

研究要旨

MG

A. 研究目的

PM

PM programming node

12

40

2 5

Denand

Denand

PM

programming telenetry

PM

PM

PM

PM

Generator

B. 研究方法

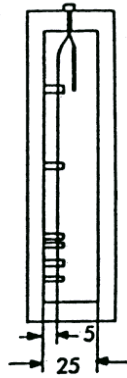
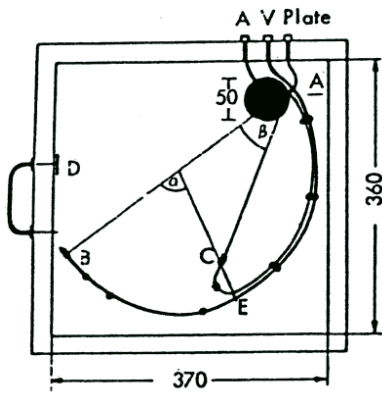
B-1 実機における電磁干渉試験

PM

(ア) PM
 1 Werner Irnich
 1) 75ppm AAI

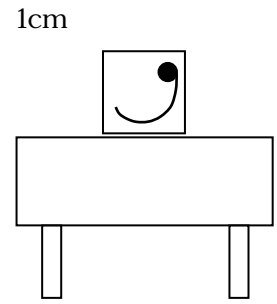
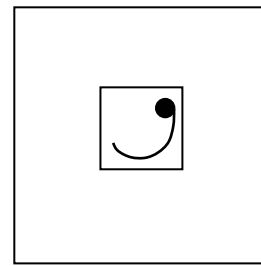
2 PM Generator
 PM
 1cm
 100ppm

2
 1cm (Top Lay)
 (Top Stand)
 3 4
 (Left) (Center) (Right)
 48.5cm (Low)
 68cm (High) PM Generator



(Parallel)

(Vertical)



1 Irnich

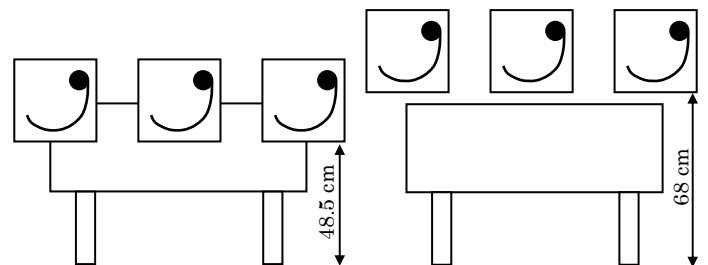
Top Lay Position
 (top view)

Top Stand Position
 (side view)

(1) PM 20

PM 20

1



(2) PM 20

PM 20

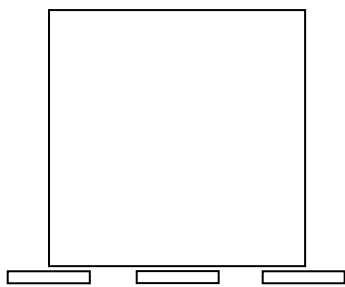
1

Left, Center, Right Low
 Position

Left, Center, Right High
 Position

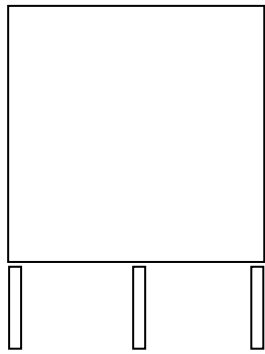
3

(side view)



Parallel Position

4



Vertical Position

(top view)

(Entrance)

(Center)

(Middle)

Generator

(Vertical)

(Entrance inner)

(Exit inner)

0cm (Low)

112cm (High)

(Parallel)

(Exit)

56cm

PM

1cm

(1)

