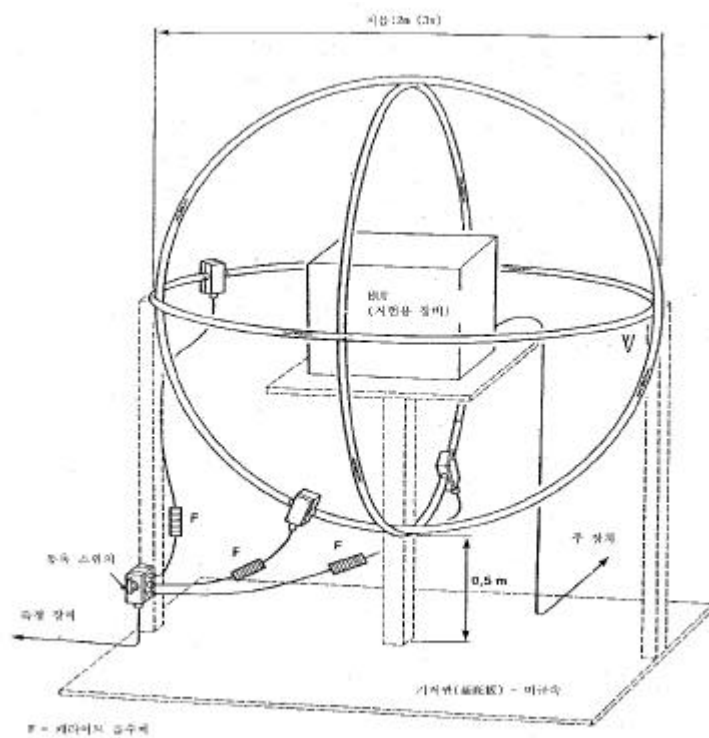
가 , ,

0.5m .

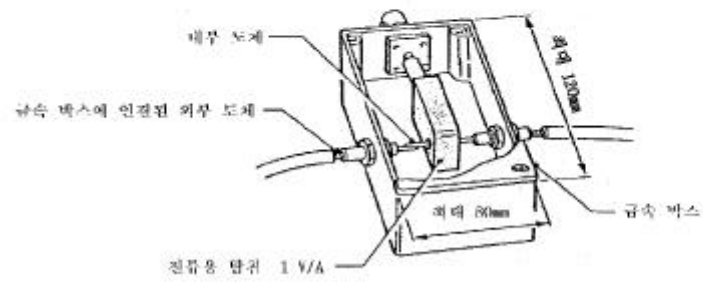
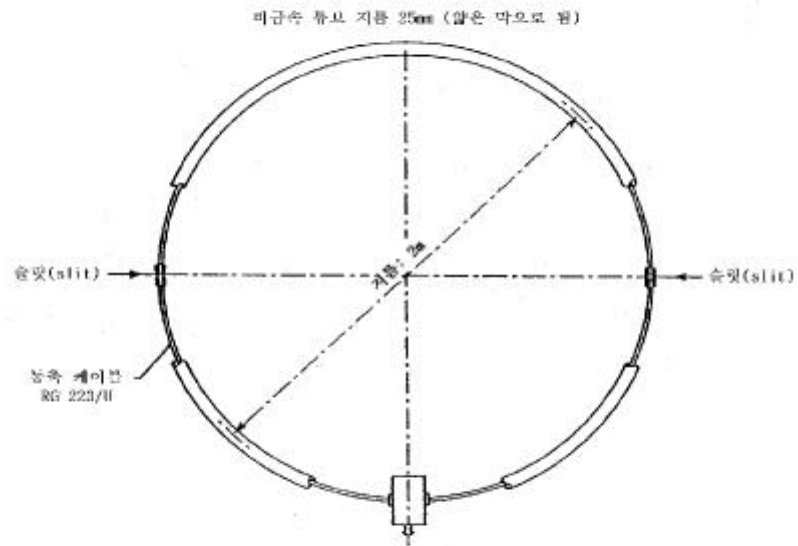
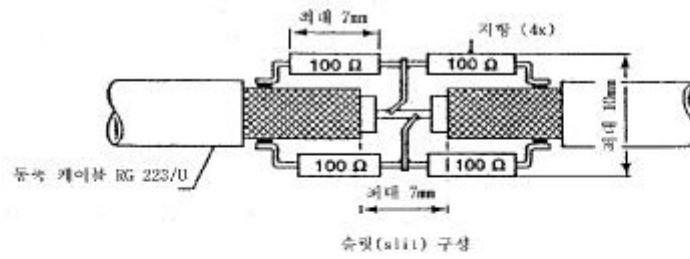
B.4

r.f (B.4)

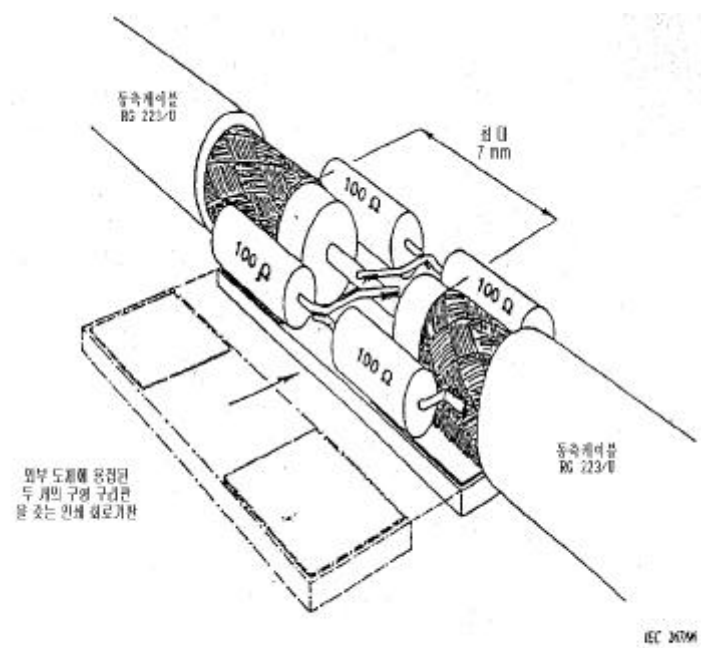
() . $\pm 2\text{dB}$.



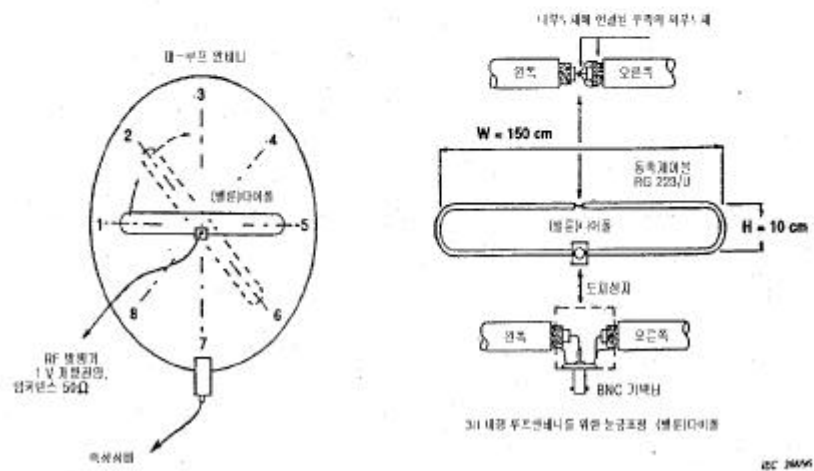
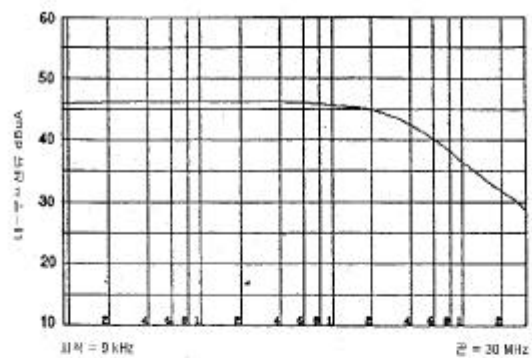
B.1- X,Y,Z
(9kHz 30MHz)



B.2-



B.3-

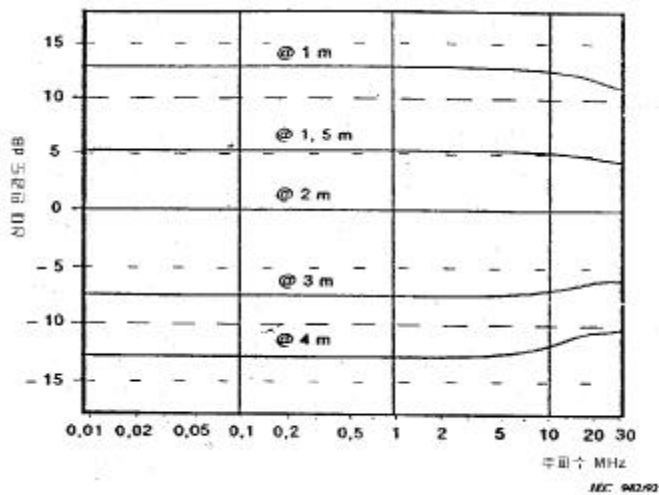


B.4-

C

()

(LLAs)



C.1- 2.0m LLA 1.0, 1.5, 3.0
4.0m LLA

C.1

a) : 100kHz
LLA : 2m
: X dB μA

1.0m LLA : = $X + 13$ dB μA
3.0m LLA : = $X + 7$ dB μA

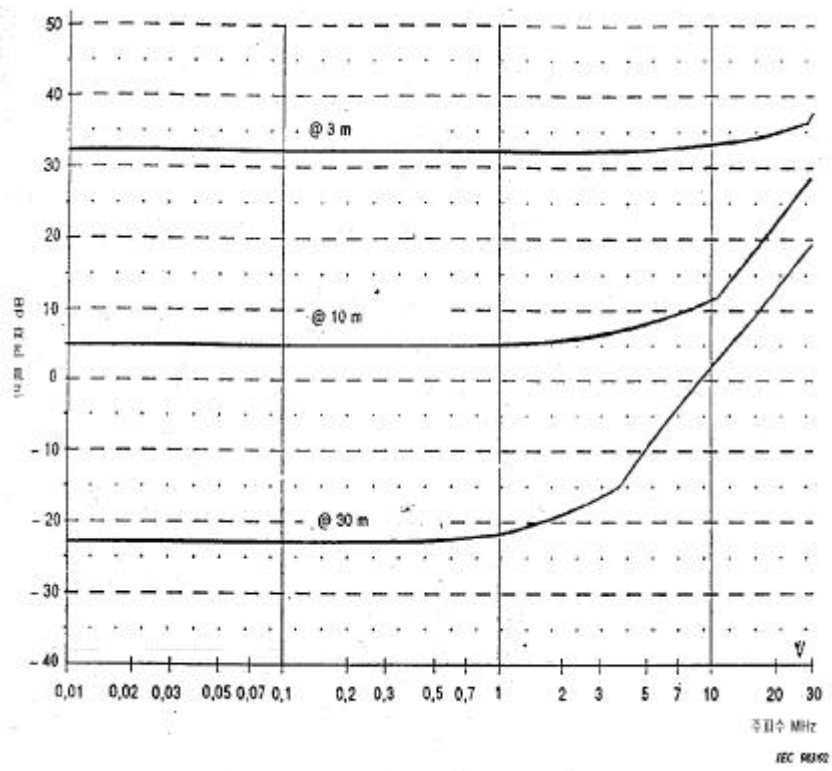
b) LLA : Dm
: S dB (D)
: Y dB μA (D LLA)

dm H (dB $\mu V/m$)

$$H(\text{dB } \mu V/m) = Y(\text{dB } \mu A) - S(\text{dB}) + C_d(\text{dB } \Omega m)$$

C_d d C.2

$$f = 100\text{kHz}, D = 3\text{m}, d = 30\text{m}, H = (Y + 7 - 22) = (Y - 15)\text{dB } \mu V/m$$



C.2-

2m

CISPR

20

4

1998- 08

,

-

-



CISPR 20: 1998

.....	1
1	3
2	3
3	4
4	5
4.1	6
4.2	11
4.3	22
5	22
5.1	22
5.2 150kHz 150MHz	27
5.3 150MHz 1GHz	42
5.3 150kHz 150MHz RF	46
5.4 150kHz 150MHz RF	51
5.5	53
5.6	57
6 CISPR	60
6.1 CISPR	60
6.2	60
A() TEM	94
B() 150kHz 150MHz RF	95
C() 가	100
D() G	102

CISPR 20 IEC : 1998

, -

-

1) CISPR CISPR
가

CISPR CISPR
CISPR
가

2) CISPR
CISPR CISPR

3) CISPR CISPR 가
CISPR . CISPR
가 가

CISPR E

CISPR 20 4 1996 3 1 (1997)
2 (1997)

CISPR 3.2

FDIS	
CISPR/E/174/FDIS	CISPR/E/178/RVD

CISPR 20 IEC : 1998

CISPR

.

CISPR

.

B D

.

A C

.

CISPR 20 IEC : 1998

-

-

1

1GHz . 150KHz

DTH(direct- to- home)

.

- , :
- (, CATV);
- (, MATV) IEC 60782- 2

2

,

. IEC ISO

CISPR 13: 1996,

CISPR 20 IEC : 1998

CISPR 16: 1987, CISPR

CISPR 16- 1: 1993, - 1
:

IEC 60050(161): 1990, (IEV) - 161 : EMC
(*Electromagnetic compatibility*)

IEC 60094- 2: 1994, - 2 :

IEC 60096- 1: 1986, RF - 1 : - 2
(1993)

IEC 60098: 1987,

IEC 60728- 2: -, - 2 :
EMC ¹⁾

ITU- R 471- 1: - (*colour bar*)

ITU- R 500- 7: 가

3

IEC 60050(161) .

3.1

가 ,
가 .

3.2

가 ,
가 .

1)

•

3.3

,

3.4

,

$$1 - \left(\frac{1}{2} \right)^n \quad (n = 1, 2, 3, \dots)$$

2 - , , D/A ,
(PAL, NTSC SECAM)

3 -

4 - , 가 ,

3.5 ()

—

,

가 .

•

—

—

—

CISPR 20 IEC : 1998

4

4.1

- .

4.1.1 0.15MHz 150MHz

5.2. .

1 -

MHz		dB(μ V/m)
0.15	150	125

2 - VHF II

MHz	dB(μ V/m)
0.15 150 : (f_i -0.5) (f_i +0.5) (f_o -0.5) (f_o +0.5) (f_{im} -0.5) (f_{im} +0.5) 87.5 108 1)	125 101 109 109 109
1) 87.5MHz 108MHz . - f_i (=10.7MHz) . $f_o = f_t \pm f_i$. $f_{im} = f_t \pm 2 f_i$. f_t . , “+” $f_o > f_t$ “-” $f_o < f_t$.	FM

3 -

MHz	dB(μ V/m)
0.15 47	125
:	
(f_c - 1.5) (f_c +1.5)	101
(f_s - 0.5) (f_s +0.5)	101
(f_i - 2) (f_v +2) ¹⁾	101
(f_v - 2) (f_i +2) ²⁾	101
47 150 ³⁾	109 ⁴⁾
	125 ⁵⁾
<p>1) B, D, G, K, I, L, M</p> <p>2) L</p> <p>3) 47MHz</p> <p>4) 가</p> <p>5) 가</p> <p>- f_i</p> <p>f_v</p> <p>f_s (intercarrier)</p> <p>f_c</p>	

4.1.2 150MHz 1GHz

5.3

4 -

MHz		dB(μ V/m)
150	1000	

5 - VHF II

MHz		dB(μ V/m)
150	1000	

6 -

MHz		dB(μ V/m)
150	1000	

4.1.3 0.15MHz 150MHz

5.4

.

7 -

MHz		dB(μ V) (e.m.f.)
0.15	1.6	
1.6	30	
30	85	
85	150	

8 -

MHz	dB(μ V) (e.m.f)
0.15 26	126
26 30	
30 150	

9 -

()

MHz	dB(μ V) (e.m.f)
0.15 1.6	
1.6 30	
30 150	

4.1.4 0.15MHz 150MHz

2 3 “ ”
5.5 .

10 -

MHz	dB(μ V) (e.m.f)
0.15 30	130
30 100	120
100 150 ¹⁾	120- 110
1) 가	

11 -

()

MHz		dB(μ V) (e.m.f.)
0.15	1.6 ¹⁾	80- 90
1.6	20 ¹⁾	90- 120
20	100	120
100	150 ²⁾	120- 110
1)	가	
2)	가	

4.2

5.6

4.2.1

4.2.4

가 75 Ω

. 75 Ω

$$L_z = L + 10 \log_{10}(Z/75) \text{ dB}(\mu V)$$

L_z Z ;

L 12 16 (Z=75 Ω) ;

Z .

- 가

(, e.m.f.) 가 .

CISPR 20 IEC : 1998

4.2.1

N 5.6.2
 . A, B, C, D M 12 13
 TV E
 14 . A, B1, F, G
 M 12a, 13b .

A: M

B: ,
 +0.5MHz
 - 0.5MHz .

B1: : 13b
 $f_N - 0.25MHz$ - 19dB ,
 $f_N + 0.25MHz$ - 9.5dB ;

C: 30kHz 1kHz FM .

B, G

가

C1: 30kHz 1kHz FM

C2: 30kHz 1kHz FM

D: 80% 1kHz AM

E: 80% 1kHz AM

CISPR 20 IEC : 1998

C, C1, C2, D, E
r.m.s. 가 .

F: 12a

G: $f_N + 10.125MHz$ 가
 $t_d = 60\mu s$, 200Hz (T=5ms)
, 가 , 13b
.

1 -
.

12 -
B G I

N	M						
	dB(μ V)						
	M=N- 5	N- 1	N+1	N+5 ²⁾	N+9 ²⁾	N+11	
N_i , N_{iii} N_{H1}	-	73	73	-	68 ¹⁾	-	A
	-	61	61	-	56 ¹⁾	-	B
	70	73- x	73- x	70	68- x ¹⁾	68	C C1
	-	73- y	73- y	-	68- y ¹⁾	-	C2
	70	-	-	70	-	68	D
N_{iv}	-	77	77	80	68	-	A
	-	65	65	68	56	-	B
	74	77- x	77- x	80- x	68- x	-	C C1
	-	77- y	77- y	80- y	68- y	-	C2
	74	-	-	-	-	-	D
N_v	80	77	77	80	-	-	A
	68	65	65	68	-	-	B
	80- x	77- x	77- x	80- x	62	-	C C1
	80- y	77- y	77- y	80- y	-	-	C2
	-	-	-	-	62	-	D
B G x=13dB, y=20dB							
I () x=10dB							
1) NH							
2) 8MHz IF 가 38.9MHz							
IF							
1 - x () (dB)							
· y () (dB)							
·							
2 - () . D- PAL K- PAL 12 M N- 4							
N+4 가 N- 5 N+5 x=10dB							

가 ,
가 가 N

CISPR 20 IEC : 1998

55MHz	가	가	I	N_i
203MHz	가	가	III	N_{iii}
503MHz	가	가	IV	N_{iv}
743MHz	가	가	V	N_v
375MHz	가	가		N_{H1} (12)
363MHz	가	가		N_{H2}
423MHz	가	가		N_{H3} (13b)

-	I	47MHz	68MHz
-	III	174MHz	230MHz
-	IV	470MHz	598MHz
-	V	598MHz	862MHz
-		320MHz	470MHz

2 - 가

가 가 .

12a - 58.75MHz IF

M- NTSC

(

)

N	M					
	dB(μV)					
	M=N- 2	N- 1	N+1	N+2		
N_{ii}, N_{iii}	70	60	65	70	70	F
N_{iV}, N_V	74	64	69	74	74	F
<div> <div>1 - : 가 TV</div> <div> <div>II III 70dB(μV) IV V 74dB(μV)</div> <div>. 15kHz 1kHz FM.</div> </div> </div>						
<div> <div>2 - : II III 64dB(μV) IV V</div> <div>68(μV) .</div> </div>						
<div> <div>3 - F : 가 TV</div> </div>						

13 -
L

N	M				
	dB(μ V)				
	M \leq N- 2	N- 1	N+1	M \geq N+2	
04	-	-	68	-	D
08	71	68	68	71	D
25	75	72	72	75	D
55	75	72	72	75	D

L , D 80% (r.m.s)
1kHz .
2 .
5dB .

13a - D- SECAM, K- SECAM()

N	M						
	dB(μ V)						
	M=N- 4	N- 1	N+1	N+4	N+8	N+9	
N_i	-	73	73	-	-	-	A
(2)	-	61	61	-	-	-	B
N_{ii}	-	73	73	-	-	-	A
(4)	-	61	61	-	-	-	B
N_{iii}	-	73	73	-	-	-	A
(10)	-	61	61	-	-	-	B
	-	63	-	70	-	-	C
	70	-	73	-	-	68	D
	-	-	-	-	-	-	-
N_{iv}	-	77	77	-	-	68	A
(25)	-	65	65	-	-	56	B
	-	67	-	70	66	-	C
	74	-	70	-	-	-	D
	-	-	-	-	-	-	-
N_v	80	77	77	-	-	-	A
(55)	68	65	65	-	-	-	B
	-	67	-	70	62	-	C
	-	-	67	-	-	62	D
	-	-	-	-	-	-	-

13b -**D2- MAC**

N	M					
	dB(μ V)					
	M=N- 4	N- 1	N+1	N+3	N+6	
NH ¹⁾	54/63.5					B1
NH ¹⁾	-	62	62	-	-	G
1)	12MHz 가 .					

14 -

N			
	MHz	dB(μ V)	
N_i	0.15 26 26 30	89	- E
N_{iii}	0.15 26 26 30	104	- E
-	Ni Nii	II가	D- SECAM K- SECAM

4.2.2 FM

15 16

5.6.3 .

/ 가 .

- II(87.5MHz 108MHz) FM

.

