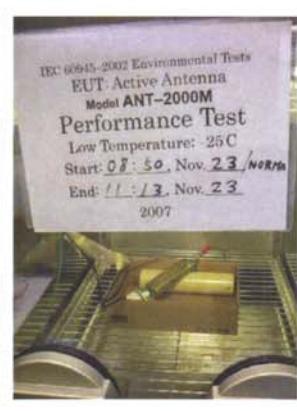


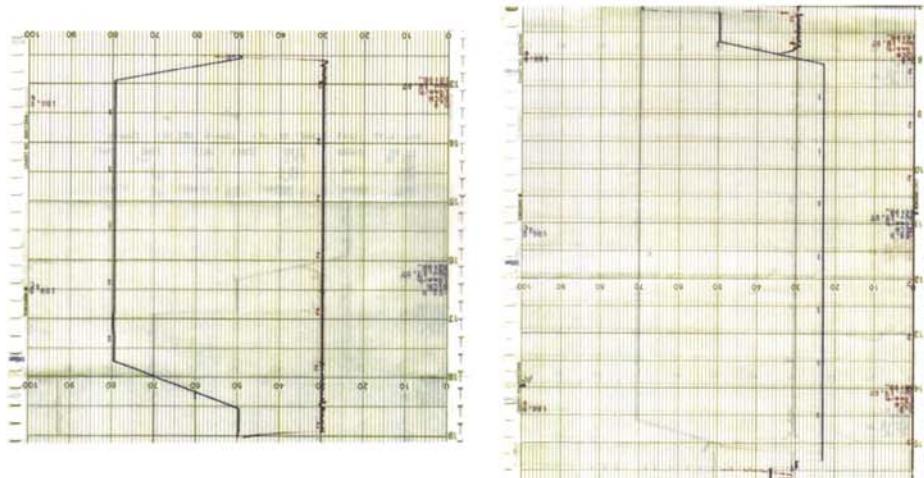
NT-1800 Temperature test data Date: Nov. 19th - 23rd, 2007

Test site: TOKIMEC Head office environmental test room S/NoS05600001

NT-1800 Performance test equipment



NT-1800Test system Photo Page: #2



NT-1800 Temperature test data Date: Nov. 19th – 23rd, 2007

Test site: TOKIMEC Head office environmental test room
 +25°C Normal Temperature test : 19th Nov. 2007 AM 9:00
 Supply STS signal to active antenna input and antenna ground

① Call sensitivity test STS = 6dB μ V Power Supply 24VDC

(Using 2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	0%	OK

② Off frequency transmitter test Power Supply 24VDC

(Using 2 signal combiner : -6dB)

Frequency offset	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
489.975kHz	18dB μ V	None	12dB μ V	None	0%	OK
490.025kHz	18dB μ V	None	12dB μ V	None	0%	OK
517.975kHz	18dB μ V	None	12dB μ V	None	0%	OK
518.025kHz	18dB μ V	None	12dB μ V	None	0%	OK
4209.475kHz	18dB μ V	None	12dB μ V	None	0%	OK
4209.525kHz	18dB μ V	None	12dB μ V	None	0%	OK

③ Blocking immunity STS + 6dB μ V = 12 dB μ V Power Supply 24VDC

(Using 2 signal combiner : -6dB)

490kHz Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
489.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
490.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
489.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
491.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
487.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
493.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

518kHz Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
517.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
518.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
517.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
519.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
515.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
521.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

4209.5 Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4209.0kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
4210.0kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
4208.5kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
4210.5kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
4206.5kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
4212.5kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	3%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

④ Co-channel rejection

Power Supply 24VDC

(Using 2 signal combiner : -6dB)

Co-Channel	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK
518kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK
4209.5kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK

⑤ Simultaneous operation

Power Supply 24VDC

(Using 2 signal combiner : -6dB)

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz	18dB μ V		12dB μ V			
490kHz + 50dB		68dB μ V		62dB μ V	0%	OK

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz +50dB		68dB μ V		62dB μ V	0%	OK
490kHz	18dB μ V		12dB μ V			

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz	18dB μ V		12dB μ V			
4209.5kHz+50dB		68dB μ V		62dB μ V	0%	OK

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz +50dB		68dB μ V		62dB μ V	0%	OK
4209.5kHz	18dB μ V		12dB μ V			

⑥ Spurious response test

Power Supply 24VDC

(Using 2 signal combiner : -6dB)

4209.5KHz spurious	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
3.2295MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
6.9490MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
7.9290MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
10.6685MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
11.6485MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK

⑦ Intermodulation test

Power Supply 24VDC

(Using 4 signal combiner : -12dB)

490kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
488kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
486kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
487kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
484kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
486kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
482kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
492kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
494kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
493kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
496kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
494kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
498kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
514kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
516kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
515kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
512kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
514kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
510kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
520kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
522kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
521kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
524kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
522kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
526kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4207.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4205.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4206.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4203.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4205.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4201.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4211.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4213.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4212.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4215.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4213.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4217.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		