5

0.18%

75ppm

AAI

Generator

PM

130cm

Generator

Generator

17cm

12cm

3cm

6 7

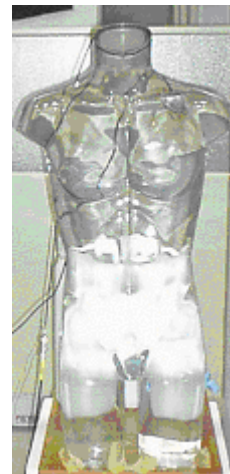
Generator

1cm

100ppm

PM

2



5



6
(Exit-Middle-Parallel Position)



7
(Center-Vertical Position)

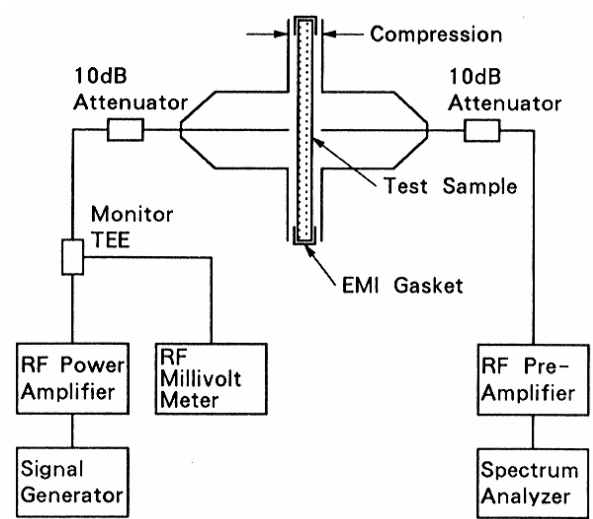
B-2 防護服衣料材の電磁波遮蔽性能の評価

(ア)

8

KEC

4mm
100kHz 1GHz



8

(イ)

9

60cm x 60cm

60cm x 60cm x 5cm

80cm

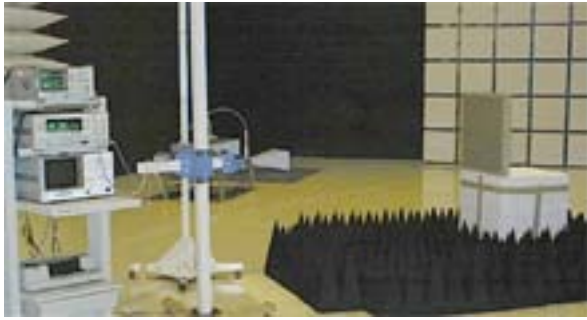
180cm

15

110cm

3GHz

9GHz



9

(ウ)

PM

PM

Low-Right-Parallel

Exit inner - Middle -

Parallel

10

0.8mm

3000S/m

B-3 防護服衣料材の耐環境性の評価

40

95%

280

KEC

200mm× 200mm

(TEM

150mm× 50mm

2

B-4 防護服の電磁波暴露における温度上昇性の評価



10

11

GH

10

30V/m

2

(エ)

26cm

IEEE SCC-34/SC-2

(P.1528) Head tissue dielectric parameters

60Hz 800Hz 0.6S/m

835MHz 0.97S/m



11

B-5 防護服の着用状態における電磁波遮蔽性能の評価

Generator

120nm
90nm
6nm
3m
20MHz 150MHz
2 9
PM
PM
20
1
1 8
2 PM

PM Generator

1

002					
003					
004					
006					
Used 1			1999.12		2
Used 2			1999.03		2
Used 3			1998.09		
Used 4			2001.05		1

002					
003					
004					
006					
Used 1			1999.12		2
Used 2			1999.03		2
Used 3			1998.09		
Used 4			2001.05		1
Used 5			2002.04	2-4	1

C. 研究結果

B-1 実機における電磁干渉試験

(ア)

PM

Top Lay Top Stand

Low Center-Parallel Low Right-Parallel

Low Center-Parallel

EM

Protection node

Low Right-Parallel

4cm

EM Protection node

50cm

5cm

800MHz

60Hz

B-6 防護服の着用状態におけるPM誤動作防止効果の評価

PM

(イ)