15 - VHF II

MHz	MHz	dB(μ V)	
87.6	66.2 ¹⁾	80	80
	76.9	80	80
	87.1	80	80
	87.2	80	80
	87.25	80	80
	87.30	72.4	69.2
	87.35	64.8	58.4
	87.40	57.2	47.6
	87.45	49.6	36.8
	87.50	42.0	26.0
107.9	129.3 ²⁾	80	80
	118.6	80	80
	108.4	80	80
	108.3	80	80
	108.25	80	80
	108.20	72.4	69.2
	108.15	64.8	58.4
	108.10	57.2	47.6
	108.05	49.6	36.8
	108.00	42.0	26.0
1)	가	가	
2)	가	가	

16 - VHF II

MHz	MHz	dB(μ V)	
98	97.5 98.5	85	85
	97.6 98.4	85	85
	97.65 98.35	80	80
	97.7 98.3	72	72
	97.75 98.25	63	63
	97.8 98.2	59	58
	97.85 98.15	57	47
	97.9 98.1	53	32
	97.925 98.075	49	20
	97.95 98.05	41	14
	97.975 98.025	34	14
	98	29	20

4.2.3

4.2.1 4.2.2 가

.

4.2.4

4.2.5

17 M $A_1, A_2, A_3,$
 A_4 N 5.6.4

.

17 -

N	M				
	dB(μ V)				
	N- 2	N- 1	N+1	N+2	
N _{min} +3	70	66	66	70	A1 A2
N _{mid}	70	66	66	70	A3
N _{max} - 3	70	66	66	70	A4
1 - N _{min} = 가					
2 - N _{mid} =					
3 - N _{max} = 가					

5.1.3 가 .

A_1 : 38.36 MHz, 13.5 MHz/V MAC/
0.6MHz 가

A_2 : 29.5 MHz, 16 MHz/V PAL 2 MHz
가

A_3 : 42 MHz, 22 MHz/V MAC/
(33MHz) SECAM 2 MHz
가

A_4 : 50 MHz, 22.5 MHz/V (33MHz)
PAL 2MHz 가

- 0 MHz/V

A_2

A_4

CISPR 20 IEC : 1998

4.2.6

N 5.6.5 17
A1, A2, A3 A4 M
.
(5.6.5)

4.3 (screening effectiveness)

4.3.1

4.3.1.1

5.7
50dB .

4.3.1.2

4.3.2

5.7
98MHz 20dB .

5.

5.1

5.1.1

5.2, 5.3, 5.4, 5.5 5.6
.

CISPR 20 IEC : 1998

가 , (chassis)
 :
 가
 ,
 ,
 가
 150kHz 1GHz
 ,
 TEM (transverse electromagnetic devices)
 (가)
 가
 100MHz
 ,
 .

가 :
 :
 - TEM : 150kHz 150MHz
 - : 150MHz 1GHz
 : 150kHz 150MHz
 : 150kHz 150MHz

CISPR 20 IEC : 1998

- 가 TEM 가
가 , 80MHz .

5.1.2

5.2, 5.3, 5.4, 5.5, 5.6 5.7

.

가

. (ITU-R 500-7)

(EBU ITU-R) 가 .

가가

FM AM FM
40dB, AM

26dB .

CISPR 20 IEC : 1998

(가)
(가) .
가
가
가
가
가
(가)
가
가

5.1.3

가가 , (time-base)
가 ,
가
가
가
가
가
가
()
가
가

ITU- R 471- 1

CISPR 20 IEC : 1998

:

2cd/ m²

30cd/ m²

80cd/ m²

- 30cd/m² .
 . 30cd/m²

1kHz

,
 . FM ,

30kHz

가 .

AM , 30% .

.

. 가 가 .
 80% 가 .

75 Ω

70dB(μV) .

6 7

: I 60dB(μV/m), III 66dB(μV/m),
 IV V 72dB(μV/m) .

가 , 46dB(μV) e.m.f

CISPR 20 IEC : 1998

가 .(5)

가 ,
TEM (6)
TEM 가 60dB($\mu\text{V/m}$)
가 .

5.1.4

. (5.1.3)
 . 50mW
 . 1kHz
 .

5.2 150kHz 150MHz

5.2.1

,
 .
 (f<30MHz)
 .
 30MHz
 , $120 \pi Q$
 .

,
가 . 150MHz
TEM
 , 가 가

CISPR 20 IEC : 1998

(b1)가 가 .

150 MHz TEM 가
가 150MHz 1GHz
.

TEM 가 가
가 .

- 가 가 TEM
, 가 , 5.3
80MHz 1GHz ..

가 , 가
가 .
(, ,)
가 ,
.

(RF , IF , VF AF
)

5.2.2 (TEM)

CISPR 20 IEC : 1998

TEM (guided wave)

가 (1)
(E/H=120 πQ)

(h/w) 2a, 2b 2c 가

3a, 3b 3c TEM 가

TEM

TEM

TEM 1.2 가

TEM h가
 $\lambda/2$ 가
, 가 TEM
가 , h=1 m TEM
150MHz 가
가 25% 50%

EUT가

TEM 가
가
가 , 가
h 2/3

TEM h_t U_{in} E :

$$h_t = \frac{U_{in}}{E}$$

CISPR 20 IEC : 1998

TEM
TEM h
TEM

TEM , TEM
가

TEM

($h \approx \lambda/2$) 가

가 ,
가
가

가

.(200 Ω 가).

TEM ()가 가
가

가 0.8m
2a 2b 2c 가

3a 3b 3c TEM

TEM 가 A

5.2.3

5.2.3.1

5.2.3 150MHz

CISPR 20 IEC : 1998

가 5.2.3.3 가
150MHz .

, 가

.

5.2.3.2

TEM TEM , ,
0.8m . TEM , 가
가 .

0.8m가 . 4

.

EUT TEM . (5
) () 0.1m .
가 TEM .

TEM 가 ,
30MHz 50m Ω /m 가

- 가 가

.

가 ,
RF 가 6
TEM TEM 가
7 가
가 TEM .

- 가 ,
IF .
.
TEM 8
.
8 , 5.1.3 (Ga)
(P) .
(P) RF .
RF (G1) 가 , S1
TEM . 5.1.3 .
2 - .
.
S1
가 .
(5.1.2).
RF (Am) 가 가 . TEM
RF .
가 IF
TEM .
B.3
.

5.2.3.3 RF IF

8 가 .

(P)가

가 가

I

가

I

III

가 가

IV

V

가

(:

I

)

IV - V

가

가

.

.

.

(G1)

1MHz

가

45 °

.

, 가

가

(5.1.2

).

E

가

가

I

IF

1MHz

.

-

RF

.

5.2.3.4 RF IF

가 RF IF 5.2.3.3 ()
() VF AF .

(, IF, VF, AV)

가

가 .

C.1, Nos 4 7(C)

가

RF IF

8

5.2.3.3

VHF

IF

VHF

150kHz

150MHz

(G1)

5.1.2

가

E 가

CISPR 20 IEC : 1998

8 가 .

5.1.3

5.2.3.3

5.1.4

.

(G1) (Ga) IF VHF (P) 150kHz
150MHz .

5.1.2

E

.

() RF

IF

.

.(

C C.1).

5.2.4

5.2.4.1

RF AM FM RF

가

RF

5.2.4.3

.

,

FM

,

FM

(

).

.

CISPR 20 IEC : 1998

RF FM IF

AM , IF

AM IF 5.2.4.2

5.2.4.2 *IF* *AM*

5 TEM (5.2.3.2

9

5.1.3 RF

5.1.2 , 5.1.4

5.1.3 TEM

가 ,

IF

가 ,

가 1KHz

5.1.2

*E*가

CISPR 20 IEC : 1998

5.2.4.3 IF

AM FM 5.2.3.2 5 .
9 .

MW / FM
(5.1.3)
5.1.2
5.1.4 .

IF RF 150KHz 150MHz
..

5.2.4.2

*E*가

- TEM 가 .
FM 150kHz 150MHz
- 150kHz 87.5MHz (FM 7.5MHz
- 87.5MHz

5.2.5

5.2.5.1

, ,
가
5.2.5.7 .

가

CISPR 20 IEC : 1998

가 . 가

가 5.2.3.2

10 .

150kHz 150MHz 가

5.1.2 .

가

- EUT가 (,) ,

가 . 가 EUT
가

가 , 가 (,
가 , RF ,
).

5.2.5.2

1kHz 가

가 . S1 가 가 TEM

CISPR 20 IEC : 1998

150kHz 150MHz .

(G1) 5.1.2 가
*E*가 .

5.2.5.3

. (10)

a) 가

1KHz .(IEC 60094- 2 19cm/s
9.5cm/s 4.75cm/s)

가 ()
(5.1.4).

1 kHz 가 .

b) 가

1KHz 가 가
(5.1.4)

CISPR 20 IEC : 1998

S1 가 TEM .

1dB .

.(5.1.2

)

5.1.2 가

E .

5.2.5.4

5.2.5.3

1KHz IEC 60098 A

가 , (, 가
) (5.1.2). ,
(5.1.4)

CISPR 20 IEC : 1998

가 TEM

5.2.5.2

5.2.5.5

5.2.5.6

- RF TV ()

(,

)

IEC

(

)

:

S1

TEM

.(10

) 5.2.3.4

CISPR 20 IEC : 1998

5.2.3.4 , .

5.2.5.7

가 . 가 가 .

가 . 5.2.3 5.2.4 5.2.5 .

5.3 150MHz 1GHz

5.3.1

150MHz , TEM . 150MHz 1GHz .

가 . TEM 가 가 .

1 - 가 TEM , 80MHz .

가

- 가 ;

CISPR 20 IEC : 1998

- :
ISM ,
;

- 가 ;

- ;

- - .

, , 가
 .
가 .
() .

2 -

150MHz 5.2

5.3.2

.
 , , , 가

.

가 0.75λ

CISPR 20 IEC : 1998

2dB

CISPR 13 2 5.3.2 150MHz 1GHz

5.3.3

150MHz 150MHz TEM
가 150MHz
150MHz ()RF
RF
IF 가 150MHz
150MHz 가 5.3.4
150MHz ()RF
150MHz
1GHz RF 5.2.3.4

5.3.4

150MHz 5.2.3.2 5.2.3.3
5.2.3.4
11a 11b
0.8m

CISPR 20 IEC : 1998

가 가 가 .

가 0.1m 3m가

CISPR 16(13.3.1 13.3.2 13.4.1 13.3.4 13.4.2)

3m

E :

$$E = 2 \times 7 \frac{\sqrt{PG}}{d} = 14 \frac{U}{d} \sqrt{\frac{G}{R}}$$

U R

d

G

2 가

1.5dB .

5.3.5 RF

(F) 8 가 :

5.2.3.2 .

가 가 III, IV, V .

CISPR 20 IEC : 1998

III, IV 가
가 가 .

5.2.3.3 .

5.4 150kHz 150MHz RF

5.4.1

RF , ,
.
가 .

a) RF
.()

5.4.2 5.4.5

b) RF
.
, (, ,)가
. 5.5 RF
.

IEC 60096- 1 A A.5.4 1(1988)

5.4.2

12 .

CISPR 20 IEC : 1998

RF RF .
 150 Ω . R_1 (150- R
 int) 가 . R_{int} .

EUT
 150 Ω ,
 .
 . 가
 . 가
 .

RF , , (), 가 ,
 가 .
 , 150 kHz
 150MHz . 150 Ω (
 100 Ω 50 Ω)
 . e.m.f
 5.1.2 .

가 e.m.f
 EUT .
 - e.m.f (T2) 50
 .

5.4.3

CISPR 20 IEC : 1998

12 50
 . 가 .(
 R1 .)

EUT 2m × 1m 0.1m . B
 .
 RF . EUT
 가 . 가
 30MHz 50m /m 가 .
 0.3m .

가 가
 , 0.3m .
 가 “ 8” .
 30mm .

13 . 14 20
 가 .

EUT 5.1.3 가 (P
 G2) .

1 RF 가
 , 5.2.3.2 TEM .
 RF TEM .
 RF 가
 .(7)
 2
 (T2)
 .

CISPR 20 IEC : 1998

(Am)가

(G1) . 5.1.3 .

, EUT IF

RF

(F)가 .

(Am) .

6dB 10dB (T2) 50 Ω

(T2)

가 50 Ω 가 .

가 150 Ω

13 (S2) 14 20

(T2)

150 (50 Ω

100) ..

5.4.2 .

3 - EUT 가 , 5.2.5.1 .

가 .

(.)

, 100kHz (Fh)

(Am) . 5nF

.

CISPR 20 IEC : 1998

(, ,) ,
(F) (Am) (Sh) .

5.4.4

(),
, , ,
14 20 .

(P) (G2)

.

5.1.3

5.1.4

(G1)

(Am)

가

5.4.2

.

.

5.4.5

가

가

가

. 5.4.4

(5.4.2).

CISPR 20 IEC : 1998

5.5 150kHz 150MHz RF

5.5.1

RF RF ()
RF, IF VF
가, RF 가 RF
RF 5.4
RF , RF
RF RF RC

5.5.2

EUT (2m × 1m) 0.10m .(21
22). (M) 가
(5.4.3) EUT RF
30 MHz 50m /m
. EUT 가 (,),
가 가
가 가
RF 가

RF RF RF 100 μ H

RF 100kHz (Fh) 가 RF 가

50 Ω (G1) 50 가

5.5.3

(G1) EUT (21 22).

1kHz ,

EUT

(DN) (5.1.3) (30).

(5.1.4).

CISPR 20 IEC : 1998

, (Ga) (G1)
5.1.3 .

(21
).

(G1)

, 5.4.2

1/2

(G1)
22).

가

,

가

, , ,

.

.

.

5.6

5.6.1

5.1.3

5.1.2

.

-

IEC SC 12A()

, 5.6.2.

5.6.3

IEC 60315 IEC 60107

.

CISPR 20 IEC : 1998

5.6.2

5.6.2.1

31 . 32
5.6.3.1 . 가
가 .

5.6.2.2

VHF 75Ω 70dB(μ
V) UHF
75 74dB(μ V)
5.1.3 . B, G
I 1kHz가 30kHz
. L 1kHz가 30%
VHF 70- x dB(μ V) UHF 74- x dB
(μ V) . B G x=13 I
x=10 .

가 B G가
가
가 .

70- y dB(μ V) 74- y dB(μ V)
y=20dB , 30kHz 1kHz 가
2.5kHz
54.6875kHz .

4.2.1 .
12, 13 14
5.1.2 .

CISPR 20 IEC : 1998

5.6.3

±

1kHz

5.6.3.1

(G2) 32 (CN) (G1) .
(T1) 가 . 75
(MN) EUT
5.1.2 5.1.4 .

5.6.3.2 VHF II

75 60dB(μ V)
(4.2). 1kHz가 40kHz .
7.5kHz
19kHz 가 .
1kHz 80% .
15 5.1.2 .

5.6.3.3 VHF II

75 Ω 60dB(μ V)
(4.2). 1kHz가 75kHz (40kHz)
7.5kHz 19kHz 가 .

CISPR 20 IEC : 1998

40kHz 1kHz .

16 5.1.2

.

5.6.4

32 5.6.3.1 . G1

G2 5.1.3 4.2.5

.

75 60 dB(μV) .

- “ ” “ IF .”

5.1.2 . 17 N

17 M .

가 .

5.6.5

5.6.4 N G2
1 kHz . (, DSR) , N

G2

1 kHz QPSK(Quadrature Phase Shift Keying)

.

V) IF 75 60 dB(μ

5.1.2 . 17 N ,

17 M .

CISPR 20 IEC : 1998

가 .

- (, DSR D2-MAC) ,
(BER) (BERR) .

5.7

, .

5.7.1

33 .

0.8m
4m .

, 가 . RF

) 가 (.
가

가 .

가

, .

. CISPR

CISPR 20 IEC : 1998

가

0.8m

33

S_c

$$S_c = U_g - A - U \quad (\text{dB})$$

U_g .(dB(μV)):

A . (dB):

U .(dB(μV)).

S_c 가
10dB

5.7.2

가
(5.6.2)

CISPR 20 IEC : 1998

70dB(μ V)

1MHz

가

1MHz 가 (,)가 .

8kHz . 가 \pm

20dB

1 -

가

가

가

가

S_e

:

$$S_e = A_a + A_c - A \quad (\text{dB})$$

A_a 가 . (dB)

A_c . (dB)

A . (dB)

CISPR 20 IEC : 1998

2 - ,
가
가 가
(5.2).

6 CISPR

6.1 CISPR

6.1.1 CISPR 가
가 .

6.1.2 .
80% 80%
가 .

6.1.3 .

6.1.3.1 6.2 가

6.1.3.2 , .

6.1.4 . 6.1.3.2

6.1.3.1

6.2

6.2.1

CISPR 20 IEC : 1998

7
가 n c 가 .

n	7	14	20	26	32
c	0	1	2	3	4

6.2.2 6.2.1

, .

1 - “ - ”

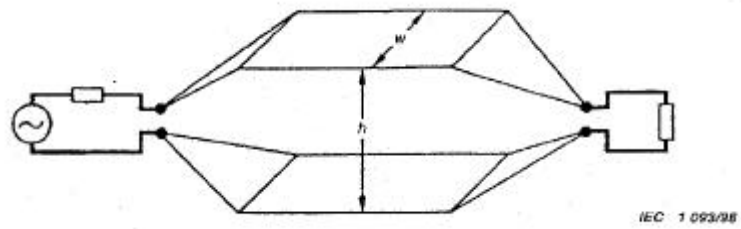
2 - CISPR 16 9

1 30

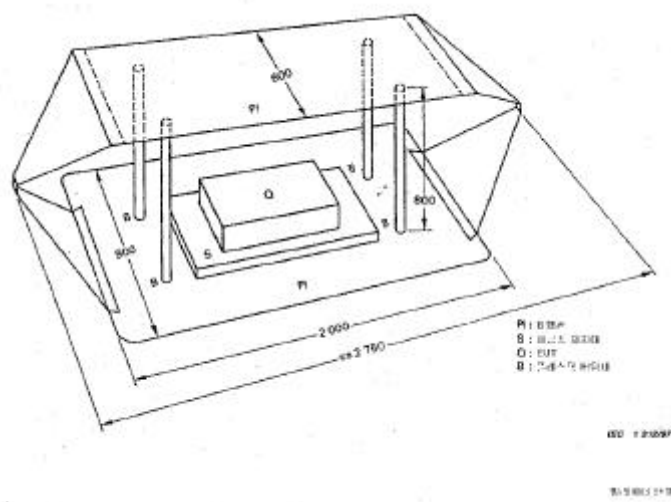
P1	=	, 1m × 2m,	.
M	=	(M).	
A	=	(A).	
L	=	(L).	
Sw	=	(가	가
Sw).			
Sr	=	(가	Sr).
w	=		.
i	=		.
G1	=	, AM , 150kHz 150MHz	
		(150MHz 1GHz).	
G2	=	, AM FM	.
Ga	=		.
P	=		.
Am	=	150kHz 150MHz(150MHz	
1GHz).	
T1	=	가 (G1).
T2	=	, 6dB 10dB , 50	.
T3	=	가 (P G2).
F	=		.
Fc	=	().
Fh	=	(fc=100kHz).	
Fv	=	(1kHz).	
V	=		.
S1	=		.
S2	=		.
Sh	=		.
Bal	=	75 /300	.
Ant	=		.
AM/FM	=	/	.
Lp	=		.

CISPR 20 IEC : 1998

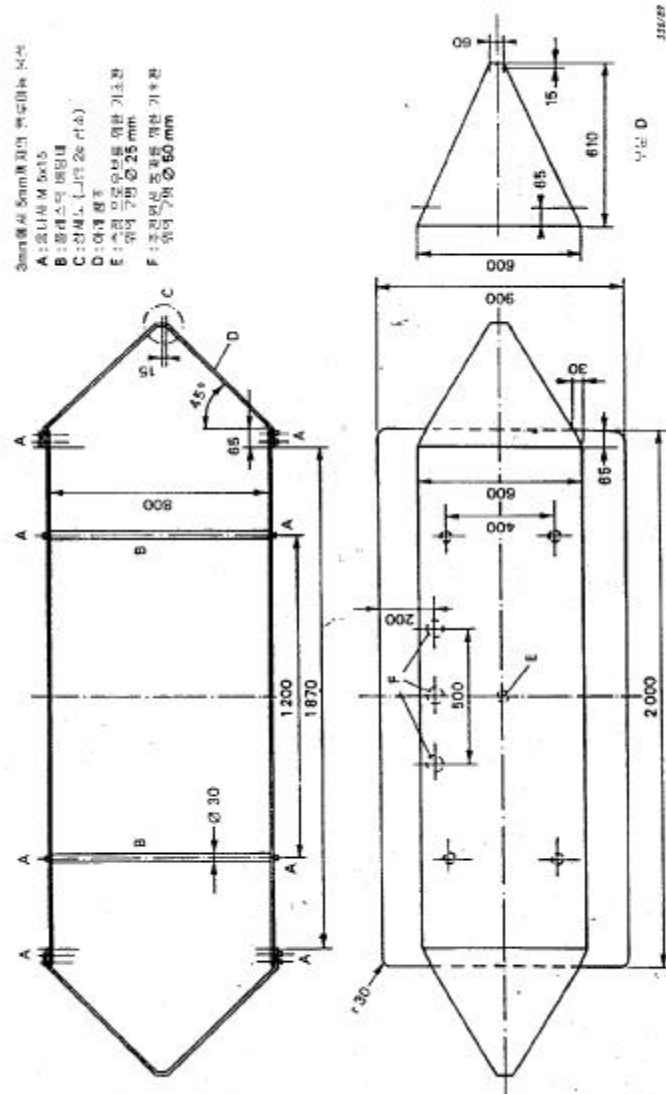
Hp	=	.
AV	=	- / .
Rem.C	=	.
AF in/out	=	/ .
Rec.in/out	=	/ .
Tu	=	.
Pu	=	.
Mic	=	.
DN	=	.