⑧ Extreme power supply test -10% lower STS = 6dB μ V Power Supply 21.6VDC
(Using 2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	0%	OK

⑨ Extreme power supply test +30% upper STS = 6dB μ V Power Supply 31.2VDC
(Using 2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	0%	OK

NT-1800 Temperature test data Date: Nov. 19th - 23rd, 2007

Test site: TOKIMEC Head office environmental test room S/NoS05600001
 +55°C Dry Heat test : 20th Nov. 2007 AM 9:00
 Supply STS signal to active antenna input and antenna ground

① Call sensitivity test STS = 6dB μ V

Power Supply 24VDC

(2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	0%	OK

② Off frequency transmitter test

Power Supply 24VDC

(2 signal combiner : -6dB)

Frequency offset	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
489.975kHz	18dB μ V	None	12dB μ V	None	0%	OK
490.025kHz	18dB μ V	None	12dB μ V	None	0%	OK
517.975kHz	18dB μ V	None	12dB μ V	None	0%	OK
518.025kHz	18dB μ V	None	12dB μ V	None	0%	OK
4209.475kHz	18dB μ V	None	12dB μ V	None	0%	OK
4209.525kHz	18dB μ V	None	12dB μ V	None	0%	OK

③ Blocking immunity

STS + 6dB μ V = 12dB μ V

Power Supply 24VDC

(2 signal combiner : -6dB)

490kHz Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
489.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
490.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
489.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
491.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
487.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
493.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

518kHz Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
517.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
518.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
517.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
519.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
515.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
521.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

4209.5 Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4209.0kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
4210.0kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
4208.5kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
4210.5kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
4206.5kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
4212.5kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	3%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

④ Co-channel rejection

Power Supply 24VDC
(2 signal combiner : -6dB)

Co-Channel	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK
518kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK
4209.5kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	3%	OK

⑤ Simultaneous operation

Power Supply 24VDC
(2 signal combiner : -6dB)

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz	18dB μ V		12dB μ V			
490kHz + 50dB		68dB μ V		62dB μ V	0%	OK

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz +50dB		68dB μ V		62dB μ V		
490kHz	18dB μ V		12dB μ V		0%	OK

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz	18dB μ V		12dB μ V			
4209.5kHz+50dB		68dB μ V		62dB μ V	0%	OK

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz +50dB		68dB μ V		62dB μ V		
4209.5kHz	18dB μ V		12dB μ V		0%	OK

⑥ Spurious response test

Power Supply 24VDC
(2 signal combiner : -6dB)

4209.5KHz spurious	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
3.2295MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
6.9490MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
7.9290MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
10.6685MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
11.6485MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK

⑦ Intermediation test

Power Supply 24VDC
(4 signal combiner : -12dB)

490kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
488kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
486kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
487kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
484kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
486kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
482kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
492kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
494kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
493kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
496kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
494kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
498kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
514kHz +50dB	24dB μ V	74dB μ V	入力レベル	妨害レベル		
516kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
515kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
512kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
514kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
510kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
520kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
522kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
521kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
524kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
522kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
526kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4207.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4205.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4206.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4203.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4205.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4201.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4211.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4213.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4212.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4215.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4213.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4217.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

⑧ Extreme power supply test -10% lower STS = 6dB μ V Power Supply 21.6VDC

(2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	3%	OK

⑨ Extreme power supply test +30% upper STS = 6dB μ V Power Supply 31.2VDC

(2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	3%	OK

NT-1800 Temperature test data Date: Nov. 19th – 23rd, 2007

Test site: TOKIMEC Head office environmental test room S/NoS05600001
 -15°C Low temperature test : 21st Nov. 2007 AM 9:00
 Supply STS signal to active antenna input and antenna ground

① Call sensitivity test STS = 6dB μ V Power Supply 24VDC

(2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	0%	OK

② Off frequency transmitter test

Power Supply 24VDC

(2 signal combiner : -6dB)

Frequency offset	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
489.975kHz	18dB μ V	None	12dB μ V	None	0%	OK
490.025kHz	18dB μ V	None	12dB μ V	None	0%	OK
517.975kHz	18dB μ V	None	12dB μ V	None	0%	OK
518.025kHz	18dB μ V	None	12dB μ V	None	0%	OK
4209.475kHz	18dB μ V	None	12dB μ V	None	0%	OK
4209.525kHz	18dB μ V	None	12dB μ V	None	0%	OK

③ Blocking immunity

STS + 6dB μ V = 12 dB μ V Power Supply 24VDC

(2 signal combiner : -6dB)

490kHz Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
489.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
490.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
489.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
491.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
487.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
493.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

518kHz Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
517.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
518.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
517.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
519.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
515.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
521.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

4209.5 Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4209.0kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
4210.0kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
4208.5kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
4210.5kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
4206.5kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
4212.5kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	3%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

④ Co-channel rejection

Power Supply 24VDC

(2 signal combiner : -6dB)

Co-Channel	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK
518kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK
4209.5kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK

⑤ Simultaneous operation

Power Supply 24VDC

(2 signal combiner : -6dB)