PM

PM

PM

Entrance inner - Low- Parallel

Exit inner - Middle - Vertical

Exit inner - Low

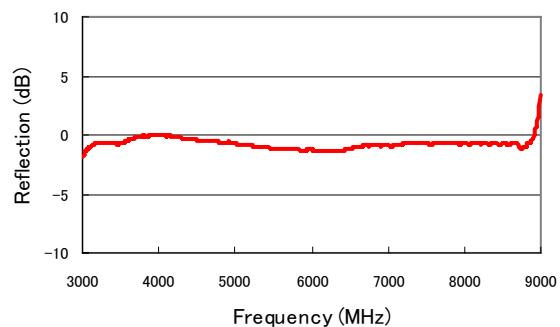
- Parallel Exit inner - Middle - Parallel

Exit inner - High - Parallel

1cm EM Protection node

2cm EM Protection node

4cm



13

(ウ)

PM

Low Right - Parallel

4cm

B-2 防護服衣料材の電磁波遮蔽性能の評価

(ア)

12

24dB

2

36dB

3

48dB

4

61dB

EM Protection node

Exit inner - Middle - Parallel

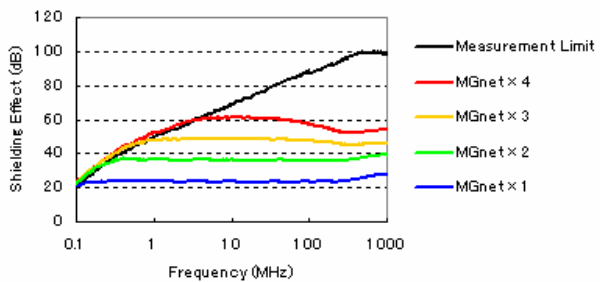
1cm

4

EM Protection node

3cm

4



12

(イ)

13

-1.8dB

(工)

3

3

	60Hz		800Hz		835MHz	
(dB)	0	110	1	120	3600	3600

B-3 防護服衣料材の耐環境性の評価

KEC

14

1. 82dB

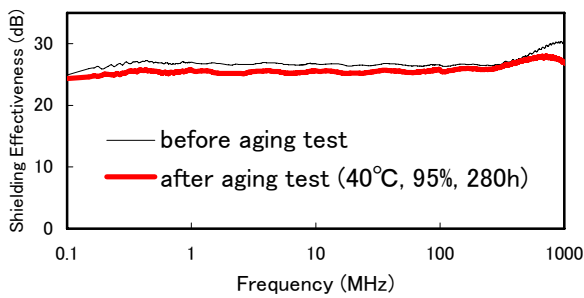
2. 88dB

(TEM)

15

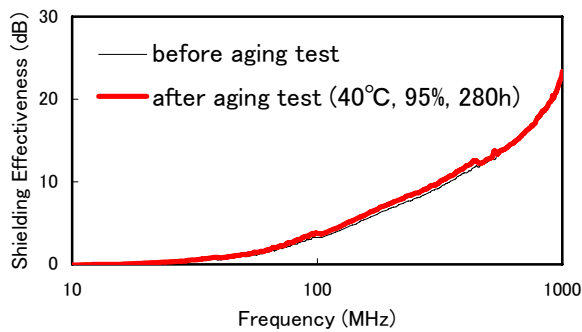
1. 06dB

2. 14dB



14

KEC



15

(TEM)