1 - TEM : (5.2.2)



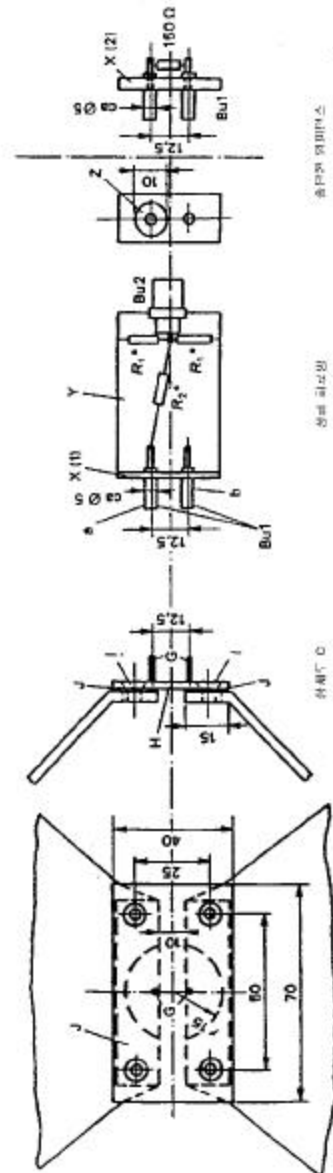
2a - TEM (5.2.2)



2b -

TEM

(5.2.2)



측면도 (단면도)

상면도 (단면도)

측면도

IEC 10463

Z_0	50	60	75	Ω
R_1	61.2	77.5	106.1	Ω
R_2	122.5	118.2	106.1	Ω

표 1

Q : 3mm 선두부 길이인 연결선 $\phi 1.3$ mm 배선 $\phi 1.5$ mm

H : 4 mm 두께의 절연체

I : 5x10 mm의 절연체 (단면도 참조)

J : 0.5mm의 절연체, 1mm의 절연체, 1mm의 절연체

$R_1 = 2R_2$ 또는 0.1mm 절연체

$R_2 = 2R_1$ 또는 0.1mm 절연체

Bu1 : 0.5mm의 절연체, 1mm의 절연체, 1mm의 절연체

Bu2 : 0.5mm의 절연체, 1mm의 절연체, 1mm의 절연체

X(1), X(2) : 1mm의 절연체, 1mm의 절연체, 1mm의 절연체

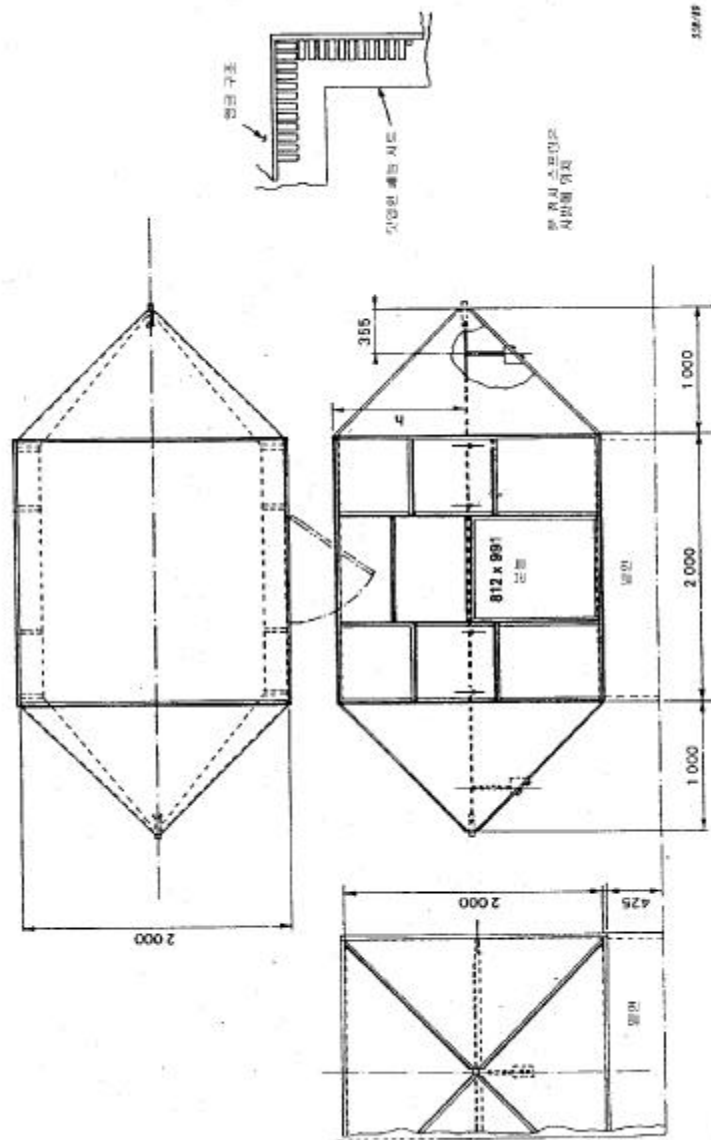
Y : 0.5mm의 절연체, 1mm의 절연체, 1mm의 절연체

Z : 0.5mm의 절연체, 1mm의 절연체, 1mm의 절연체

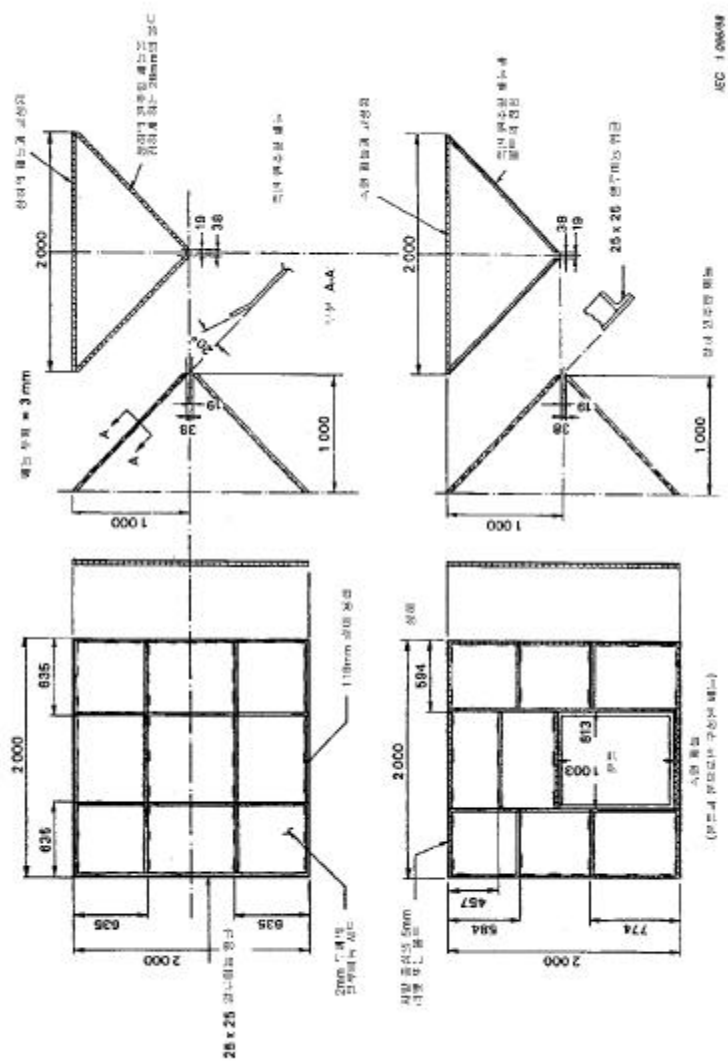
2c -

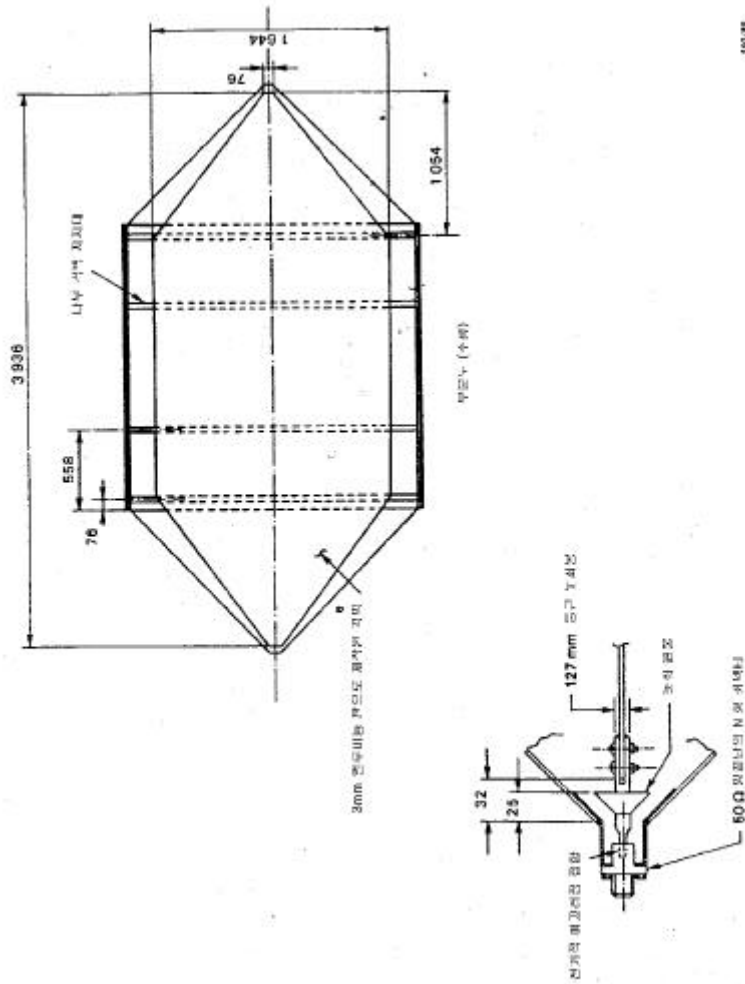
TEM

(5.2.2)



3a - 2m TEM (5.2.2)

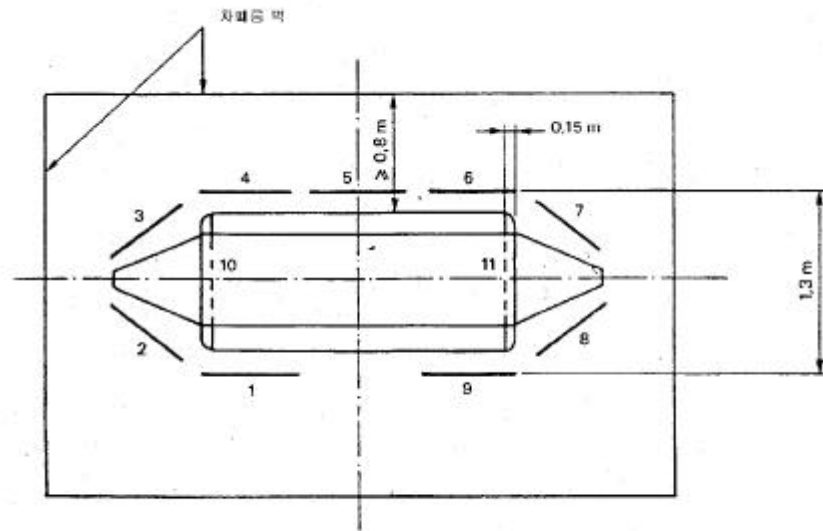

$$3b - 2m \quad \text{TEM} \quad (5.2.2)$$



3c - 2m

TEM

(5.2.2)



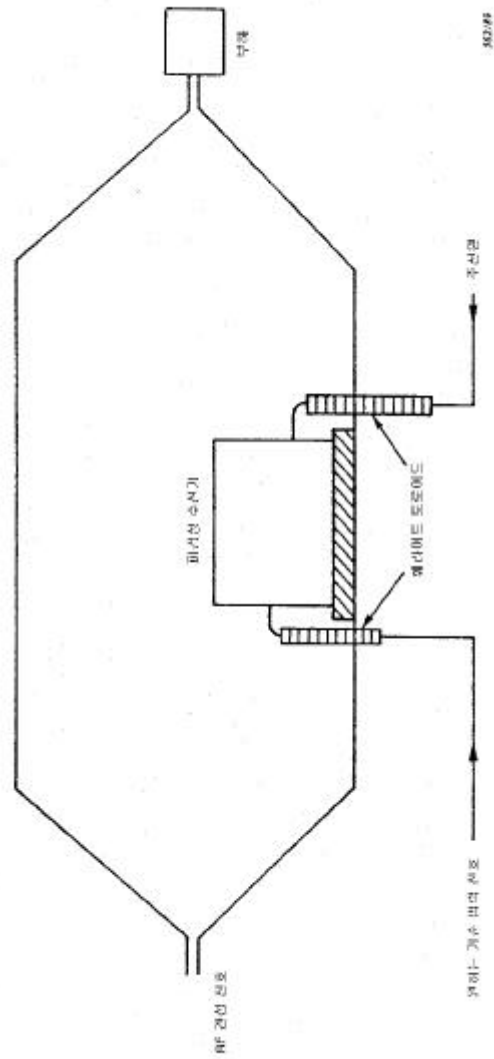
1-11: 대략 0.8 m x 0.5 m의 크기인 개전 흡수 패널

561/89

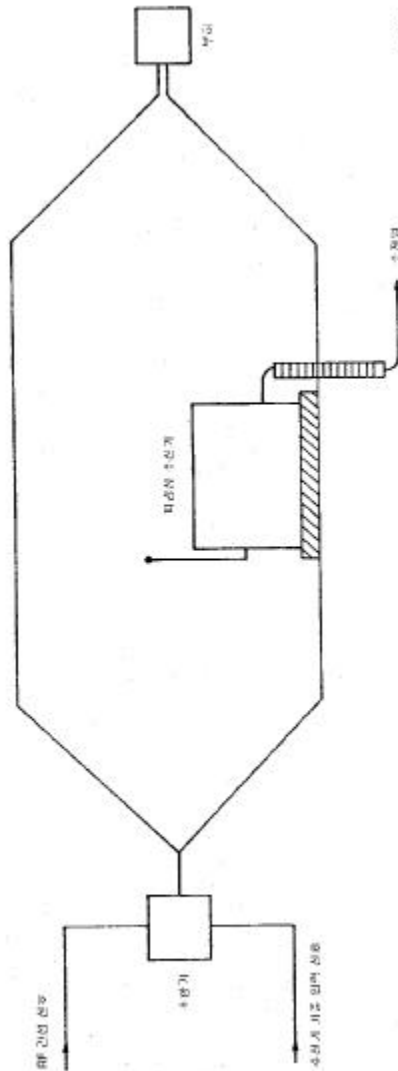
4 - 3m x 3.5 m

TEM

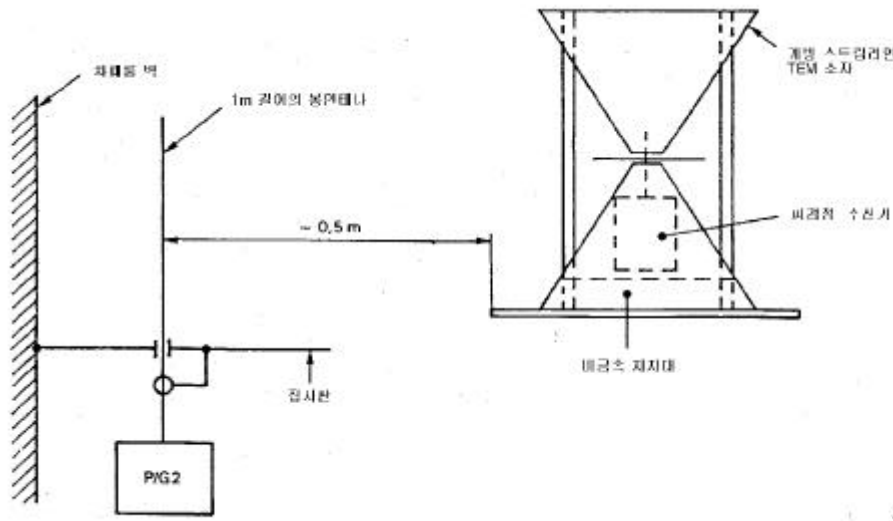
(5.2.3.2)



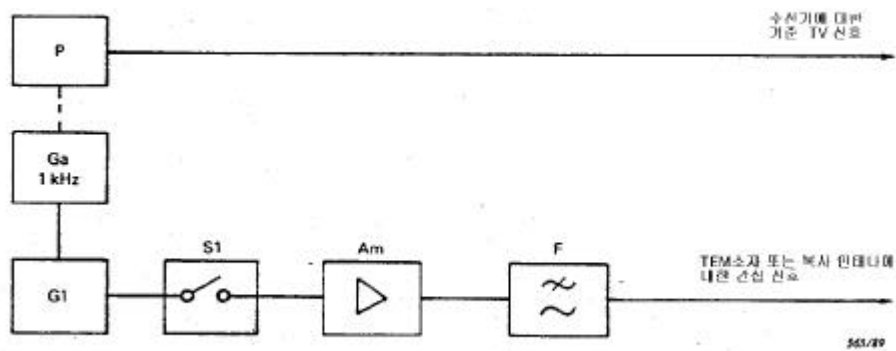
5 - 150kHz - 150MHz
(5.2.3.2)



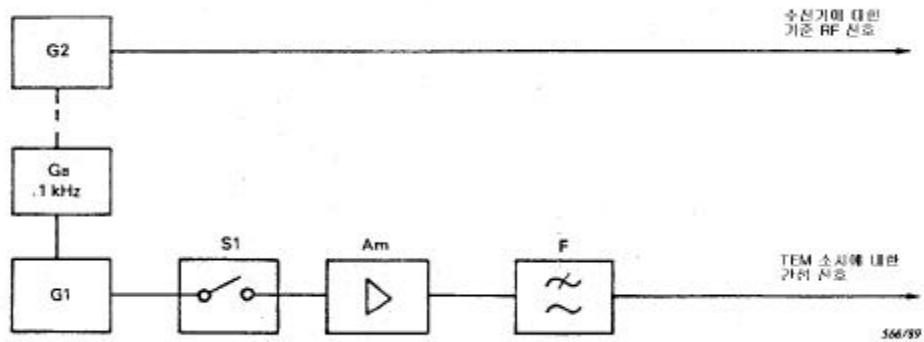
6 - 가
(5.2.3.2)



7 - 가 ()
 TEM 가 6)
 (5.2.3.2)

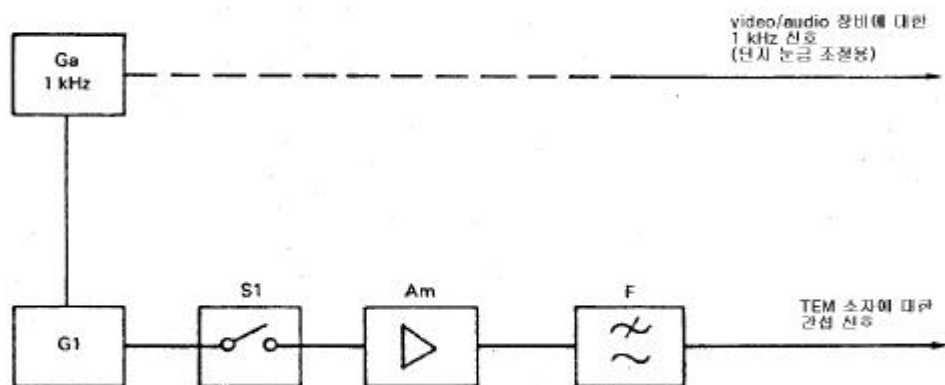


8 - (5.2.3.2)



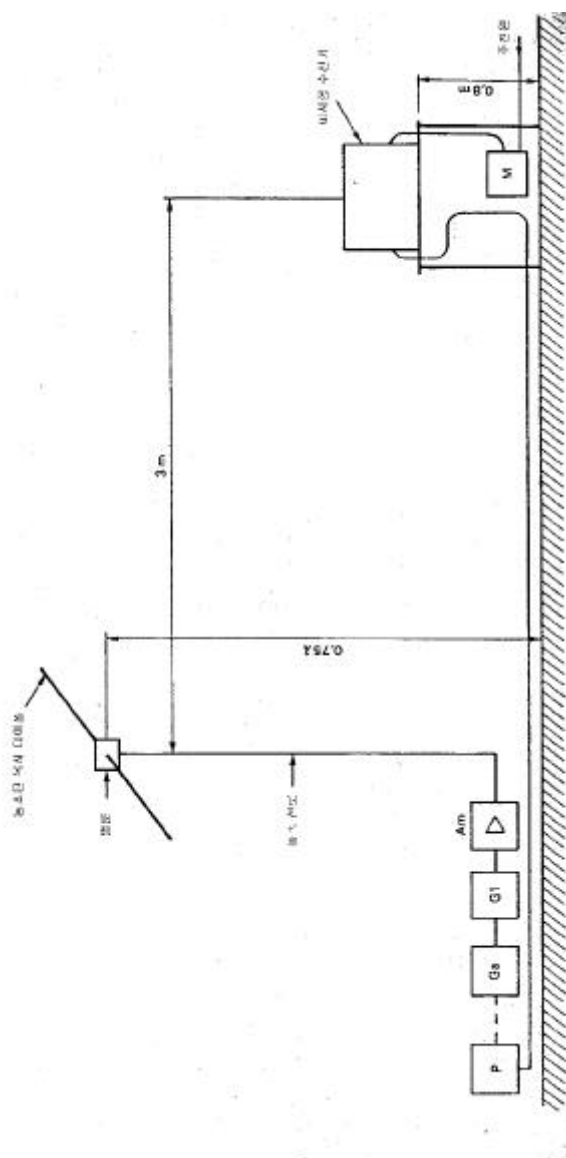
9 -

(5.2.4.2)