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz	18dB μ V		12dB μ V			
490kHz + 50dB		68dB μ V		62dB μ V	0%	OK

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz +50dB		68dB μ V		62dB μ V		
490kHz	18dB μ V		12dB μ V		0%	OK

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz	18dB μ V		12dB μ V			
4209.5kHz+50dB		68dB μ V		62dB μ V	0%	OK

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz +50dB		68dB μ V		62dB μ V		
4209.5kHz	18dB μ V		12dB μ V		0%	OK

⑥ Spurious response test

Power Supply 24VDC

(2 signal combiner : -6dB)

4209.5KHz spurious	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
3.2295MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
6.9490MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
7.9290MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
10.6685MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
11.6485MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK

⑦ Intermediation test

Power Supply 24VDC

(4 signal combiner : -12dB)

490kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
488kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
486kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
487kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
484kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
486kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
482kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
492kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
494kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
493kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
496kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
494kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
498kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
514kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
516kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
515kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
512kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
514kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
510kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
520kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
522kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
521kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
524kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
522kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
526kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4207.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4205.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4206.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4203.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4205.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4201.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4211.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4213.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4212.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4215.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4213.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4217.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		

⑧ Extreme power supply test -10% lower STS = 6dB μ V Power Supply 21.6VDC
(2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	0%	OK

⑨ Extreme power supply test +30% upper STS = 6dB μ V Power Supply 31.2VDC
(2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	0%	OK

NT-1800 Temperature test data Date: Nov. 19th – 23rd, 2007

Test site: TOKIMEC Head office environmental test room S/NoS05600001

+40°C Damp heat test : 22nd Nov. 2007 AM 9:00

Supply STS signal to active antenna input and antenna ground

① Call sensitivity test STS = 6dB μ V

Power Supply 24VDC

(2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	0%	OK

② Off frequency transmitter test

Power Supply 24VDC

(2 signal combiner : -6dB)

Frequency offset	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
489.975kHz	18dB μ V	None	12dB μ V	None	0%	OK
490.025kHz	18dB μ V	None	12dB μ V	None	0%	OK
517.975kHz	18dB μ V	None	12dB μ V	None	0%	OK
518.025kHz	18dB μ V	None	12dB μ V	None	0%	OK
4209.475kHz	18dB μ V	None	12dB μ V	None	0%	OK
4209.525kHz	18dB μ V	None	12dB μ V	None	0%	OK

③ Blocking immunity

STS + 6dB μ V = 12dB μ V Power Supply 24VDC

(2 signal combiner : -6dB)

490kHz Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
489.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
490.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
489.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
491.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
487.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
493.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

518kHz Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
517.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
518.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
517.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
519.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
515.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
521.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

4209.5 Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4209.0kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
4210.0kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
4208.5kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
4210.5kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
4206.5kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
4212.5kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	3%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

④ Co-channel rejection

Power Supply 24VDC
(2 signal combiner : -6dB)

Co-Channel	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK
518kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK
4209.5kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK

⑤ Simultaneous operation

Power Supply 24VDC
(2 signal combiner : -6dB)

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz	18dB μ V		12dB μ V		0%	OK
490kHz + 50dB		68dB μ V		62dB μ V		
2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz + 50dB		68dB μ V		62dB μ V	0%	OK
490kHz	18dB μ V		12dB μ V			
2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz	18dB μ V		12dB μ V		0%	OK
4209.5kHz+50dB		68dB μ V		62dB μ V		
2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz + 50dB		68dB μ V		62dB μ V	0%	OK
4209.5kHz	18dB μ V		12dB μ V			

⑥ Spurious response test

Power Supply 24VDC
(2 signal combiner : -6dB)

4209.5KHz spurious	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
3.2295MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
6.9490MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
7.9290MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
10.6685MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
11.6485MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK

⑦ Intermediation test

Power Supply 24VDC
(4 signal combiner : -12dB)

490kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
488kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	-	-
486kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
490kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
487kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	-	-
484kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
490kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
486kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	-	-
482kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
490kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
492kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	-	-
494kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
490kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
493kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	-	-
496kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		

490kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
494kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
498kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
514kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
516kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
515kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
512kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
514kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
510kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
520kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
522kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
521kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
524kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
518kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
522kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
526kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4207.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4205.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4206.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4203.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4205.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4201.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4211.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4213.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4212.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4215.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4209.5kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4213.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4217.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		

⑧ Extreme power supply test -10% lower STS = 6dB μ V Power Supply 21.6VDC
 (2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	-	-
518kHz	12dB μ V	None	6dB μ V	None	-	-
4209.5kHz	12dB μ V	None	6dB μ V	None	-	-

⑨ Extreme power supply test +30% upper STS = 6dB μ V Power Supply 31.2VDC
 (2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	-	-
518kHz	12dB μ V	None	6dB μ V	None	-	-
4209.5kHz	12dB μ V	None	6dB μ V	None	-	-

NT-1800 Temperature test data Date: Nov. 19th - 23rd, 2007

Test site: TOKIMEC Head office environmental test room S/NoS05600001
 -25°C Low temperature test (Antenna only) : 23rd Nov. 2007 AM 9:00
 Supply STS signal to active antenna input and antenna ground