B-4 防護服の電磁波暴露における温度上昇性の評価

16 17

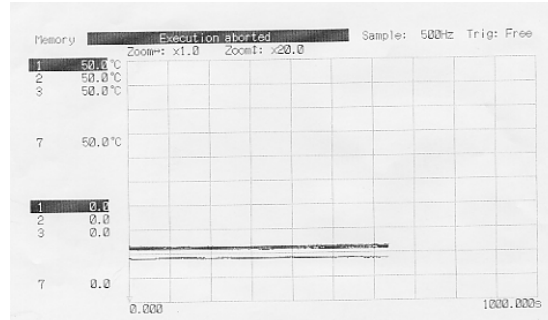


図 16 電磁波（水平偏波）照射中の温度変化

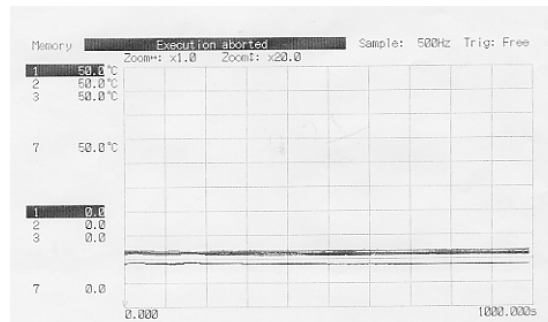


図 17 電磁波（垂直偏波）照射中の温度変化

B-5 防護服の着用状態における電磁波遮蔽性能の評価

18 19

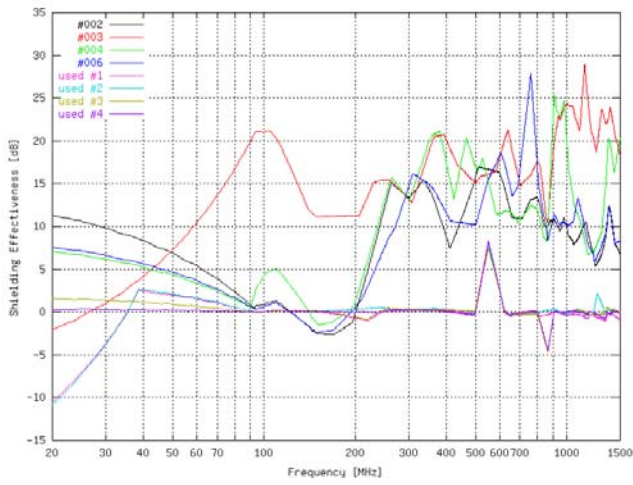
28dB

2

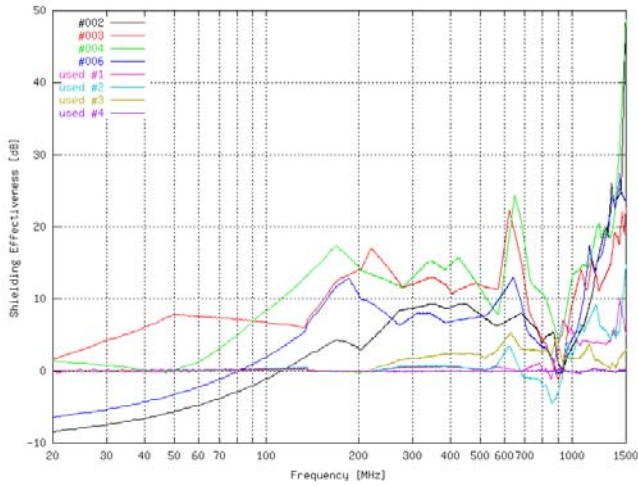
0

4

100M m



18



19

表 4 防護服の表面低効率（直流）

	表面抵抗率 (Ω・m)
001	4.0×10
002	3.0×10
003	2.0×10
004	4.0×10
006	3.0×10
Used1	1.0×10^5
Used2	2.0×10^4
Used3	8.0×10^3
Used4	$> 1.0 \times 10^8$

B-6 防護服の着用状態におけるPM誤動作防止効果の評価

5

1

2

表 5 防護服のPM誤動作防止効果

001		
002		
003		
004		
006		
Used1	1999.12	
Used2	1999.03	
Used3	1998.09	
Used4	2001.05	
Used5	2002.04	

D. 考察

PM Generator

PM

100kHz 1GHz
3GHz 9GHz

10dB

F. 健康危険情報

30V/m

G. 研究発表

H. 知的財産権の出願・登録状況

PM

E. 結論

1) Irnich, W.: *Interference in Pacemakers*.
PACE, Vol.7, November-December 1984,
Part I, pp.1029-1048.

PM

5cm

PM

2) ”,
”

MEDICAL VIEW, p.148

PM

4cm

Mnet

Mnet

M