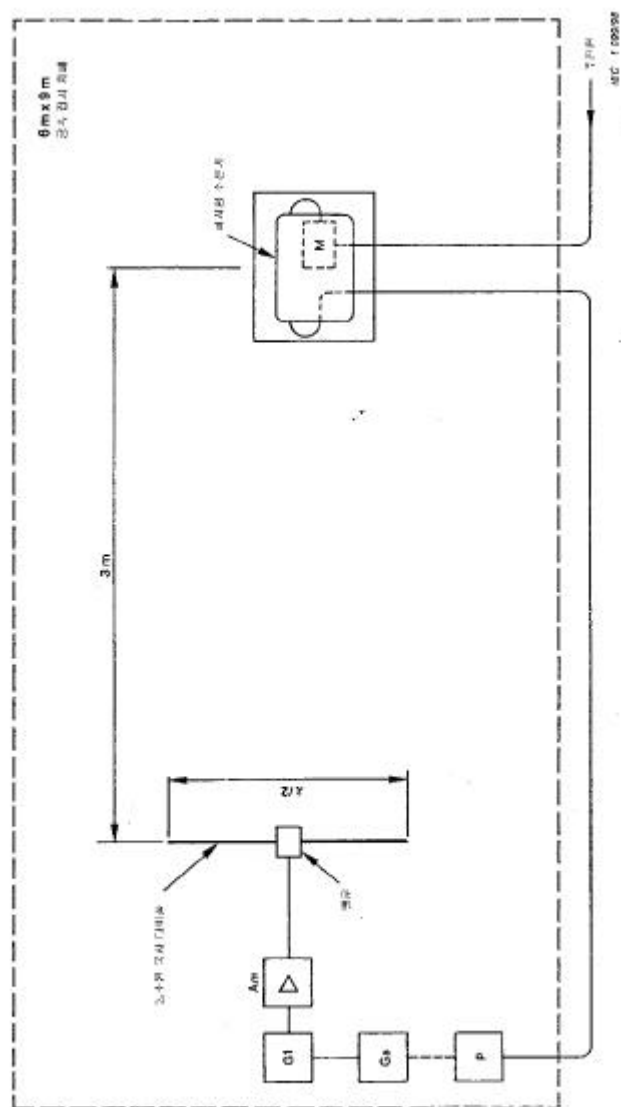


10 -

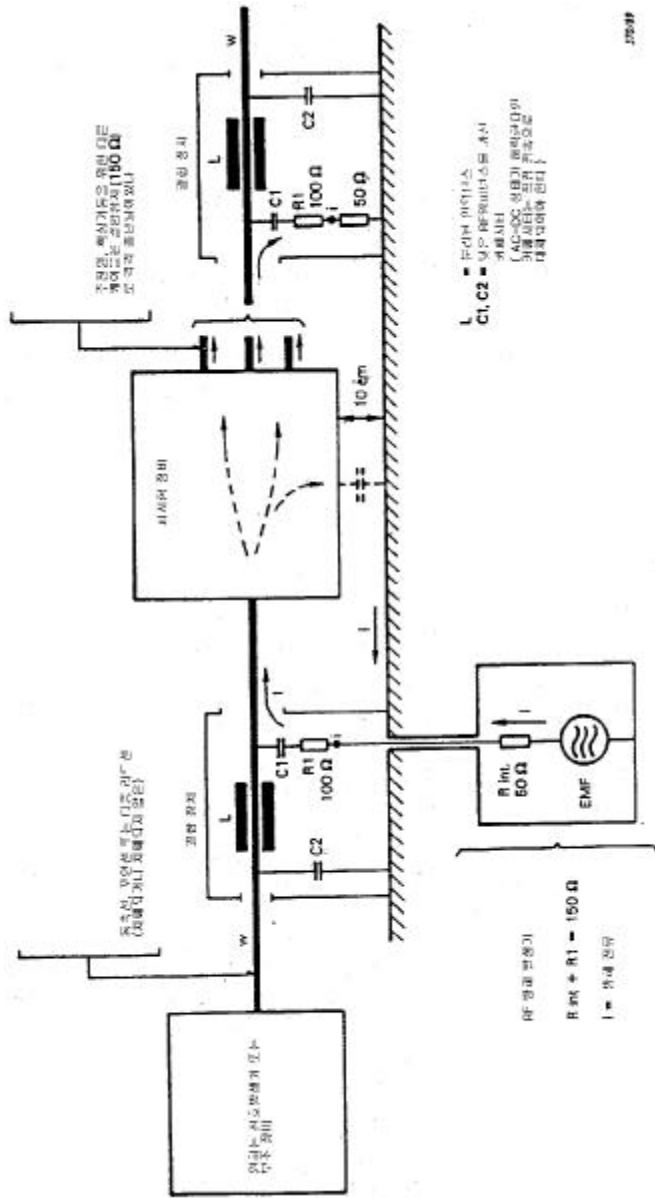
(5.2.5.1)



11a - 150MHz - 1GHz
() (5.3.4)

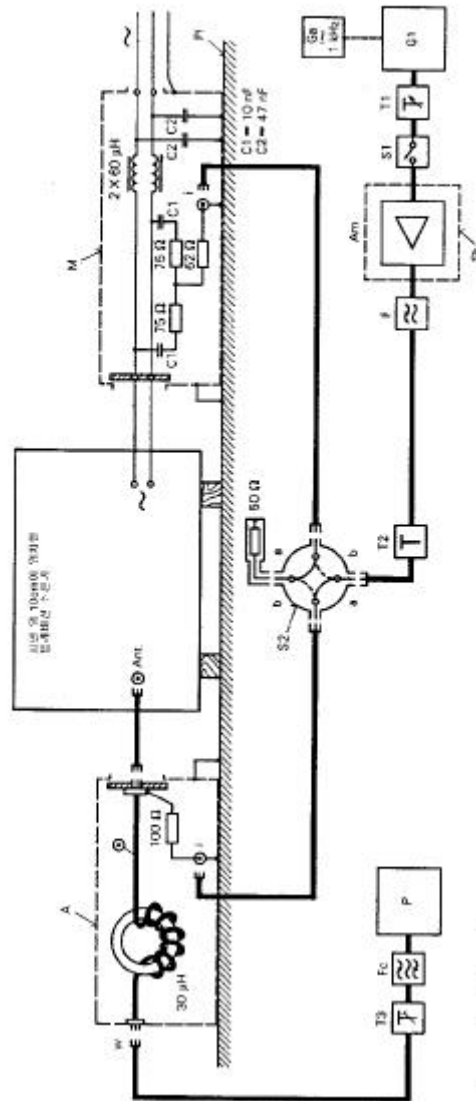


11b - 150MHz - 1GHz
() (5.3.4)



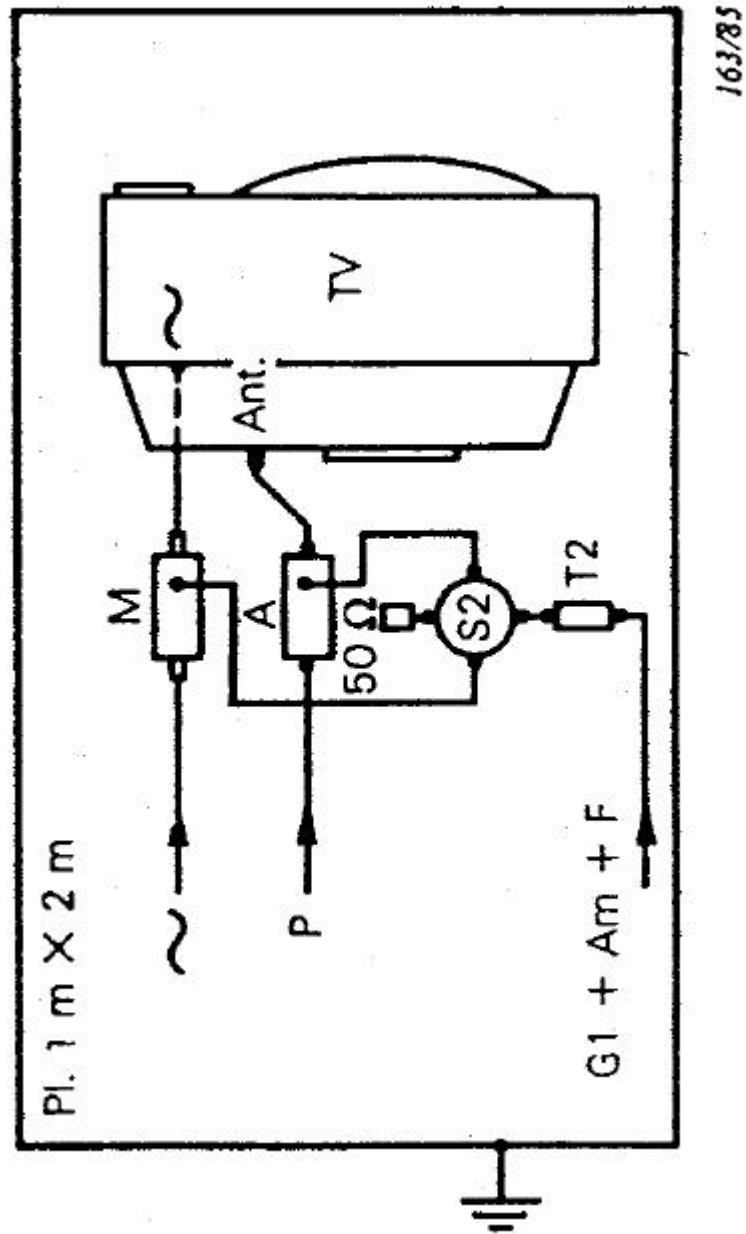
12 -

(5.4.2)

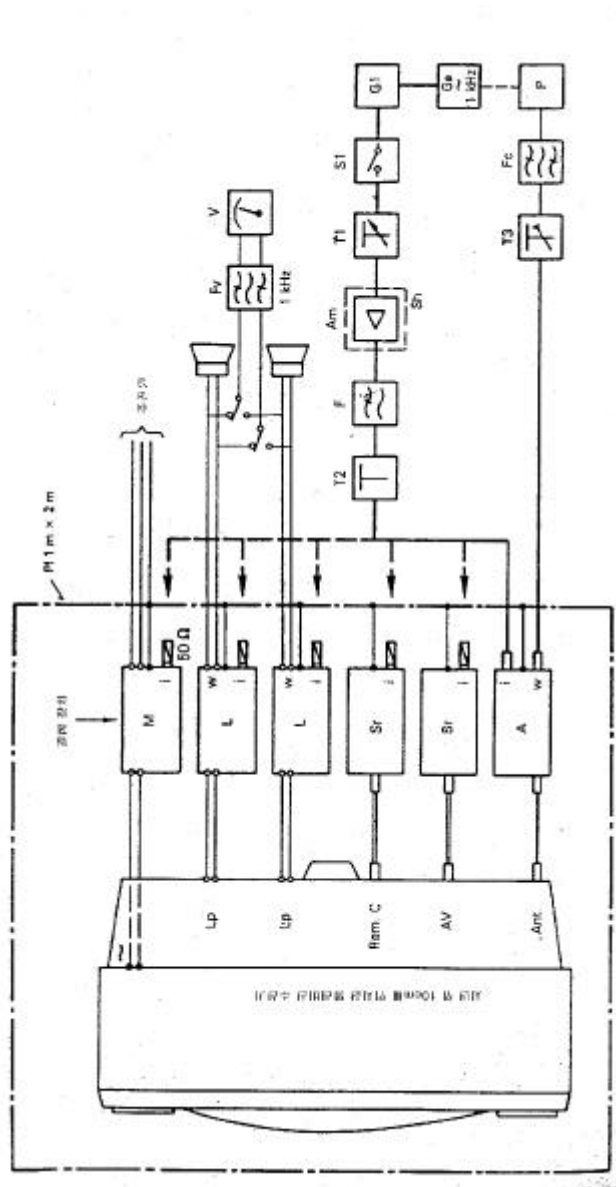


13 -

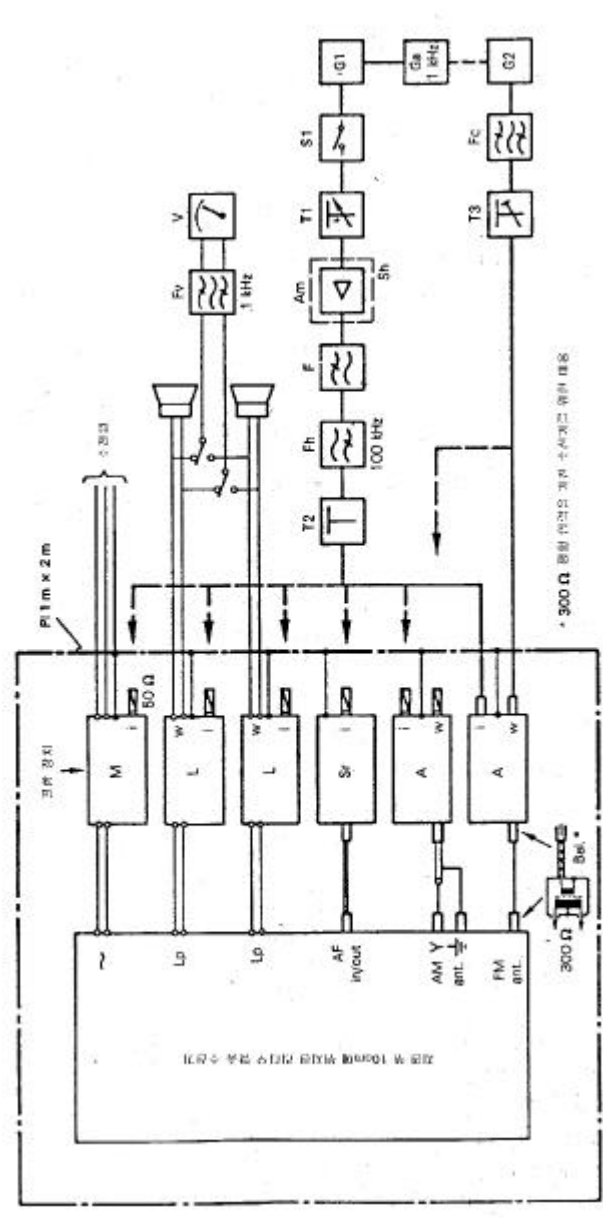
(5.4.3)

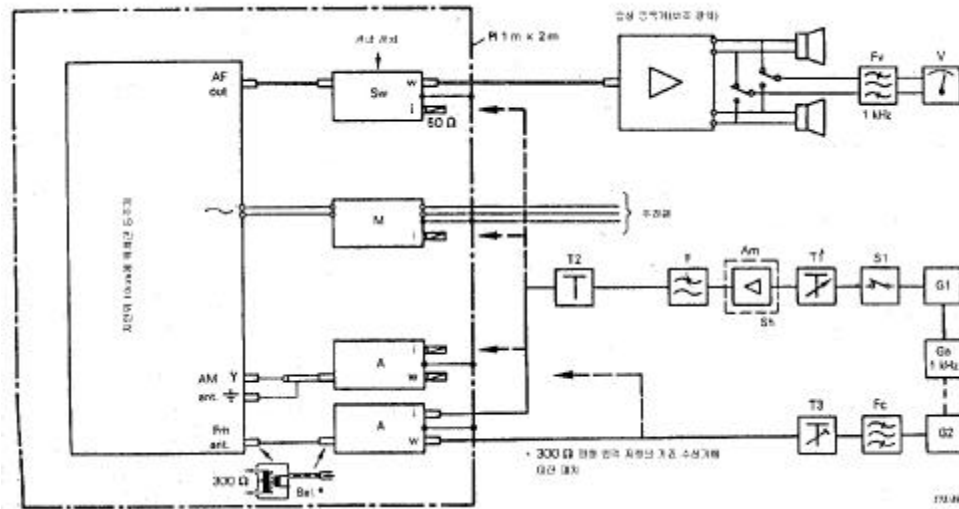
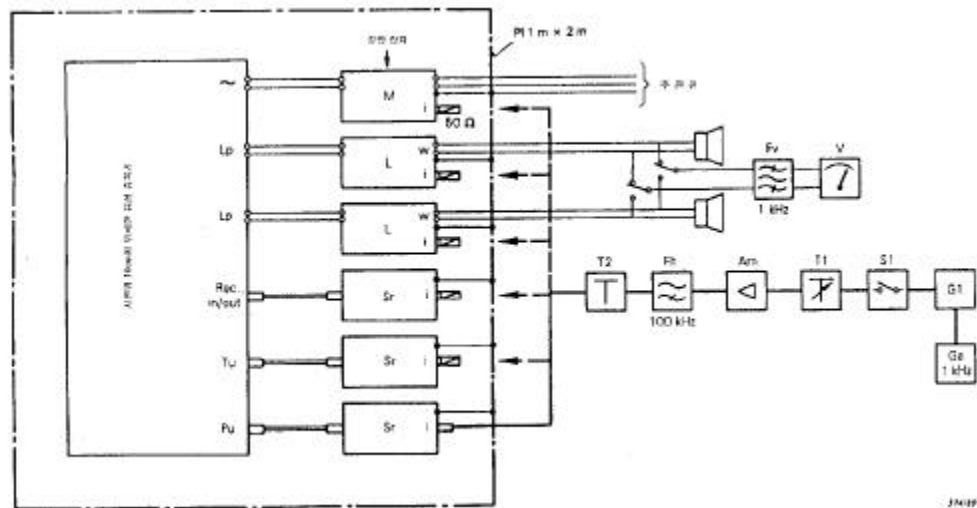


13a -

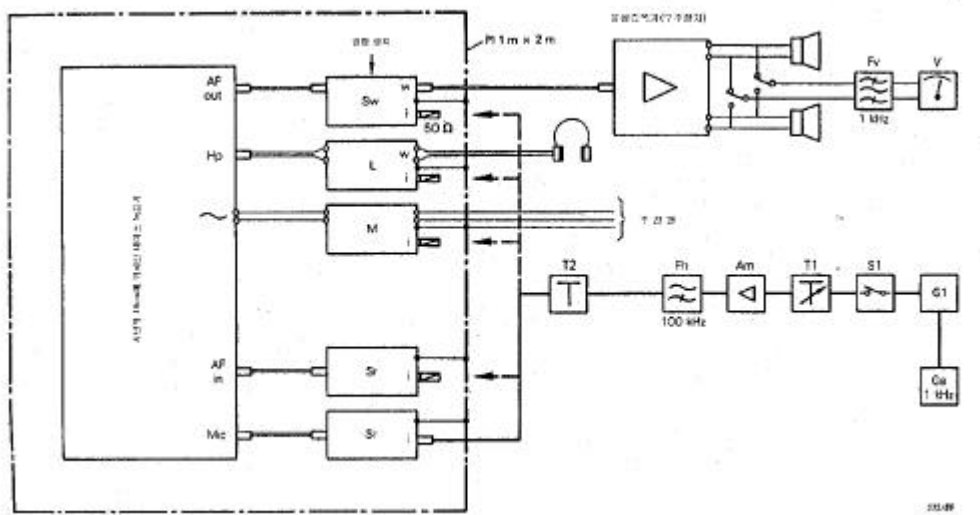


14 - (,)가
(5.4.4)



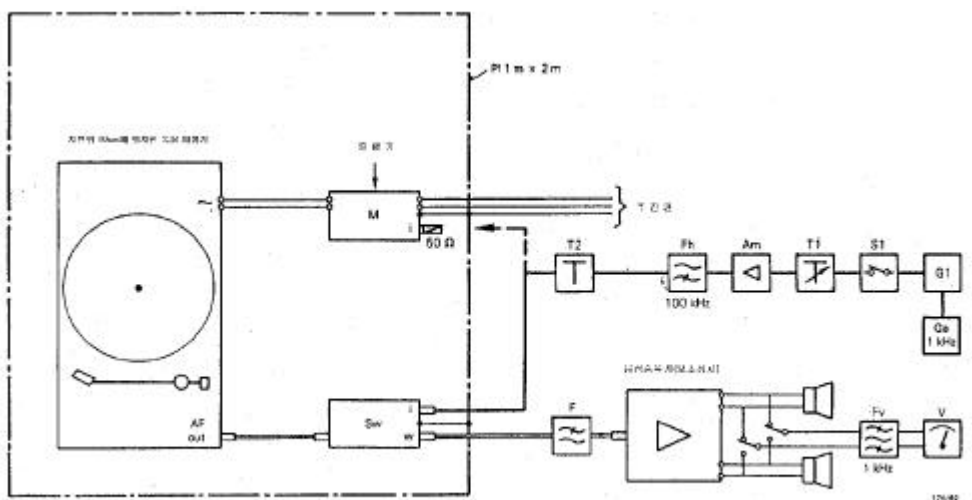

$$16 - (5.4.4)$$


17 - (5.4.4)



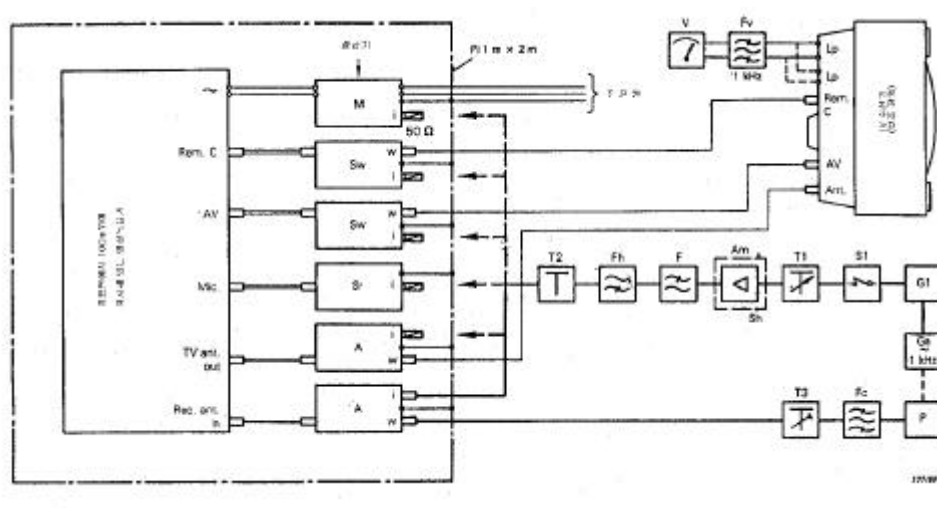
18 -

(5.4.4)