① Call sensitivity test STS = 6dB μ V

Power Supply 24VDC

(2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	0%	OK

② Off frequency transmitter test

Power Supply 24VDC

(2 signal combiner : -6dB)

Frequency offset	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
489.975kHz	18dB μ V	None	12dB μ V	None	0%	OK
490.025kHz	18dB μ V	None	12dB μ V	None	0%	OK
517.975kHz	18dB μ V	None	12dB μ V	None	0%	OK
518.025kHz	18dB μ V	None	12dB μ V	None	0%	OK
4209.475kHz	18dB μ V	None	12dB μ V	None	0%	OK
4209.525kHz	18dB μ V	None	12dB μ V	None	0%	OK

③ Blocking immunity

STS + 6dB μ V = 12 dB μ V Power Supply 24VDC

(2 signal combiner : -6dB)

490kHz Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
489.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
490.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
489.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
491.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
487.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
493.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

518kHz Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
517.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
518.5kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
517.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
519.0kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
515.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
521.0kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

4209.5 Blocking	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4209.0kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
4210.0kHz +20dB	18dB μ V	38dB μ V	12dB μ V	32dB μ V	0%	OK
4208.5kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
4210.5kHz +40dB	18dB μ V	58dB μ V	12dB μ V	52dB μ V	0%	OK
4206.5kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
4212.5kHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	3%	OK
156MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK
450MHz +70dB	18dB μ V	88dB μ V	12dB μ V	82dB μ V	0%	OK

④ Co-channel rejection

Power Supply 24VDC
(2 signal combiner : -6dB)

Co-Channel	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK
518kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK
4209.5kHz	18dB μ V	12dB μ V	12dB μ V	6dB μ V	0%	OK

⑤ Simultaneous operation

Power Supply 24VDC
(2 signal combiner : -6dB)

2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz	18dB μ V		12dB μ V			0% OK
490kHz + 50dB		68dB μ V		62dB μ V		
2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz +50dB		68dB μ V		62dB μ V		
490kHz	18dB μ V		12dB μ V			0% OK
2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz	18dB μ V		12dB μ V			0% OK
4209.5kHz+50dB		68dB μ V		62dB μ V		
2 Channel receipt.	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
518kHz +50dB		68dB μ V		62dB μ V		
4209.5kHz	18dB μ V		12dB μ V			0% OK

⑥ Spurious response test

Power Supply 24VDC
(2 signal combiner : -6dB)

4209.5KHz spurious	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
3.2295MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
6.9490MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
7.9290MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
10.6685MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK
11.6485MHz +60dB	18dB μ V	78dB μ V	12dB μ V	72dB μ V	0%	OK

⑦ Intermediation test

Power Supply 24VDC
(4 signal combiner : -12dB)

490kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
488kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
486kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
490kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
487kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
484kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
490kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
486kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
482kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
490kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
492kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
494kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
490kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
493kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
496kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

490kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
494kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
498kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
514kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
516kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
515kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
512kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
514kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
510kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
520kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
522kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
521kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
524kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
518kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
522kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
526kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ①	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4207.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4205.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ②	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4206.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4203.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ③	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4205.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4201.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ④	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4211.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4213.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ⑤	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4212.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4215.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK
4209.5kHz IMD ⑥	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
4213.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V		
4217.5kHz +50dB	24dB μ V	74dB μ V	12dB μ V	62dB μ V	0%	OK

⑧ Extreme power supply test -10% Lower STS = 6dB μ V Power Supply 21.6VDC

(2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	0%	OK

⑨ Extreme power supply test +30% Upper STS = 6dB μ V Power Supply 31.2VDC

(2 signal combiner : -6dB)

Sensitivity	SG output	Unwanted signal	Wanted Sig	Unwanted Sig	CER	Results
490kHz	12dB μ V	None	6dB μ V	None	0%	OK
518kHz	12dB μ V	None	6dB μ V	None	0%	OK
4209.5kHz	12dB μ V	None	6dB μ V	None	0%	OK

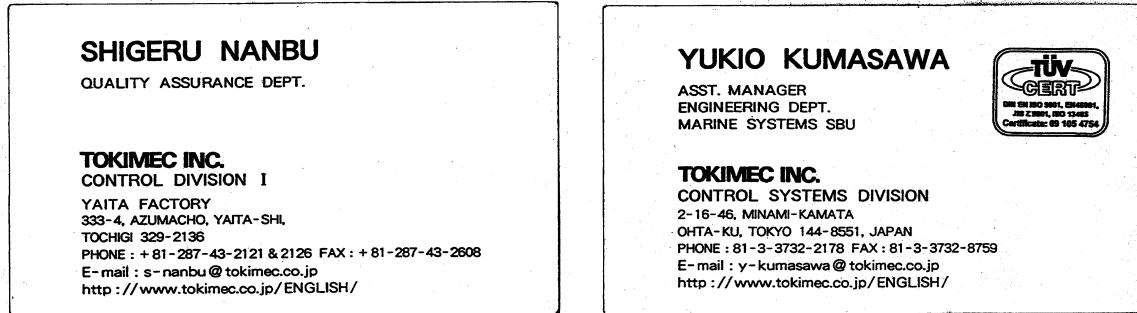


Vibration Tests

Date: October 31, 2007

1. Test Standards Applied: IEC 60945 Ed.4.0:2002
2. Equipment under Test (EUT):
 - EUT Manufacturer: Japan Marina Company Limited (JMC)
 - IEC Equipment Category: Protected Equipment
 - Type of Product: NAVTEX Receiver
 - Model Name and Serial No.: **NT-1800**, Serial # S05600001
 - OEM Model Names: **Alden AE-1800*1, SAM 2918*2, TRN-1800*3**
3. Test Site: TOKIMEC Inc. Yaita Factory
333-4 Azuma-cho, Yaita City, Tochigi 329-2136
PHONE: 0287-43-2121 FAX: 0287-43-2608
4. Test Dates and Time Periods:
 - Y-Axis Vibration: October 18, 2007, from 10:37 to 12:37, 18°C, 45% RH
 - X-Axis Vibration: October 18, 2007, from 14:05 to 16:05
 - Z-Axis Vibration: October 19, 2007, from 08:53 to 10:53, 19°C, 40% RH
5. Test Engineers:

Shigeru Nanbu, Quality Assurance Dept., TOKIMEC
Yukio Kumasawa, Engineering Dept., TOKIMEC
Hisashi Ichikawa, Technical Manager, JMC



6. Test Results Summary

The tests were conducted by H. Ichikawa, JMC under the supervision of S. Nanbu and Y. Kumasawa, TOKIMEC.

Vibration Axis	Resonant Frequency	Acceleration at Resonance	2-Hour 0.7G Continuous Vibration at Resonance
X (lengthwise, right-left)	61.5 Hz	12.9G	Passed. Notes (2),(3)
Y (breadthwise, forward-backward)	68 Hz	5.85G	Passed. Note (2),(3)
Z (perpendicular to Slip Table)	70 Hz	1.4G	Passed. Notes (2),(3)

Notes:

- (1) The EUT was operated at 24 VDC (nominal input voltage) throughout the tests.
- (2) Test result statys "Passed" means that the EUT performed normally (i.e. required sensitivity obtained on all frequencies for specified CER) and did not show any sign of mechanical damage to its hardware on completion of each test.
- (3) The result of each axis test was confirmed by the above TOKIMEC engineers.

*1: OEM for MORCOM International, Inc. 3653 Centerview Drive, Unit #1, Chantilly, VA 20151, U.S.A.