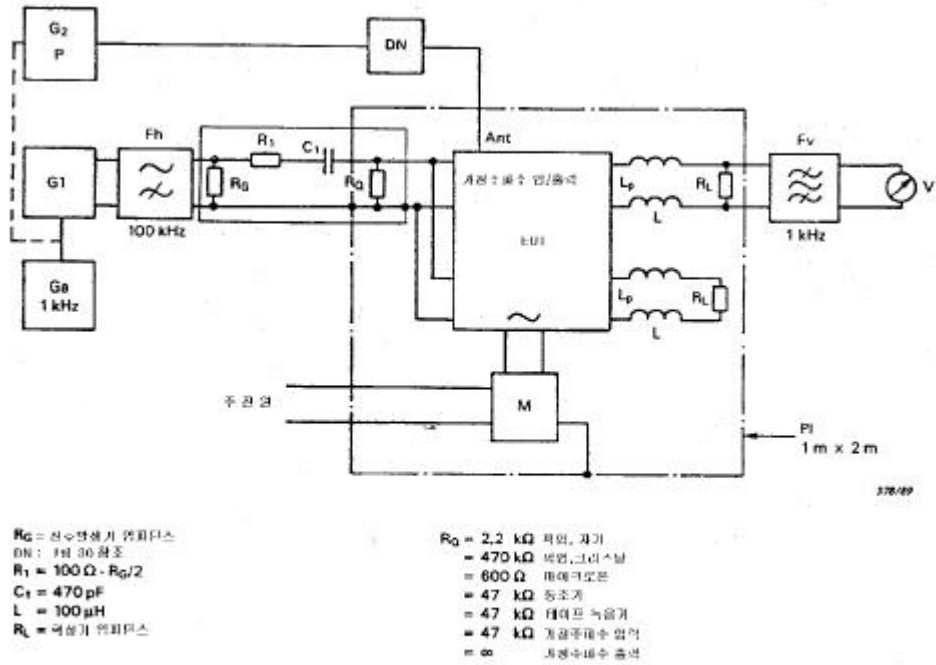
19 -

(5.4.4)



20 -

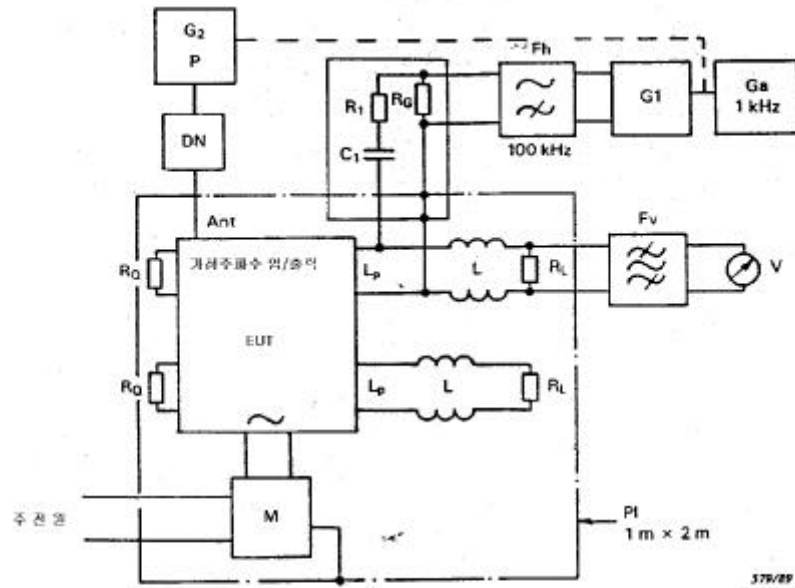
(5.4.4)



21 -

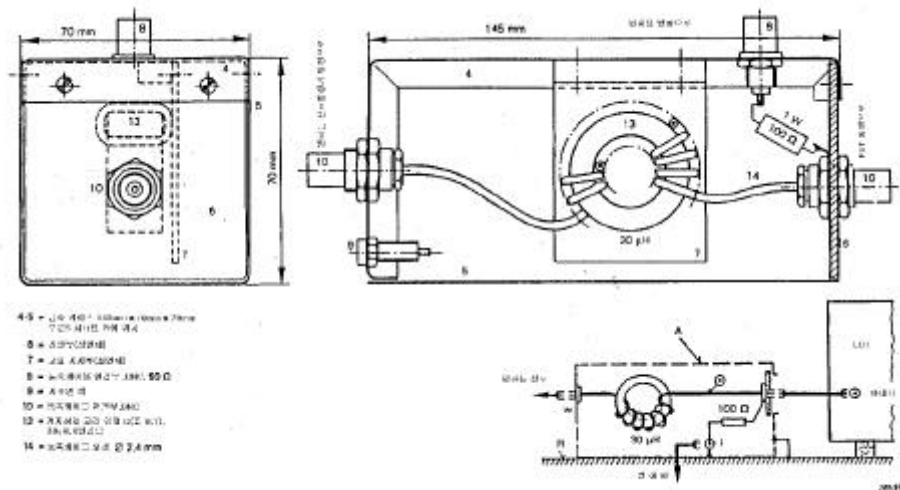
(/)

(5.5.2)



R_G = 신호발생기 임피던스
 DN = 그림 3-6
 $R_1 = 100\ \Omega - R_G/2$
 $C_1 = 470\text{ pF}$
 $L = 100\ \mu\text{H}$
 R_L = 측정기 임피던스

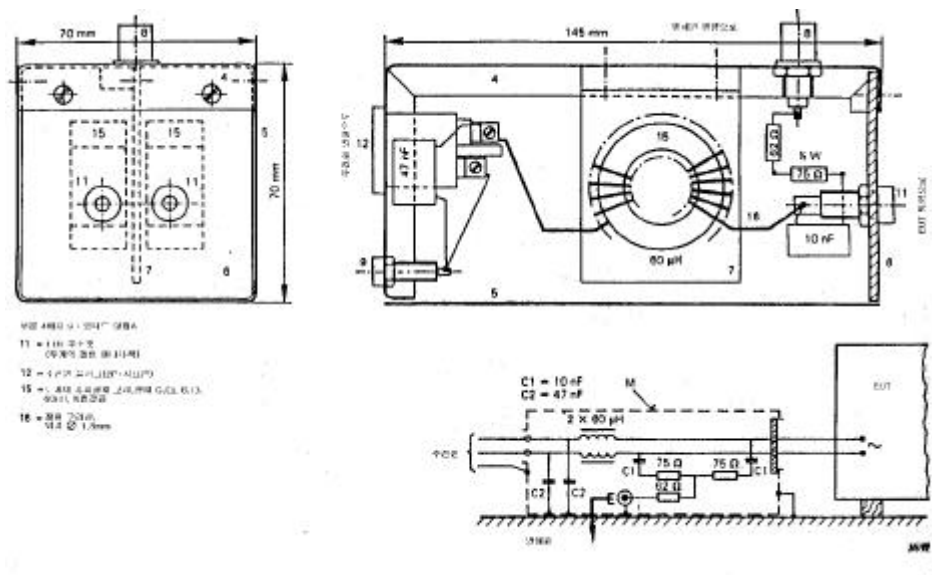
$R_0 = 2.2 \text{ k}\Omega$ 배압, 자기
 $= 470 \text{ k}\Omega$ 맥압, 크리스탈
 $= 600 \Omega$ 마이크로폰
 $= 47 \text{ k}\Omega$ 둘 주 기
 $= 47 \text{ k}\Omega$ 터미드 녹음기
 $= 47 \text{ k}\Omega$ 가변주파수 업렉
 $= \infty$ 가변주파수 다운



23 -

A

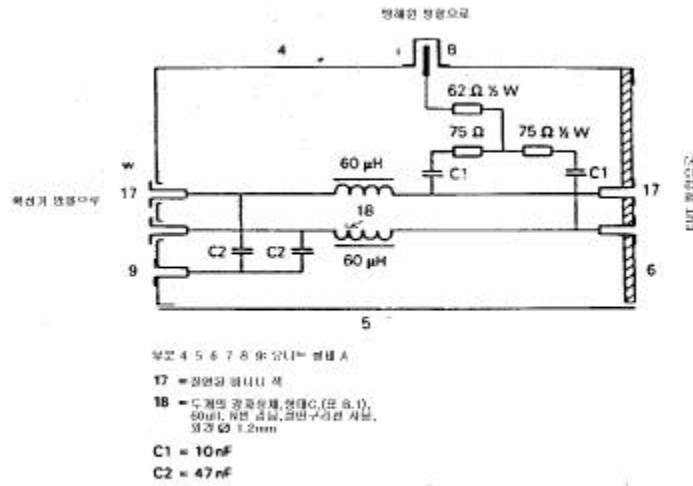
(B.1)



24-

M

(B.1)

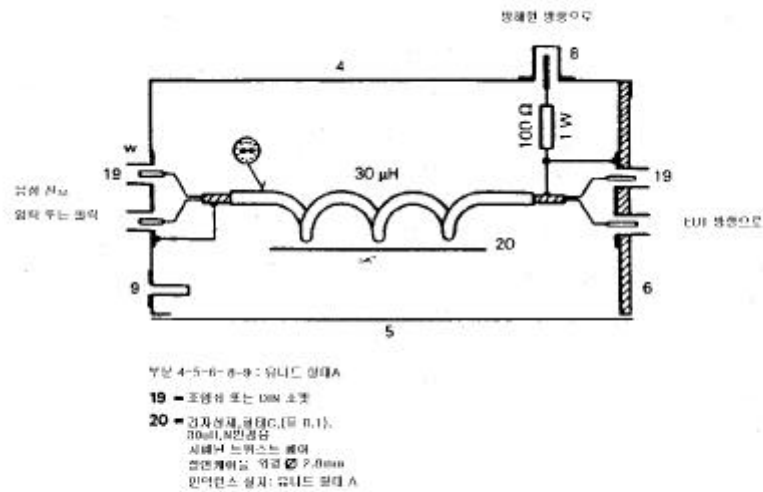


582/89

25 -

L

(B.1)

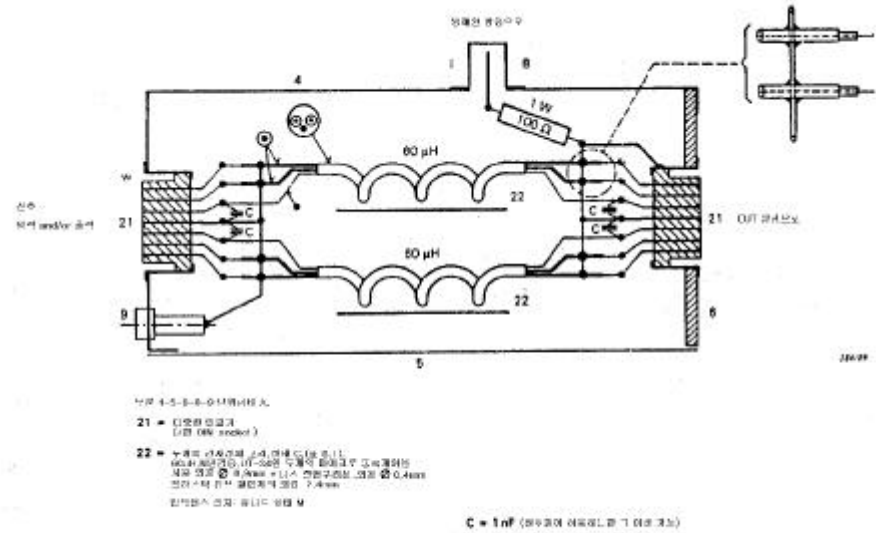


582/89

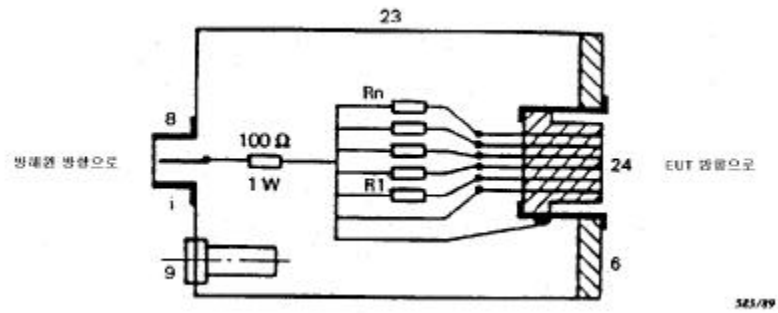
26 -

Sr

(B.1)



27 - , , Sw
(B.1)



부록 6-8-9: 유니트 형태 A

23 = 금속 케이스 100 mm x 55 mm x 55 mm

24 = 내국인 연봉기 또는 DDM 또는 연봉 TV 소켓

R1 ... Rn = 권역 부하 지점

Examples: 음전 강제 결속 단위 &

미명(자계) : $2 \times 2.2 \text{ k}\Omega$

복합(크리스탈) : 2 x 470 kΩ

매이그루폰 : $2 \times 600 \Omega$

동조기 : 2 x 47kΩ

테이TM 녹말계 : 4 x 47 kΩ

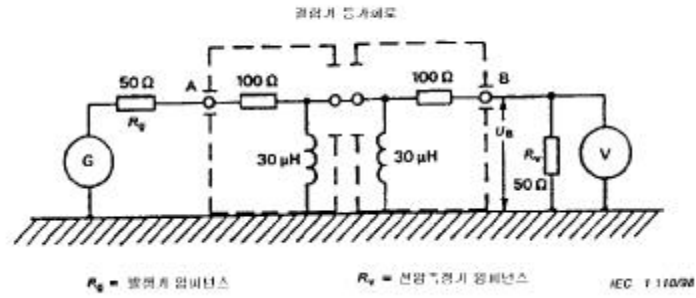
規格 型/番號： 4 x 47 kΩ

$$28 - \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = 27 \quad (B.1)$$

30MHz	150MHz	9,6 dB	12,6 dB	UGUB
				. UG

가

- 2 (10mm) .



UG/UB

30MHz 150MHz

9,6 dB 12,6 dB

. UG

가

- 2

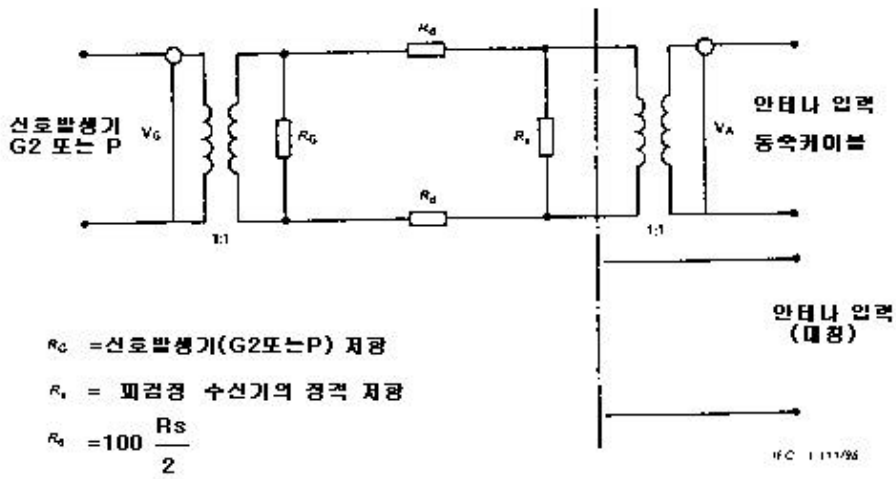
(10mm)

29 -

30MHz

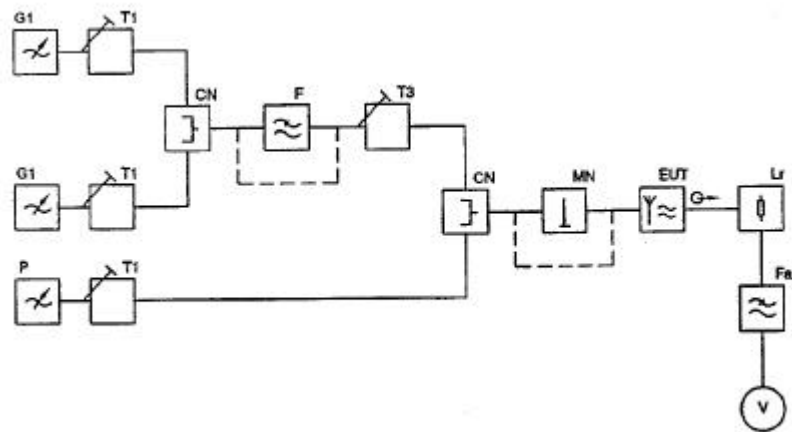
150MHz

(B.2)



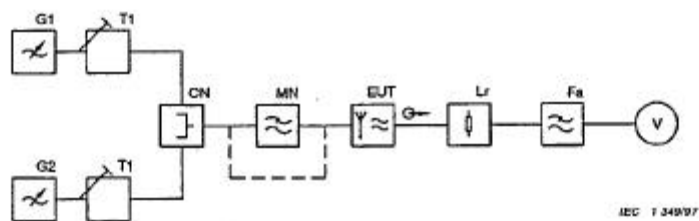
30 -

(DN)(5.5.3)



31 - TV

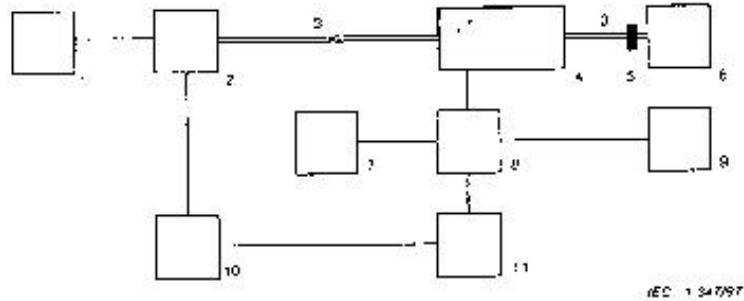
(5.6.2.1)



32 - FM

(5.6.3.1)

(5.6.4 5.6.5)



- 1 공대 발생기
- 2 신호 감쇠기
- 3 측정 케이블
- 4 수신기
- 5 고주파 연결기
- 6 피검체 수신기
- 7 정전압 부하
- 8 동축 전송 스위치
- 9 방전 발생기
- 10 정전압
- 11 변수 감쇠기

33 - TV

(5.7.1)

31 32

P = TV

G1 =

G2 =

Lr =

Fa = 15kHz(IEC 60315-4)

V = - (CCIR 468 가)

CN =

T1 = 가 (P, G1 G2 가)

MN = /

EUT =

F =

T3 = 가

*

CISPR 20 IEC : 1998

A
()

A.1 TEM

, TEM U_{in} h
 E :

$$E = \frac{U_{in}}{h}$$

TEM h_1
가 .

$$h_1 = \frac{U_{in}}{E}$$

(1 ≤ λ / 4)

CISPR 20 IEC : 1998

B
()

150kHz 150MHz RF

B.1 (23 28)

,

1.5MHz 150MHz
150kHz 30MHz
B.4

150 가

12 L RF
L/C2 AC-DC
C1 C2 50 Ω 가
RF 100 Ω C1(
)

:

A: RF
RF 23

M: 24

L: 25

Sw: ,

CISPR 20 IEC : 1998

가 가

26

(27).

Sr: 가 28

26 27

가 가 가 가

(

)

:

a) $150\ \Omega$ 가 (G1+Am+T2

) 가 $50\ \Omega$,

$100\ \Omega$ 가 (A) $100\ \Omega$

(M) $100\ \Omega$ 가

$150\ \Omega$

b) RF RF

c) (A)

(,)

10dB

30cm

B.2

30MHz , (150 Ω RF)
 $150 \Omega \pm 20 \Omega$ $\pm 20^\circ$ 가 .(
 CISPR 150 Ω .)

A S
 M L

30MHz 150MHz ,
 50 Ω .
 29 .

- 30 μH 2 \times 60 μH 23 28
 , a) b) 1.5MHz 150MHz
 .

B.3 (F)

TEM (: 8 10) (: 14
 20 .

(F)
 (F) MHz
 가 .

- - (

50 가 RF -
 - (A) TEM
 IF

CISPR 20 IEC : 1998

,

.

(G1+Am+F)

RF

(T2)

10dB

(F)

B.4 150kHz 30MHz

1)

A

23

,

280 μ H

.

280 μ H

:

C(B.1),

.

:

280 μ H

N ,

UT- 34,

0.9mm:

:

,

1.5mm.

2)

M

24

,

560 μ H

C1=0.1 μ F

C2=0.47 μ F.

560 μ H

: 2

C(B.1),

.

: 560 μ H

N ,

1.5mm.

3)

L

25

,

560 μ H

C1=0.1 μ F

C2=0.47 μ F.

560 μ H

: 1

C(B.1).

: 560 μ H

N ,

0.4mm.

4) AF

Sw

CISPR 20 IEC : 1998

26 , 280 μ H 가 , 1)
AF 2.1mm .

가 , 1)
A .

5) AF Sw

27 , 560 μ H 가 ,
2) . 3 가
1.5mm 0.6mm -
UT - 20 0.3mm .

B.1 -

	C
	/
mm	40 \pm 10
mm ²	200 \pm 30
	50 200
	60 MHz 50% 100 MHz 75%
mT	> 300

-

:

$$N = \sqrt{\frac{L}{A_L}}$$

L [μ H]
N
AL [μ H/N²] .

C ()

150 kHz 1GHz

- :
- IF :
- :
- .

C.1

C.1

a)

가 .

b)

(F) B.3
. (5 .)

c)

3 6 (F)
.

d)

(Fc) 가
. (,)

e)

(D)가
IF
, 가 .