*2: OEM for SAM Electronics GmbH, Behringstrasse 120, 22736 Hamburg, Germany

*3: OEM for TOKIMEC Inc., 2-16-46 Minamikamata, Ota-ku, Tokyo 1458551, Japan

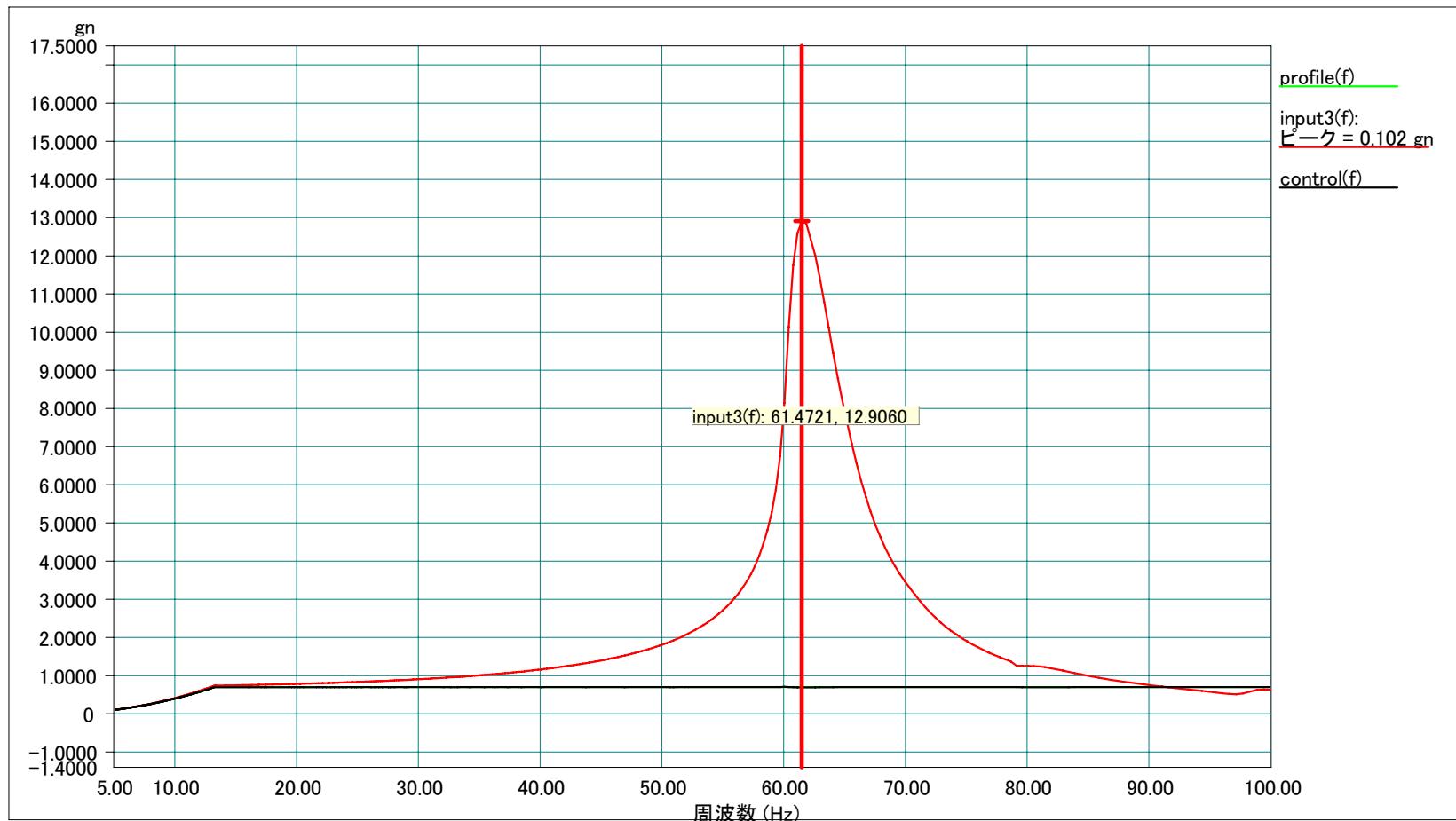
7. Vibration Test Details

7.1 X-Axis Vibration Resonance Search

Project File Name: NT-1800 X-Axis Vibration
Profile Name: IEC60945-Ed4

Test Type: Swept Sine

Run Folder: .\RunDefault Oct 18, 2007 13-32-57



Level: 100 %
Frequency: 5.001557 Hz

Control Peak: 0.100241 gn
Demand Peak: 0.100642 gn

Full Level Time: 00:17:18
Time Remaining: 00:00:00

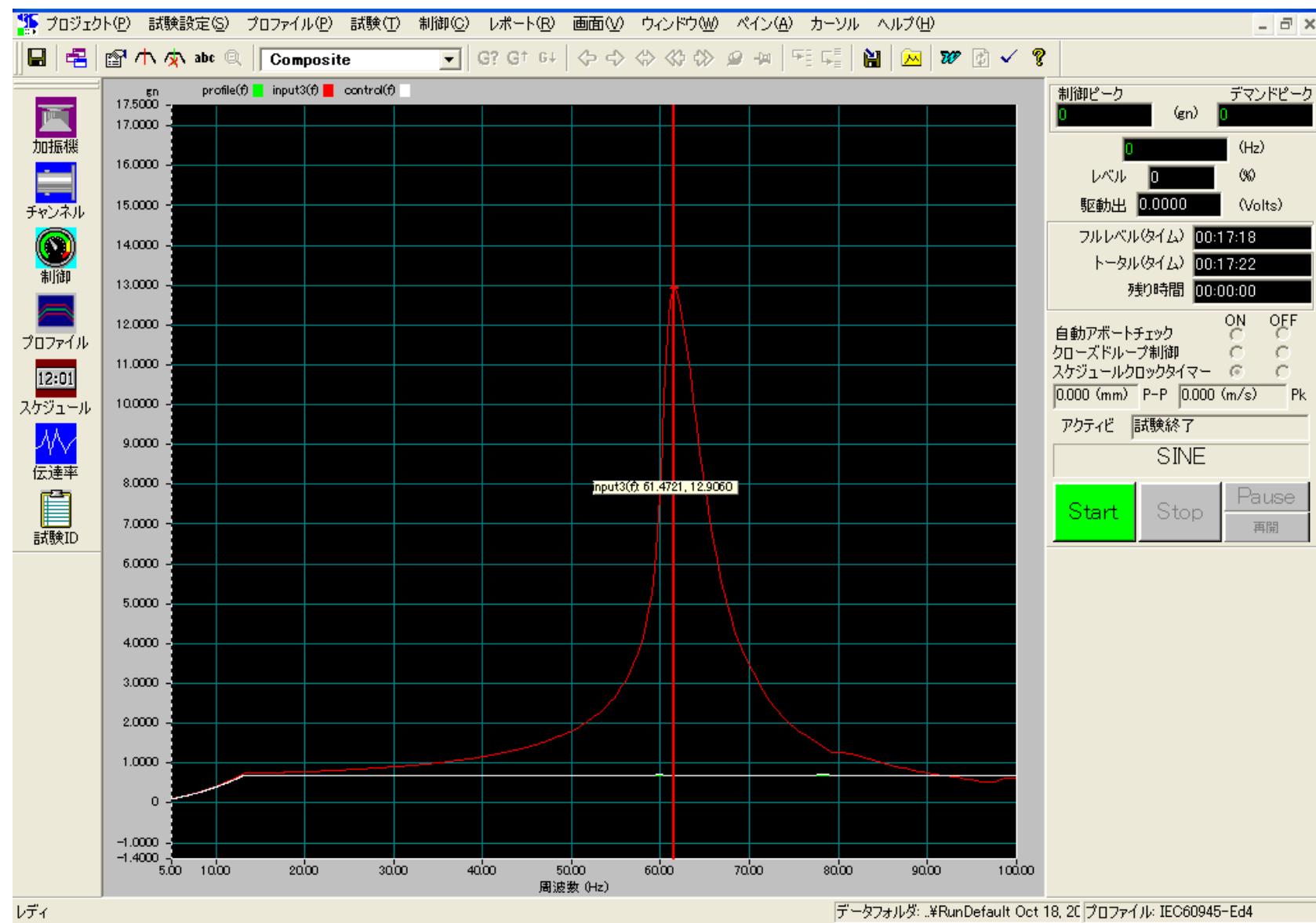
Sweep Type: Logarithmic
Sweep Rate: 0.5 Oct/Min

Data saved at 01:54:05 PM, Thursday, October 18, 2007

Report created at 01:54:08 PM, Thursday, October 18, 2007

Screen Copy of X-Axis Resonance Search

Project File Name: NT-1800 Wheel Mark Type Approval Test
Data saved at 01:54:06 PM, Thursday, October 18, 2007
Report created at 01:54:08 PM, Thursday, October 18, 2007



7.2 Y-Axis Vibration Resonance Search

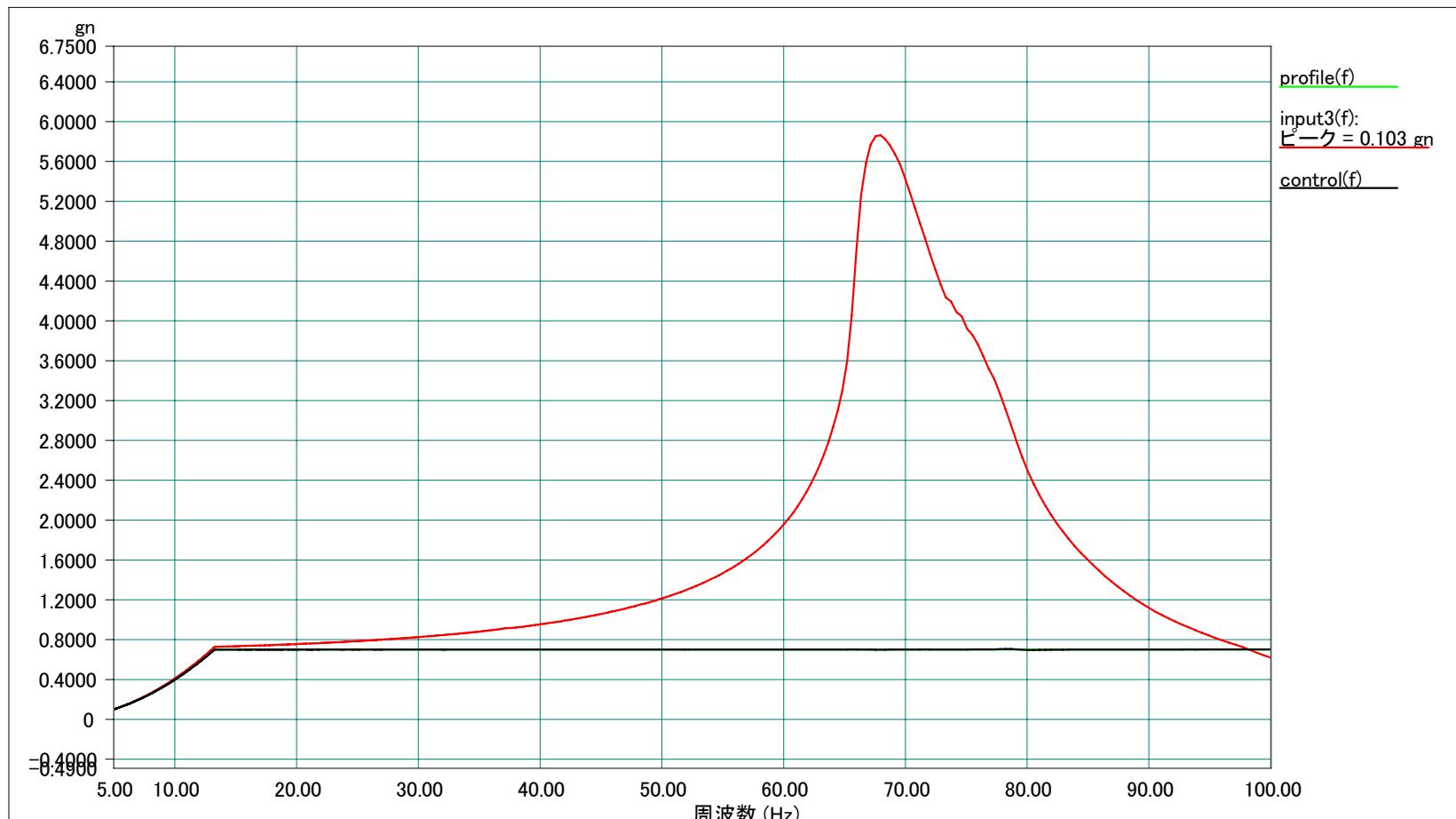
Project File Name: NT-1800 Y-Axis Vibration