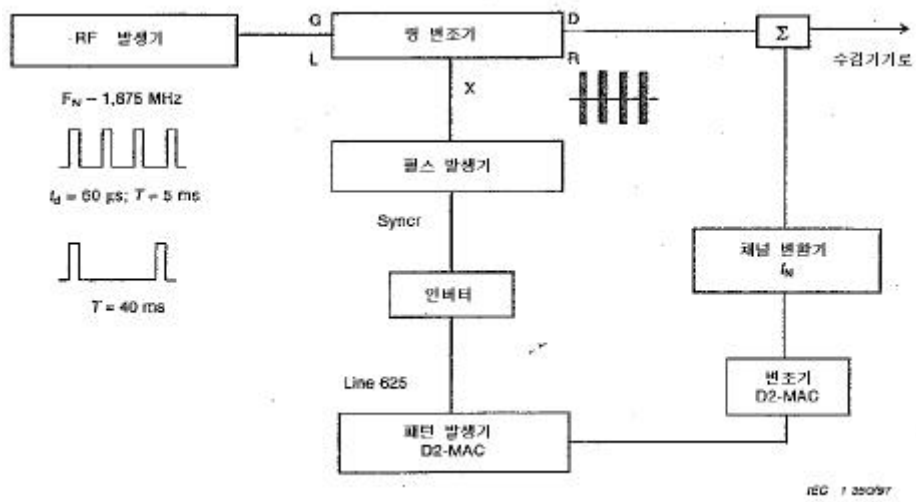
CISPR 20 IEC : 1998

C.1 - 150kHz- 150MHz , B,
G/PAL (IF:32- 40MHz; I:47- 68MHz;
III:174- 230MHz; :104- 174MHz)

		(G1)	Am	F		Fc d)
1	I (47- 68 MHz)				I 2) 3)	가 d)
2						가 d)
3	IF (32- 40MHz)	32- 40MHz		0- 47MHz c)	I 2) 3)	e)
4		150MHz 가		0- 30MHz b)	I 2) 3)	e)
5	a)	6- 30MHz		0- 30MHz b)	I 2) 3)	e)
6	a)	40- 47MHz		0- 47MHz c)	I 2) 3)	e)
7	a)	68- 150MHz		0- 150MHz c)	I 2) 3)	e)
1) 2) I III 3) IV V IV- V						

D
()

G



D.1 - G

(4.2.1)

IEC 61000-4-4 EFT

가 MIL-461Std
IEC 61000-4
MIL
1- 5V/m , IEC
1- 10V/m
1996 1 CE mark
, MIL-STD, 10
,

1.

IEC 61000-4

1-1. IEC 61000-4-2(ESD)

IEC 61000-4-5(Surge) 가
가 .

1-2. IEC 1000-4-3(Radiated RF Immunity)

GTEM Cell ,
IEC 61000-4-3 80cm
1.5m x 1.5m 6dB ,
80cm
가 가
가

가
 .
 30%
 GTEM Cell
 ,
 . IEC 61000-4-3
 GTEM Cell 30%
 IEC 61000-4-3
 가 가
 .

1-3. IEC 61000-4-4, EFT(Electric Fast Transient)

가 가
 .
 IEC 61000-4-4
 3가
 .
 - Level
 , IEC 61000-4-4, Level 3 가
 . CISPR 1kV
 .
 - DC adaptor DC 가 , AC
 DC Coupler 가
 .
 ISM Level 4 가
 가 , 가
 Level 3 가 가
 .
 Level
 .
 - IEC 61000-4-4 가
 3 .

1-4. IEC 61000-4-5(Surge)

가 ,

가 가

2.5 가

(MOV)

IEC 61000-4-5 100%

IEC 61000-4-5 가

가 (MOV) 1

Surge

가 가

Arrestor

3

가

가 , , , 가 가 ,

가

1- 5. IEC 61000-4-6(RF Conducted)

가 (9kHz- 150kHz)

(10V) , 가 가

가

MIL- STD Inductive Coupler ,

Capacitive Coupling 가

1- 6. IEC 1000-4-8(Power frequency field)

가

IEC 1000-4-3

가 (60Hz)

가 IEC

1- 7.

IEC 1000- 4 9- 12

IEC 1000- 4- 11 ,

10,12

IEC 1000- 4- 12 IEC

1000- 4- 5

1- 8. ,

IEC

Competent body

2.

가

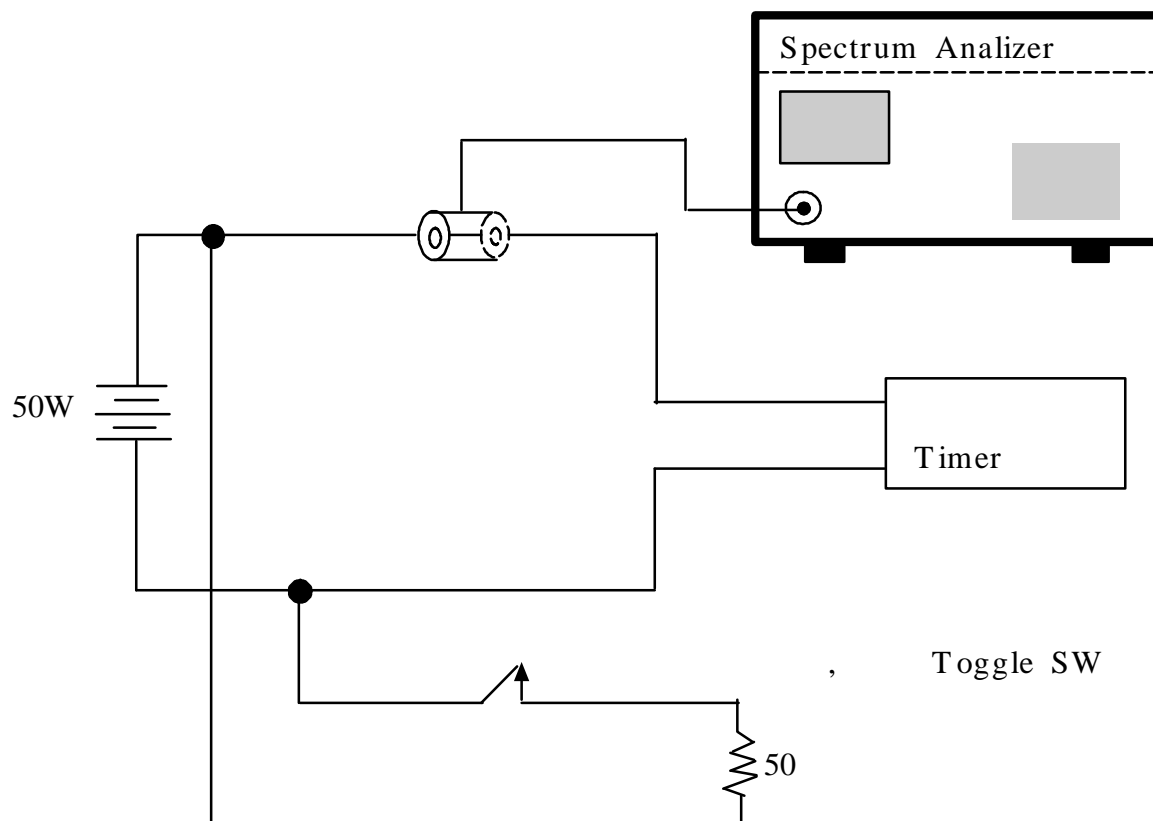
가 IEC 1000- 4- 4, EFT

EFT

Transient

가

1.



	Transient	Spectrum	Max. Hold	IEC
1000- 4- 4	Level 2		.	
2.	IEC 1000- 4- 4, Level 2	spectrum		
3.			spectrum	
4.			spectrum	
5. AC		EFT	spectrum	
2	IEC 1000- 4- 4, Level 2		200MHz	
,	()	1		
3				
	Lvel 2	,	600MHz	
4				
	가	250MHz	.	
5 AC			EFT	
. DC	EFT	AC	.	
			.	
	가			
			가 IEC 1000- 4- 4가	
가		SMPS		EFT
900V	.			
			가	
		Level 4(	4kV EFT	3kV- 3.5kV)
	.			
		가		
	.			

3.

Transient

IEC 1000- 4- 4, Level

- 가 : Level 3 (2kV, 1kV)
- : (3kV, 1.5kV)
- : Level 4 (4kV, 2kV)

IEC 1000- 4- 4

가 Level 2(1kV)

EFT

/

IEC

1000- 4- 4, Level

IEC 1000- 4- 4, Electric Fast Transient

	IEC			
Level 1	0.5kV	0.25kV	1kV	0.5kV
2	1kV	0.5kV	2kV	1kV
3	2kV	1kV	3kV	1.5kV
4	4kV	2kV	4kV	2kV

IEC 1000- 4- 3(RS), 5(Surge)

가 . ;

IEC 1000- 4- 3 :

1) 0.8m ,

가

2)

GTEM Cell

Anechoic chamber

GTEM Cell

3) CISPR 24-3, IEC 1000-4-3

IEC 1000-4-5 :

- 1) 가 .
- 2) .

IEC 1000-4-8 :

IEC 1000-4-11 :

IEC 1000-4-12 :

IEC 1000-4 Series :

EN , CB가
 , CB CE
 , IEC 가
 /

Summary of the uncertainty on the IEC 1000-4 Series

IEC 1000-4	Uncertainty	Recommended solutions
IEC 1000-4-3 (RF Radiated)	<ul style="list-style-type: none"> - Area of uniform field 1.5m x 1.5m on 0.8m height - Bottom and upper area Cable (I/O, Power line) layout 	<ul style="list-style-type: none"> - Changed the direction of the main lobe. - Front edge of antenna moving method for weak side and weak frequency band. - Re-test by GTEM CELL - Neglect the height, 0.8m
IEC 1000-4-4 (EFT)	<ul style="list-style-type: none"> - Applied level on requirement is lower than malfunction level on site. - Normally level 2 is applied for most of electric/electronics equipment. 	<ul style="list-style-type: none"> - increase the applied level ISM : Level 4 Home appliances : Level 3 *It's very important for against malfunction on the site and have a tight correlation
IEC 1000-4-5 (Surge)	<ul style="list-style-type: none"> - Having a problem for clamping component, Varistor(MOV) - Applied voltage - Applied current - Even so, EUT had passed on the test lab. but, most of clamping component burn out when actual lightning imposed on the line. 	<ul style="list-style-type: none"> - MOV + Arrestor - Current is important better than voltage Ideal imposed voltage is slightly higher voltage than 2.5 times of operating voltage - Changing the absorbing components
IEC 1000-4-8 (Power frequency, 60Hz magnetic field)	<ul style="list-style-type: none"> - Not applied for all display equipments (CRT monitor, magnetic sensitive equipment) 	<ul style="list-style-type: none"> - Should be applied for all display unit
IEC 1000-4-11 (Dip. & Inter.)	<ul style="list-style-type: none"> - Applied for certain facilities 	<ul style="list-style-type: none"> - Widen its applied domain for the most of analog (power) equipments
EMS generals	<ul style="list-style-type: none"> - Not defined the how applied, what level for each component & system on IEC 	<ul style="list-style-type: none"> - Recommend for the forced test series on view of the weakness

Summary of the proposed countermeasuring methodology against EMS & new emission requirements

IEC		CENELEC	
801- 2	1000- 4- 2	EN 6100- 4- 2 (EN55024- 2)	가 ,
801- 3	1000- 4- 3	EN 50140 (EN55024- 3)	가 , I/O , Ground Loop
801- 4	1000- 4- 4	EN 6100- 4- 4 (EN55024- 4)	EFT , Cy
801- 5	1000- 4- 5	EN 6100- 4- 5 (EN55024- 5)	, TNR, Zenner
801- 6	1000- 4- 6	EN 50141 (EN55024- 6)	,
	1000- 4- 7	---	
	1000- 4- 8	EN 6100- 4- 8	, ,
	1000- 4- 9	EN 6100- 4- 9	, I/O, ,
	1000- 4- 10	EN 6100- 4- 10	, I/O,
	1000- 4- 11	EN 6100- 4- 11	가 , , S/W
	1000- 4- 12	---	가 , ()
555- 2	1000- 3- 2	EN60555- 2 (EN50081- 1)	Active (, SCR PWM
555- 3	1000- 3- 3	EN60555- 3 (EN50081- 2)	가 .

TV

: () CS

: ()

· Digital

가

,

Digital TV

,

.

(, Digital Device

, IEC() ,CISPR(:),

FCC(:)

.

, DIGITAL TV

,

.)

1.

1-1

가 , Interactive Service가 가
MEDIA
.
가
가
Contents S/W, Service
가 가 .
 ,
TV(HDTV: High Definition Television) 가 , Program
 , Interactive Choices(, Internet)가 가 .
 , Digital Noise Ghost
가 , Digital (HD)TV 多
가 , Digital Network 가
Interactive Service 가 .

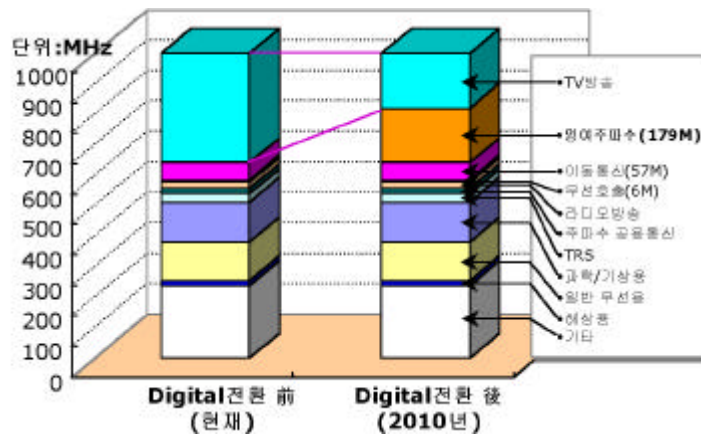
1-2 Analog TV Digital TV

TV 4:3 ,
TV (TV 5), (5.1 Surround) 16:9
Wide Service
1 (6MHz) 1
가 , 가 TV
1 (6MHz) 4~6 가
 , Interactive 가 ,
Internet 가
가 .
 , TV
가 .

1-3.

가 , 가 .
-

10 3.2 GHz *1
Digital 時(Analog Off) Analog 50%
가가 가 .



* :

(98/12/31)

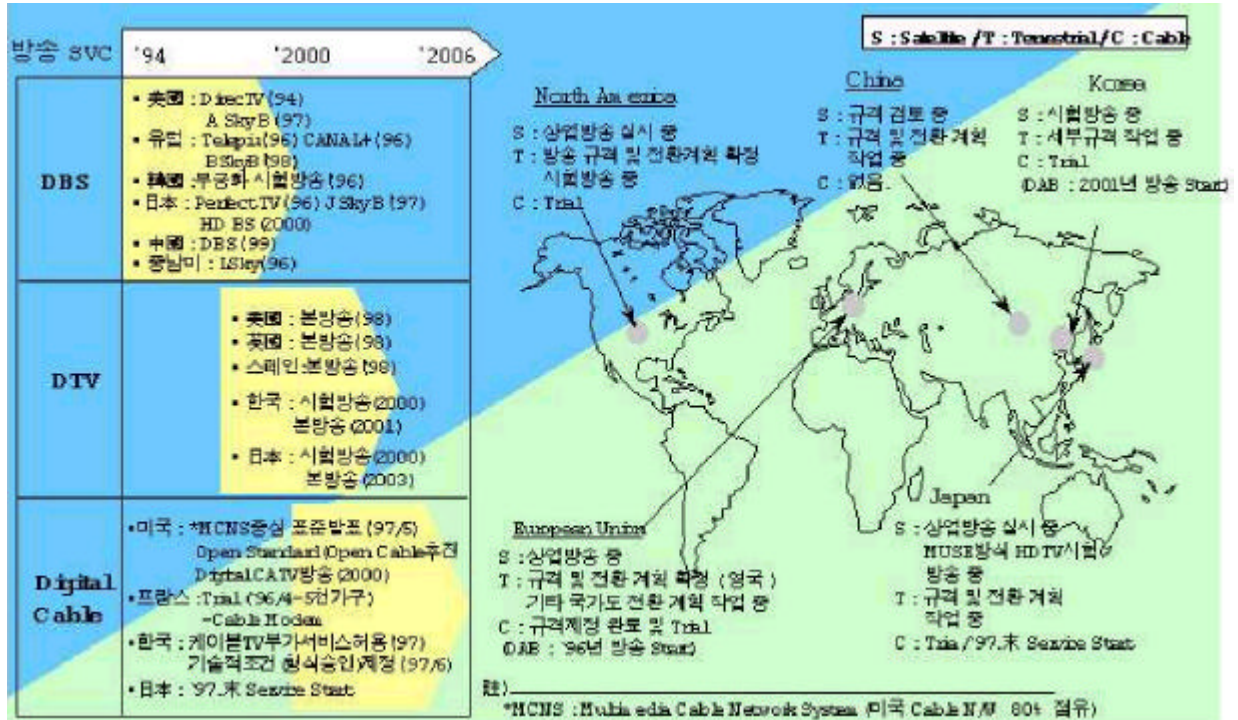
- Digital : 低 Cover 가 , Analog Taboo 가
(Digital 例)
- 12 주 Digital
- 5 주 Cover가
- Analog 700 (84)

2.

2- 1

Satellite, Terrestrial, Cable 3

DIGITAL



< DIGITAL >

2- 2.

—

HDTV DTV

HDTV	DTV	FCC7	1996	12	24
------	-----	------	------	----	----

DTV 가 , TV

TV

가 30% 10 4 .

18 (1996 12) TV

10 (Network

Affiliate) 1999 5 1 . TV 가

53% 11~30

11 1 . NTSC

2006 2 DTV

- -

TV

[]

, OFDM

[BST- OFDM(ISDB- T)]

ISDB- T QPSK, 64QAM OFDM

TV

(ISDB)

, 6/14MHz 429KHz

13 가

1999

TV , ANALOG 2010

.

* *

- -

가 DTV DVB- T

TV 1995 8 DVB (47)

DTG 1998 11

HDTV SDTV

.

TV BBC, ITV(), BDB()

) SND 가

1998 9

, ([Hertz])

(Switching OFF) 2020

TV ITV 34% [On

Digital] 1998 11 15

.

- -

TV

CANAL+ TPS

가 100

.

TV

가
2002 . , 99 TF1
TF2 (TF1 TV
) .

- -
Digital TV
DTG, 8K- IG, EBU 가 , 125 가
가 .
TV ,
TV , DVB 가
TV
TV 2000 .

- -
가 . 1998 1
가 60 .
99 . ,
가 .
10

Telia (가)
STB ECCA ,
CA ViAccess, OS Open TV .

- -
97 TV 가
TV
99 .

- -
TV

[illegible]

3. ()

*

FCC

*

:

.

3-1 FCC

(Federal Communications Commion)

.

(EMI)

.

, , ,

가

.

FCC

가 FCC

.

FCC

,

, TV,

,

FCC

OET(Office of Engineering and Technology)

.

FCC

<http://www.fcc.gov>

OET

<http://www.fcc.gov/oet>

3-2

FCC

CFR(Code of Federal Register) Title 47

(Telecommunications)

, Part

.

Part 2	Frequency Allocations and Radio Treat Matters; General Rules and Regulations
Part 15	Radio Frequency Devices
Part 18	Industrial, Scientific and Medical equipment
Part 95	Personal Radio Services
<p>* Note : CFR 47 Part 0 100 , http://www.fcc.gov/oet/info/rules</p> <p>CFR 47, Part 2 Adobe PDF (1998 10)</p> <p>CFR 47, Part 15 Word Perfect (1999 3)</p> <p>CFR 47, Part 18 Adobe PDF (1998 10)</p>	

CFR 47 Part 15, 18, 95

FCC

.

,

,

(FM,TV,VCR), CB

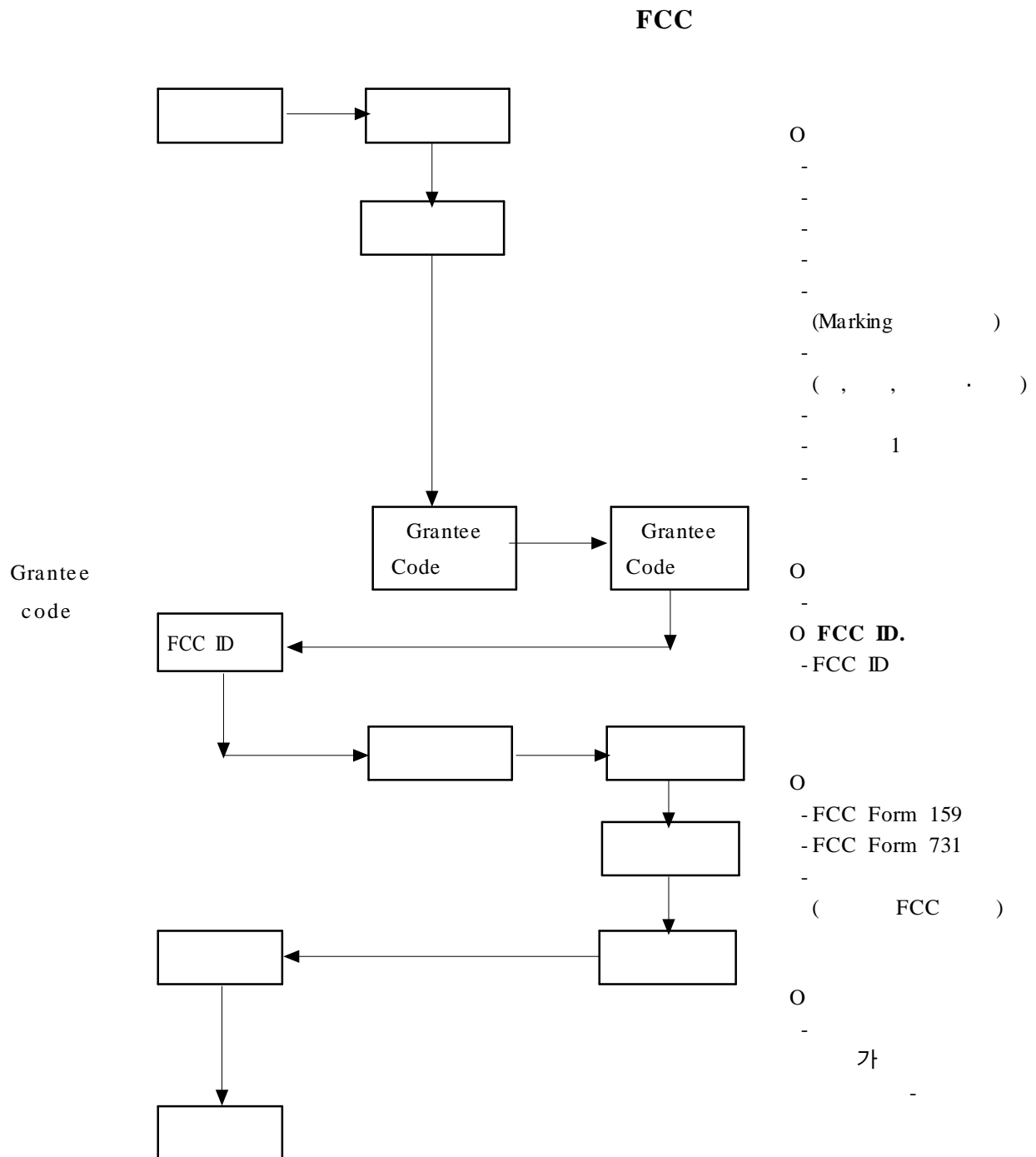
.

.

FCC**- Effective on October 5, 1998**

Type of Device	Authorization Required	Remark
Intentional Radiator(carrier current system, Tunnel radio system, Cable locating equipment)	Verification	Part 15
Other Intentional Radiator	Certification	
TV Broadcast Receiver	Verification	
FM Broadcast Receiver	Verification	
CB Receiver	DoC or Certification	
Superregenerative receiver	DoC or Certification	
Scanning receiver.....	Certification	
All other receivers subject to part 15	DoC or Certification	
TV interface device	DoC or Certification	
Cable system terminal device	DoC	
Stand-alone cable input selector switch	Verification	
Class B personal computers and peripherals	DoC or Certification	
CPU boards and internal power supplies used with Class B personal computers	DoC or Certification	
Class B personal computers assembled using authorized CPU boards or power supplies	DoC	
Class B external switching power supplies	Verification	
Other Class B digital devices & peripherals	Verification	
Class A digital devices, peripherals & external switching power supplies.....	Verification	
All other devies.....	Verification	
Consumer ISM equipment	DoC or Certification	Part 18
Consumer ultrasonic equipment generating less than 500Watts and operating below 90kHz	Verification	
Non consumer equipment	Verification	

Certification, Verification



가.

FCC ANSI 63.4- 1992 , FCC

FCC
, FCC 가

. *Grantee Code* (FCC)

Grantee code 2가

1)

2) FCC form 159 (\$45.00) FCC

3~4 FCC

Grantee code ,

grantee code , 가

FCC 5 가

Grantee Code

가

FCC ID

FCC

FCC ID

. FCC ID

, FCC ID 가

()

FCC ID Grantee code Equipment Product code ,

Grantee code FCC 3

, Equipment Product Code 14 ,

, (" - ") 가

FCC Grantee Code Equipment Product Code

FCC ID

() FCC ID. : X3YARILANG- 1

Grantee Code : FCC 3 (X3Y)

Equipment Product Code : , (“ ”)

14 가 (ARILANG- 1)

Grantee Code <https://gulfoss.fcc.gov/prod/oet/>

.

FCC (FCC Form 731)

FCC

.

FCC Form 731

Fee Type Codd

.

FCC (http://www.fcc.gov)

(Electronics Filing)

. FCC

,

/

40

60

.

FCC 가

Form 731 Confirmation Number

Number FCC ID

가

FCC

.

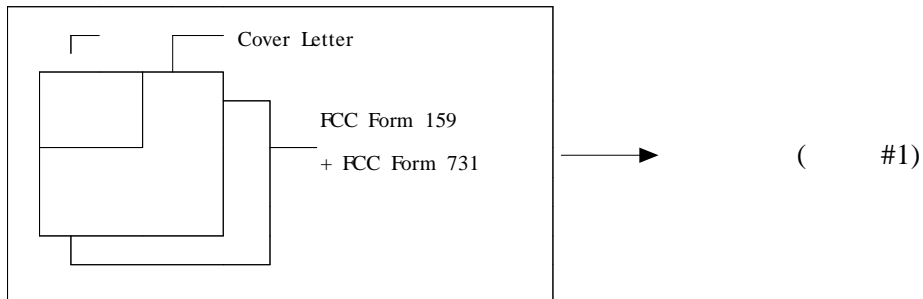
FCC , Code

<Effective on September 14, 1998>

TYPE OF APPLICATION	FCC FORM NUMBER	FCC AMOUNT	FEE TYPE CODE
1. Certification			
a. All Receivers(except TV and FM)	731 & 159	\$365.00	EEC
b. Devices under Parts 11, 15 and 18 (except receivers)	731 & 159	\$940.00	EGC
c. All Other Devices	731 & 159	\$475.00	EFT
d. Modification and Class II Permissive Changes.	731 & 159	\$45.00	EAC
d. Request for confidentiality	731 & 159	\$135.00	EBC
2. Advance Approval for Subscription			
TV System	159 & Corres,	\$2885.00	EIS
a. Request for confidentiality	159 & Corres,	\$135.00	EBS
3. Assignment of Applicant code			
a. New Applicants for all Application Types except Subscription TV	159 & Corres.	\$45.00	EAG
<p>4. FCC</p> <p>Federal Communications Commission, Equipment Authorization Branch 7435 Oakland Mills Road Columbia, MD 21046 Tel : (301) 725-1585, Fax : (301) 344-2050, URL : http://www.fcc.gov/oet</p> <p>- Equipment authorization policy : Rich Fabina mailto:rfabina@fcc.gov - Status of a pending application : Bette Taube mailto:btaube@fcc.gov - Importation : Ray LaForge mailto:rlaforge@fcc.gov - Testing techniques : Greg Czumak mailto:gczumak@fcc.gov</p>			

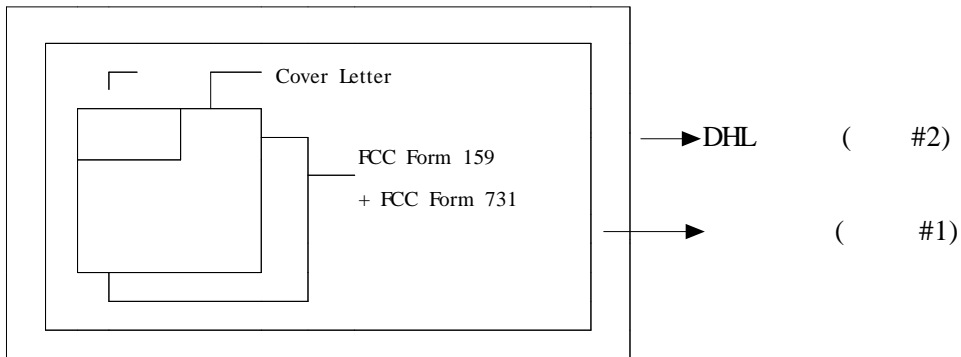
FCC

(Mail)



(Courier)

- DHL, UPS, Federal Express .



- # 1 -

TO : Federal Communications Commission
EQUIPMENT APPROVAL SERVICES
P.O. Box 358315
Pittsburgh, PA 15251- 5315

- # 2 -

TO : Federal Communications Commission
c/o Mellon Bank
Three Mellon Bank Center
525 William Penn Way
27th Floor, Room 153- 2713
Pittsburgh, PA 15259- 0001
Attn. : Wholesale Lockbox Shift Supervisor

FCC Marking

1. Labelling

1- 1. Certification Verification

i) 가 (, FM, TV)

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

ii) Stand- alone cable input selector switch (CATV)

This device is verified to comply with part 15 of the FCC Rules for use with cable television service.

iii) TV Interface Devices Transfer switch가

This device is intended to be a receiver that is not used to receiver over-the air broadcast signals. Connection of this device in any other fashion may cause harmful interference to radio communications and is in violation of the FCC Rules, Part 15.

iv) Cordless Telephone System

"Privacy of communications may not be ensured when using this phone"

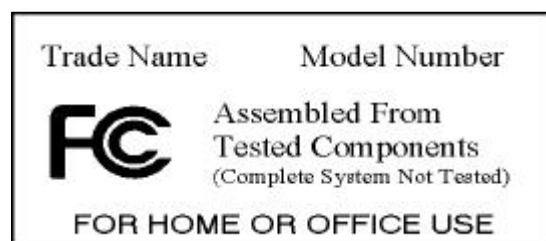
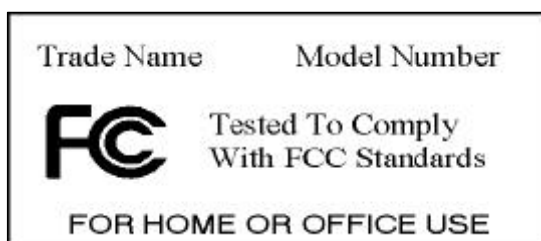
v)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1- 2. Declaration of Conformity

i) Product system : 1

ii) (assembly) : 2



2.

2- 1. Certification Verification

i)

Caution : Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

ii) Class B Digital Device

Note : This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

iii) Class A Digital Device

Note : This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2- 2. Declaration of Conformity

i) Product system

- (; Name and Model name)
- FCC Part 15 (Statement)
- (Responsible Party) ,

ii) (assembly)

- (; Name, Model name, FCC ID.)
- FCC Part 15 (Statement)
- (Responsible Party) ,
- (Compliance Information

Statements)

3- 4.

FCC

3가

CERTIFICATION

FCC filing

FCC

FCC ID.

FCC

NVLAP(National Voluntary Laboratory Accreditation Program)

, NIST(The National Institute of Standards and Technology) NVLAP(National Voluntary Laboratory Accreditation Program) (Accreditation Laboratory) FCC

가

DoC(Declaration of Conformity)

가 ,

FCC ID.

DoC

FCC

FCC

1998 10 FCC DoC Digital Device

NVLAP

MRA

DoC

MRA

NIST NVLAP

<http://ts.nist.gov/ts/htdocs/210/214/214.htm>

VERIFICATION

Noise Level

가

FCC

가 , FCC ID

NIST NVLAP

<http://ts.nist.gov/ts/htdocs/210/214/214.htm>

3- 5 2000 FCC

(FCC)

2000 4 TCB(Technical Competent Body) Certification / Registration

TCB Lab.

3- 6 FCC CISPR

항 목	FCC 규격	CISPR 규격	비 고
Conducted Emission	0.45 ~ 30 MHz : 48.0 dBμV/m	0.15 ~ 0.5 MHz : 66 to 56 (QP) 56 to 46 (QP) 0.50 ~ 5 MHz : 56(QP), 46(QP) 5 ~ 30 MHz : 60(QP), 50(QP)	FCC P.15, P.18 규정을 CISPR 22 기준과 동일 (CLASS B) FCC C/E 규정변경사점 적용 : 2000.19.13
Radiated Emission	30 ~ 88 MHz : 40.0 dBμV/m 88 ~ 216 MHz : 43.5 dBμV/m 216 ~ 960 MHz : 46.0 dBμV/m	Television Channel Freq. 300MHz 이하 (단위: dBμV/m) Fundamental 57 Harmonics 80 to 300MHz : 52 300 to 1GHz : 56 Television Channel Freq. 300MHz ~ 1GHz (단위: dBμV/m) Fundamental 56 Harmonics 80 to 300MHz : 52 300 to 1GHz : 56 Others 121.5MHz : 40 243.0MHz : 47	FCC P.15 규정을 CISPR 13과 비교한 것임 측정 Freq. 1GHz 이상 QP값 시험 중 Limit Over 되는 Point 에서 AV 값 차이가 6dB 이상이면 OK 됨.

4.

Digital TV

CISPR FCC

가

1.

EMC Shielded Enclosure
1968 Mendes
EM Immunity
EMI, EMC
가 EMI
EM Immunity
가
가
EMI EMS
96
CISPR 97 Yokosuka
가
NWIP(New Work Item Proposal)
.
.
o
o Random Polarization
o Uniformity
Anechoic Chamber
(, ,) 가
, EUT 가

EUT

가 . 가 ,
.

o EMI EUT
,
Anechoic Chamber .

o 가 가 EUT
가가 ,
.

o Site
가 가
CISPR
.

가 .

2. IEC/CISPR TC77

CISPR- A TC77 . CISPR- A

가

, TC77

IEC61000-4-4

가

.

가. 77B/260/CD

- IEC/TC : SC 77B
- Project number : 61000-4-21 Ed. 1
- SC77B : High Frequency phenomena
- : '99. 2. 26
- comment : '99. 6. 30
- Ref. document : 77B(UK)2/NP
- Secretary : Marcel DELAPLACE

o : **Draft 61000-4-21** : Electromagnetic compatibility
(EMC) - Part 4-21 : -

Reverberation chambers

o note :

- CISPR/A SC 77B JTF
(Joint Task Force) .
- CISPR/A
CISPR Pub. 16-1 (PNW CISPR/A/242/NP, Ed. 1.0)
- SC 77B

o Draft 61000-4-21 contents

Foreword

Introduction

Clauses

1. Scope
2. Normative references
3. General
4. Definitions
5. Test levels
6. Test equipment
7. Test set- up
8. Test Procedure
9. Test results and test report

Annexes

- A (informative) Rever. Chamber Design Considerations
- B (normative) Reverberation Chamber Calibration
- C (normative) Immunity Testing Procedures
- D (normative) Emission Testing Procedures
- E (normative) Shielding Effectiveness Meas. Procedures
- F (informative) Additional References

International Electromagnetical Commission

Electromagnetic Compatibility(EMC)

Part 4: Testing and measurement techniques-

Section 21 : Reverberation Chamber Test Methods

[Introduction]

IEC 61000

Part 1 : (General)

(,)

,

Part 2 :

Part 3 :

Part 4 :

Part 5 : 가

Part 6 :

Part 9 : Miscellaneous

Emission

Immunity

1)

IEC 61000-4-21 section EMC

section

RF

가

가

RF

section

IEC

(EH

)가

2)

o Reverberation Chamber

- mechanical stirrer가 shielded enclosure.

- Reverberation chamber, stirrer가 enclosure mode stir .

- Chamber stirred-mode mode-stirred chamber

(0.75), (0.9) .

o Reverberation chamber Q (BW_Q)

가

$$BW_Q$$

$$BW_Q = f/Q$$

3) Test levels

.

.

chamber ,
stirrer

annex A

.

200 MHz 18 GHz

.

200 MHz

chamber가 .

80 MHz .

4)

o Reverberation Chamber : 가

(multi- mode)

o Mechanical tuner(s)/stirrer(s) : 가

1/4 가
stirrer chamber 가
, 가 chamber 가
3/4 가 .
가 stirrer
field 가 가
.

o Field generating (annex B) :

test volume

.
.

o Field strength reference antenna(annex B) :

가 .
.

o Isotropic field strength monitoring probe(annex B) :

가 0.1
가 .

o Field strength monitoring antenna : 0.1

3 . feed line balance
가 .

o EMI filter

가 resonance

.

o RF : cover ,

80% depth 1kHz AM 가 가 ,

1.5×10^{-3} decade/s sweep

RF synthesizer step dwell

o power :

15dB 가 .

5) Test set-up

.

6)

o EUT .

o chamber .

o EUT 가 가

.

7)

,

.

- EUT size

- EUT

- EUT가 (tabletop) (floor- standing)

가

(0.1m 1m)

-
-
- sweep rate, dwell time, step
-
- , EUT interface

- 가
- EUT

(IEC 68- 1)

- o : 15- 35
- o : 25- 75 %
- o : 86- 106 kPa

A(informative)

A.1

, stirrer . stirrer가
가
 .
RF
multi- mode stirrer , stirrer
'isotropic' 'uniform' .

stirrer

가

stirrer 가 .

stepping- motor가 . 가 .

EUT stirrer .

stirrer 가 section3 .

B (normative)

Reverberation chamber

(1) EUT가 IEC

1 , EUT (3)

.

1)

. ().

1

.

.

. 1

.

.(2)

. 가 (f_o) ,

P_{input} RF

가 .

chamber RF 가 20dB
 .
 . (mode- stirred operation)
 360 ° (mode- tuned operation).
 1
 1
 가 가
 .
 .
 . ($P_{\max - rec}$, $P_{ave - rec}$) ($P_{\max - rec}$, $P_{ave - rec}$)
 , dBm watts)
 tuner
 ($E_{\max_{x,y,z}}$)
 (P_{input})
 1 10fo
 . 1 (8) , 10fo
 8
 . 10fo 가
 가 가
 가 clearness
 1

. 10 fo

a)

$$\cdot \qquad \qquad \qquad < E_{\max_{x,y,z}} >$$

,

$$<E_{\max}>_{probes}$$

.

$$<E_{\max_x}>_{probe} = (\sum E_{\max_x})/8$$

$$<E_{\max_y}>_{probe} = (\sum E_{\max_y})/8$$

$$<E_{\max_z}>_{probe} = (\sum E_{\max_z})/8$$

$$<E_{\max}>_{probe} = (\sum E_{\max})/24$$

b)

paddle wheel

8

.

.

.

$$\sigma = \sqrt{\frac{\sum (E_i - \langle E \rangle)^2}{n - 1}}$$

$$\mathbf{n} =$$

$$E_i =$$

$$\langle \mathbf{E} \rangle = \mathbf{E}$$

x

$$\sigma_x = \sqrt{\frac{\sum (E_{iX} - \langle E_X \rangle)^2}{7}}$$

$$E_{iX} = \mathbf{x}$$

$$\langle E_{iX} \rangle =$$

$$E_{X_{\max}}$$

$$\sigma_{total}=\sqrt{\frac{\sum(E_i-\langle E_{MAX}\rangle)^2}{23}}$$

$$E_i = \qquad \qquad \qquad (x, y, z)$$

$$\langle E_{Max}\rangle = \qquad \qquad \qquad E_{Max}$$

c)

가 1

fail

1) 10~50% () 가 .

2) ($P_{\neq t} = P_{input} - P_{reflected}$)

(normalize) .

3) step , 가

4) .

8

step .

$$10(f_o)$$

Empty Chamber ECCF(f) ,

ACF(f), Chamber (IL) .

$$ECCCF(f)=\frac{<E_{\max}x,y,z(f)>_{24meas}}{\sqrt{P_{input}(f)}}$$

$$ACF=\left<\frac{P_{ave,rec}(f)}{P_{input}(f)}\right>_8$$

$$IL=10*Log\left(\frac{<P_{\max,rec}(f)>_8}{P_{input}(f)}\right)$$

$$<E_{\max,x,y,z}(f)>_{24meas} \qquad \qquad \qquad 8 \qquad \qquad \qquad 3$$

$$<P_{averec}>_8 \qquad \qquad \qquad 8$$

$$<P_{\max,rec}>_8 \qquad \qquad \qquad 8$$

$$P_{input}(f) \qquad \qquad \qquad (v)$$

XI. 10(*f_o*)

Empty Chamber ECCF(f) ,

ACF(f), Chamber (IL) .

$$ECCCF(f)=\frac{<E_{\max}x,y,z(f)>_{3meas}}{\sqrt{P_{input}(f)}}$$

$$ACF=\frac{P_{ave,rec}(f)}{P_{input}(f)}$$

$$IL=10*Log\left(\frac{<P_{\max,rec}(f)>}{P_{input}(f)}\right)$$

$$<E_{\max,x,y,z}(f)>_{3meas} \qquad \qquad \qquad 3$$

$$\begin{aligned} & \cdot P_{ave,rec}(f) \\ & \cdot P_{max,rec}(f) \\ & \cdot P_{input}(f) \end{aligned} \tag{v}$$

(2) Empty Chamber

Empty Chamber

가

1GHz

가

1GHz

ECCF(f)

$$ECCF(f) = \frac{\frac{8\pi}{\lambda} \sqrt{5 * <P_{Max, Rec}>}}{\sqrt{\frac{P_{Input}(f)}{\eta_{rx}}}}$$

$< P_{Max, Rec}>$ aksd

$P_{input}(f)$ c.(1)(v)

η_{Rx}

0.75

0.9

가

(3)

EUT

가

.
 , EUT,
 1 .(2).
 .

. 가 (f_o)
 (P_{input}) RF
 $c(1)$
 RF
 20dB 가 .

. (mode- stirred operation) ,
 360. step (mode- tuned
 operation) .
 가 1
 1
 가 가
 .

.
 $(P_{max,rec}, P_{ave,rec})$
 (P_{input}) .
 $(P_{max,rec})$ 20dB
 가 .

.
 .
 .

(CCF(f)) .

$$CCF(f)=\frac{P_{ave,rec}}{P_{input}}\mid_{tp}(f)$$

$$\frac{P_{ave,rec}}{P_{input}}\mid_{tp}(f)\qquad\qquad\qquad(\quad)\qquad\qquad(P_{input}$$

forward)

.
CCF(f) EUT

가 normalised

.

. loading , CLF(f) .

$$CLF(f)=\frac{CCF(f)}{ACF(f)}$$

CCF(f) ()
. ACF(f) c.(1)

.
 $10*LOG(CLF(f))$ 10% 20dB

load 가 . (1)
가 .

(5) Q

c(2)

CCF(f)

Q

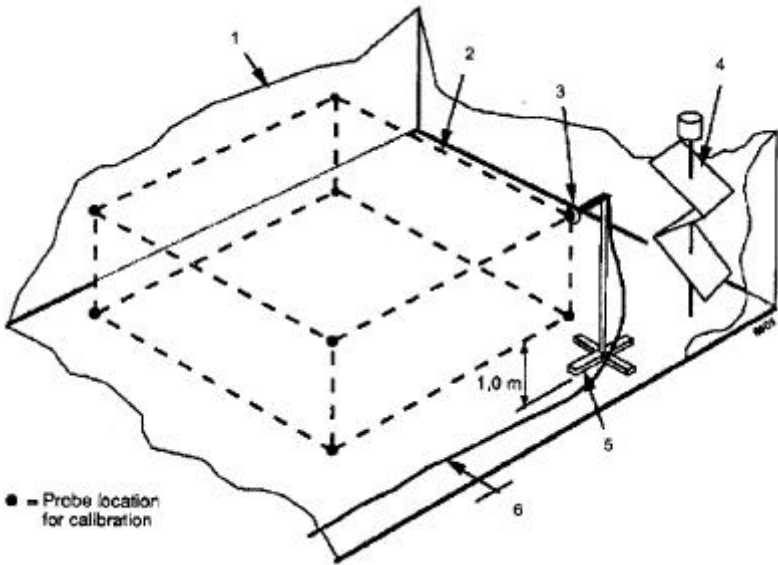
$$Q = \left(\frac{16 \pi^2 V}{\eta_{Tx} \eta_{Rx} \lambda^3} \right) (CCF(f))$$

$$\tau = \frac{Q}{2 \pi f}$$

Q

f

(Hz)



1.

:

(1)

8
- (2)

(working volume)

stirrer

1m .
monitoring

.
가

, . ,
가 .

(3) .
가 .
.

(4) 3 .

(5) 가 /3
1m 가 . 1/3m
.

C (normative)

c.1. Test set-up

set-up 1 .
, EUT

1m .
EUT .

가 .

c.2. RS

$$P_{input}(w)=\left[\frac{E_{test}(\frac{V}{m})}{ECCF(f)*\sqrt{CLF(f)}}\right]^2$$

$$E_{test}(V/m)$$

CLF(f) B, (2), loading

ECCF(f) B. (1), empty chamber

ECCF

interpolation .

mode- tuned mode- stirred

mode- tuned 1 step .

tuner evenly spaced space
360.

mode- stirred 12rpm
EUT dwell
mode- stirred

가

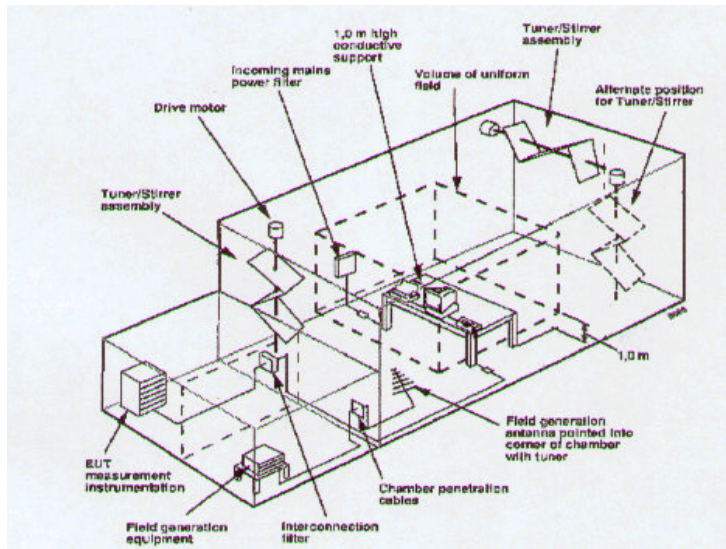
$P_{\max,rec}$ $P_{ave,rec}$ monitoring

P_{input} $P_{reflected}$ monitor .
가 P_{input} 가 3dB
.
carrier . 가
.

f0 to 3f0	50	20	5dB
3f0 to 6f0	18	15	4dB
6f0 to 10f0	12	6	3dB
10f0	12	20/decade	-

. scan time

1.
f0 :



2) Reverberation chamber

- 1) Test volume chamber , stirrer
1m .
- 2) DUT가 ground plane
가 .
- 3) .

77B/273/CDV

: IEC 61000-4-3

J : Alternative procedure-

K :

IEC61000-4-3dml I

IEC 61000-4-3 J (normative)

Alternative procedure-

J.1

IEC 61000-4-3

(Full anechoic chamber)

J.2, J.3, J.4 6, 7, 8

J.2 (alternative to clause 6)

- IEC 61000-4-3 clause 6

- : 가 multi-mode

- Mechanical tuner(s)/stirrer(s) : 가

1/4 가

stirrer chamber 가

, 가 chamber 가

3/4 가 .

가 stirrer

field 가 가

- (B)

- Field strength reference antennas

- isotropic field strength monitoring probe

- Field strength monitoring antenna

J.2.1

enclosure , enclosure
multi- mode ,
EUT 가 .
j.1

j.2.2. Field

Field EUT 가 가
가
set- up EUT isotropic random polarization
“uniform volume”
j.2 , isotropic
randomly polarized,
uniform volume , mechanical
stirrer 1m
isotropic
1m
EUT wire
가 0.4m
(E_x, E_y, E_z)

3.

(IEC :
International Electrotechnical Commission)

가

가

가

99

CISPR

(National Physical

Laboratory)

2000

Draft

ISN

ITE

: 1999. 12. 17

:

Tel. +82- 461- 730- 5290 E- mail : wschang@kytis.konyang.ac.kr

()

Tel. +82- 335- 333- 4093 E- mail : jhnlee@web.dwe.co.kr

: ,

■

■ ISN

- ISN

-

-

-

■

ITE

-

ITE

-

■

ISN

ITE

1.

가 ITE 가 EMC

가 ITE CISPR

.

1.1

o ITE 가

,

o 1997 11 가 CISPR/G/WG2
ISN

o CISPR22 (1997- 11) 3

.

1.2

ITE

o 1994 (GSM)

o CISPR/G/166/CDV(1999 10 15) CISPR pub.22
3.1 ITE (3rd edition/1997)

.

o ITE LAN(WAN)

가 CISPR 22 Class B

.

2. ISN

2.1 ISN

ISN

(2 wire 4wire) ,

o 2

가 ISN

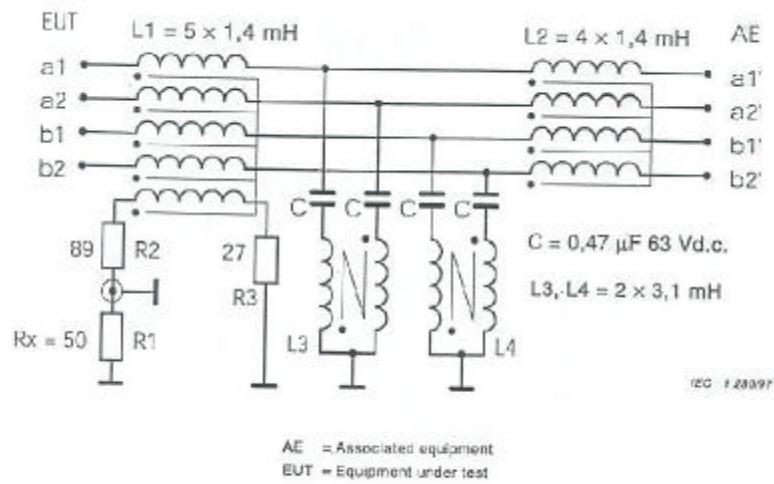
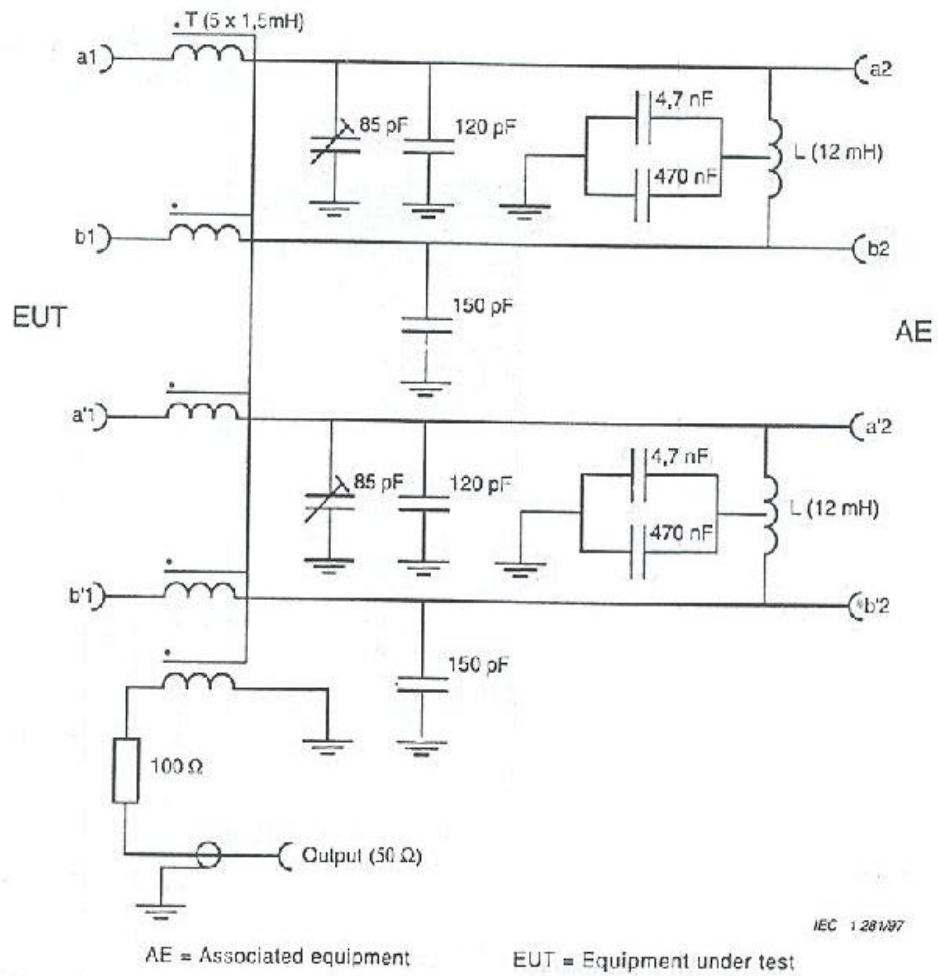
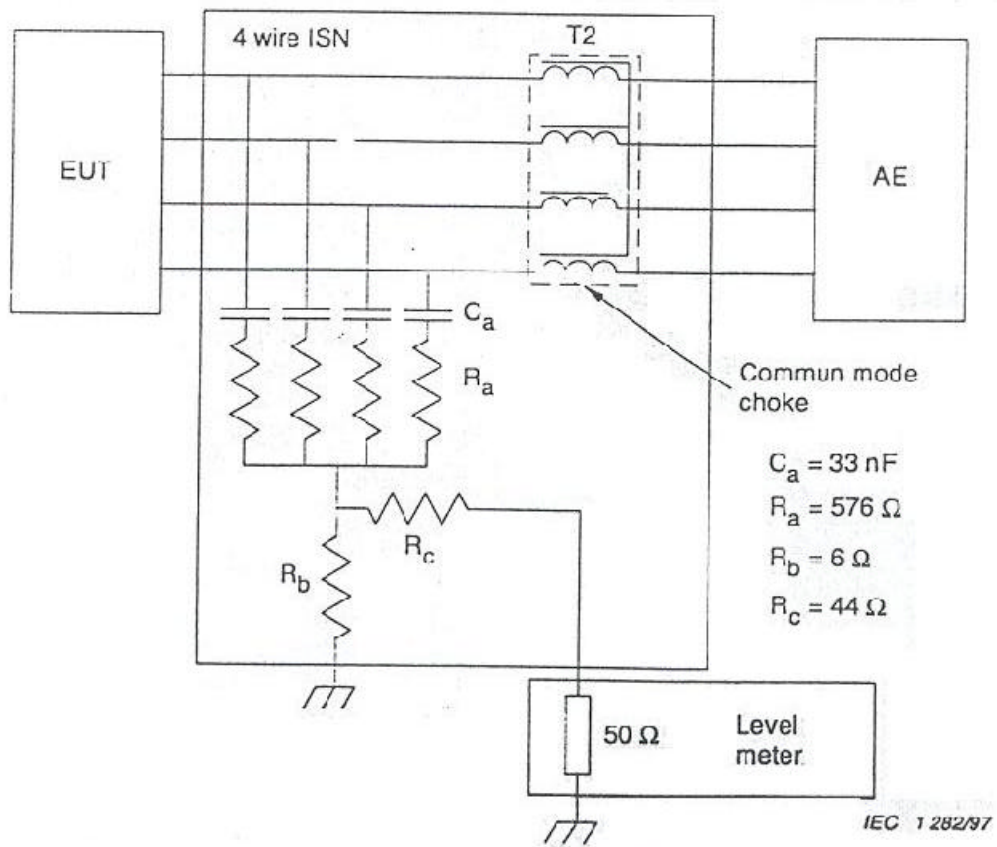


Figure D.2 – ISN with high longitudinal conversion loss for use with two unscreened single balanced pairs



IEC 1281/97

Figure D.3 – ISN for use with two unscreened single balanced pairs



AE = Associated equipment

EUT = Equipment under test

Figure D.4 – ISN for use with two unscreened single balanced pairs

2.2

o A

(MHz)	dB(uV)				dB(uA)			
0.15 0.5	97	87	84	74	53	43	40	30
0.5 30	87		74		43		30	

o B

(MHz)		dB(uV)				dB(uA)			
0.15	0.5	84	74	74	64	40	30	30	20
0.5	30	74		64		30		20	

2.3

o Simulation

- ISN

,

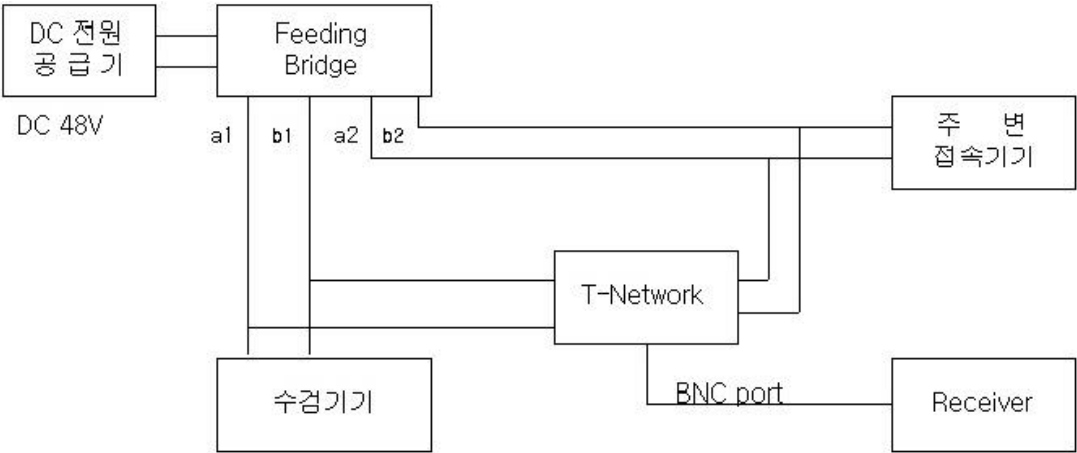
.

o

-

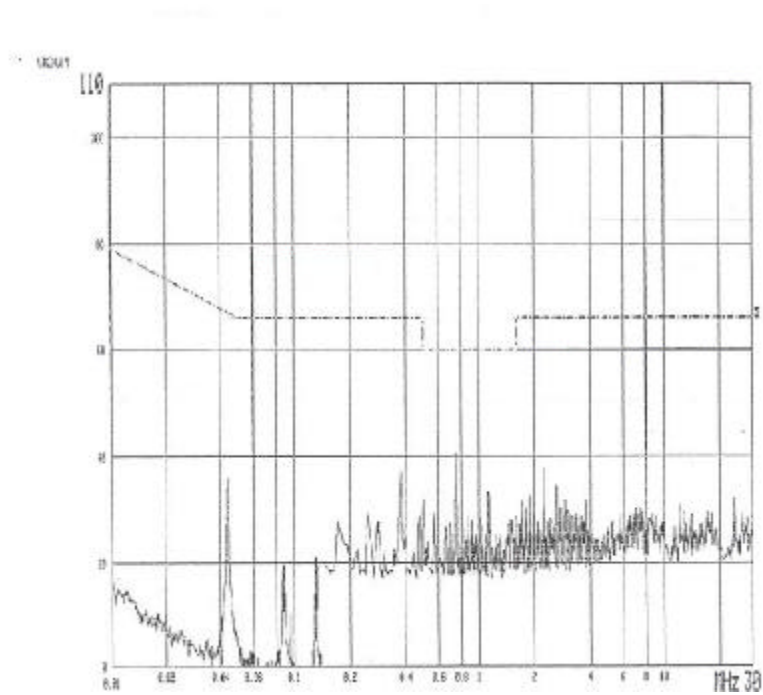
ISN
(T - Network)
VDE
VDE0872

.



2.4

o



o

- VDE (T- Network)
CISPR 22 ISN
- T- Network VDE
- CISPR22

가 가 .

3. ITE

3.1 ITE

CISPR/G/166/CDV CISPR 22 “ ”

.

o (ITE)()
- , , , , , ,
()
가 .

o 600 V 가 . ,
, , .

Any equipment(or parts of the ITE equipment) which has a primary function of radio transmission and/or reception according to the ITU Radio Regulations are excluded from the scope of this publication.

Note - Any equipment which has a function of radio transmission and/or reception according to the definitions of the ITU Radio Regulations should fulfil the national radio regulations, whether or not this publication is also valid.

o CISPR/G/166/CDV
- CISPR pub.22 (ITE) :

ITE or parts of ITE with a function of radio transmission and/or reception are included in the scope of this standard. Disturbances emitted from cables, and/or antennas, including disturbances emitted from transmitters in idle or standby states and/from receivers which are parts of ITE, are subject to the limits in this standard. See Clause 3.7 for a definition of the idle or standby state of a transmitter, and Clause 3.8 for a definition of the active state of a transmitter, In the active state a transmitter is not subject to the limits in this standard.

Some examples of ITE with radio functions which are covered by

this standard are given in Annex YY

- o Idle or standby state of a transmitter 가

- o Active state of a transmitter 가

Annex YY : Examples of ITE with a radio transmission and/or reception function 가

-) Wireless LANs WAN, Cordless telephones, mobile telephone
(, ,),
,

3.2

- o CISPR 22 :

(Information Technology Equipment Radio Disturbance Characteristics Limits and Methods of Measurement)

-
-

- o

-
-
-

- (가)
- EUT가 가 .

- o (Radiate Test)
- : 3 and 10 Meter Open Area Test Site.
-
- 가
- 2.4m(8 feet) 2



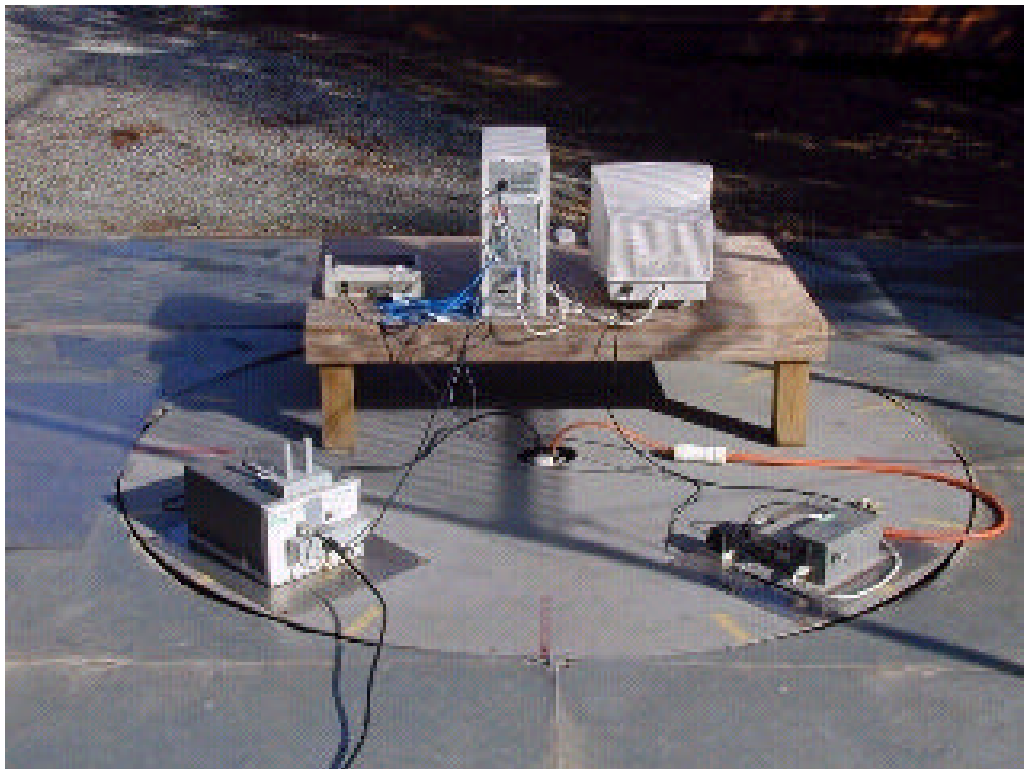
: Atlas Compliance & Engineering, Inc. : <http://www.atlasce.com/>

o (Conducted Emission Test)

- : Open Area Test Site.

-

- Peak Test
- Quasi-Peak Test
- Average Test



: Atlas Compliance & Engineering, Inc. : <http://www.atlasce.com/>

4.

4.1 (ISN)

CISPR22

ISN

Simulation

가

.

CISPR

ISN

.

ISN

가

,

.

ISN

.

4.2 가 ITE

CISPR 22

.

가

.

CISPR 24 :

- (ESD Test, IEC 61000- 4- 2:1995)
- (EFT/Burst Test, IEC 61000- 4- 4:1995)
- RF (Radiated RF Test, IEC 61000- 4 :1995)
- (Conducted RF Test, IEC 61000- 4- 6:1996)
- (Magnetic Field Test, IEC 61000- 4- 8:1993)

- (Surge Test, IEC 61000- 4- 5:1995)
- (Voltage Dips/Variations Test, IEC 61000- 4- 11:1994)

4.3

- o 가 가 ,
- o Know - How 가
- ITE 가 .