Profile Name: IEC60945-Ed4

Test Type: Swept Sine

Run Folder:

.¥RunDefault Oct 18, 2007 09-56-37



Level: 100 %

Frequency: 5.001865 Hz

Control Peak: 0.100423 gn

Demand Peak: 0.100642 gn

Full Level Time: 00:17:18

Time Remaining: 00:00:00

Sweep Type: Logarithmic

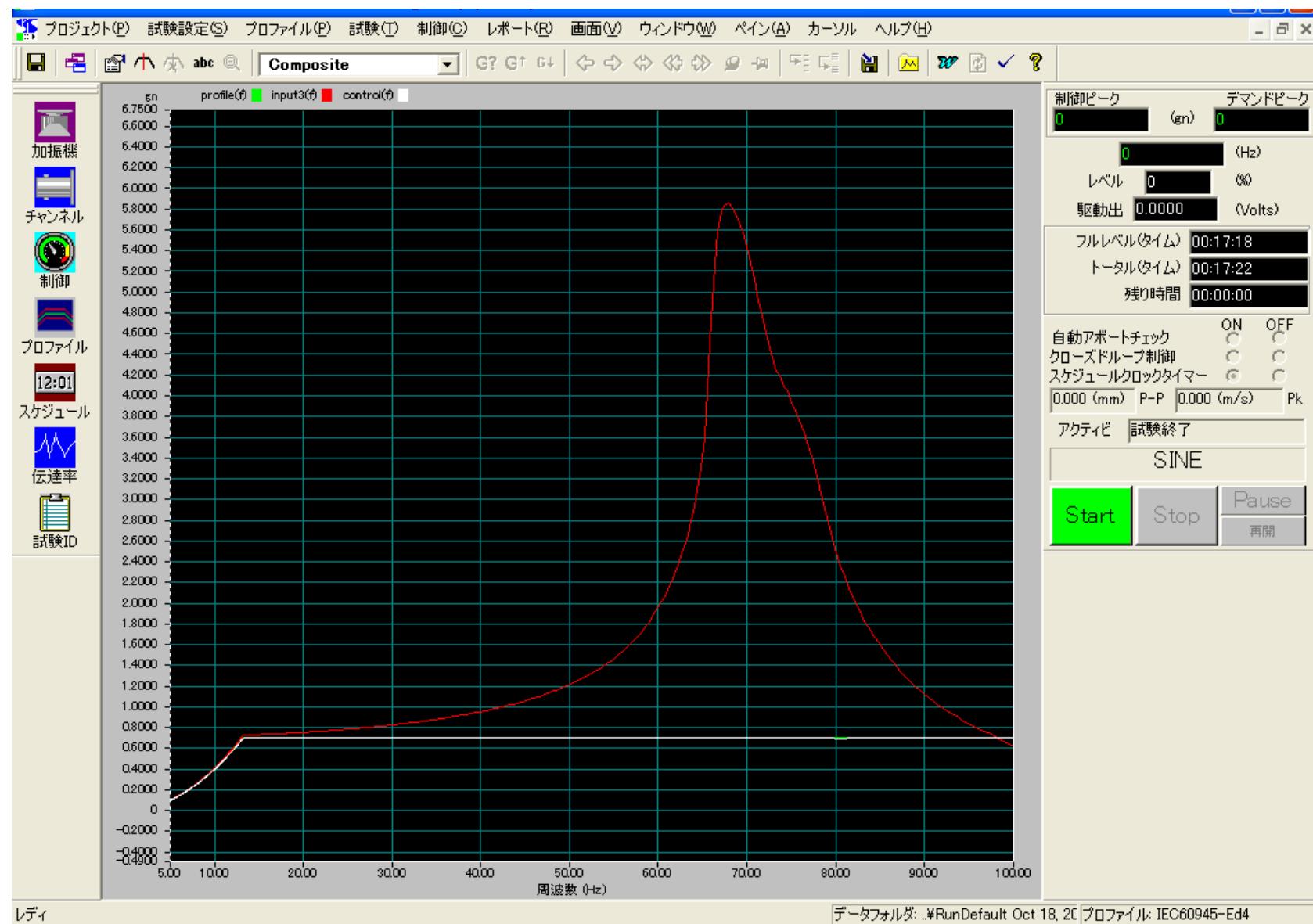
Sweep Rate: 0.5 Oct/Min

Data saved at 10:26:39 AM, Thursday, October 18, 2007

Report created at 10:26:41 AM, Thursday, October 18, 2007

Screen Copy of Y-Axis Resonance Search

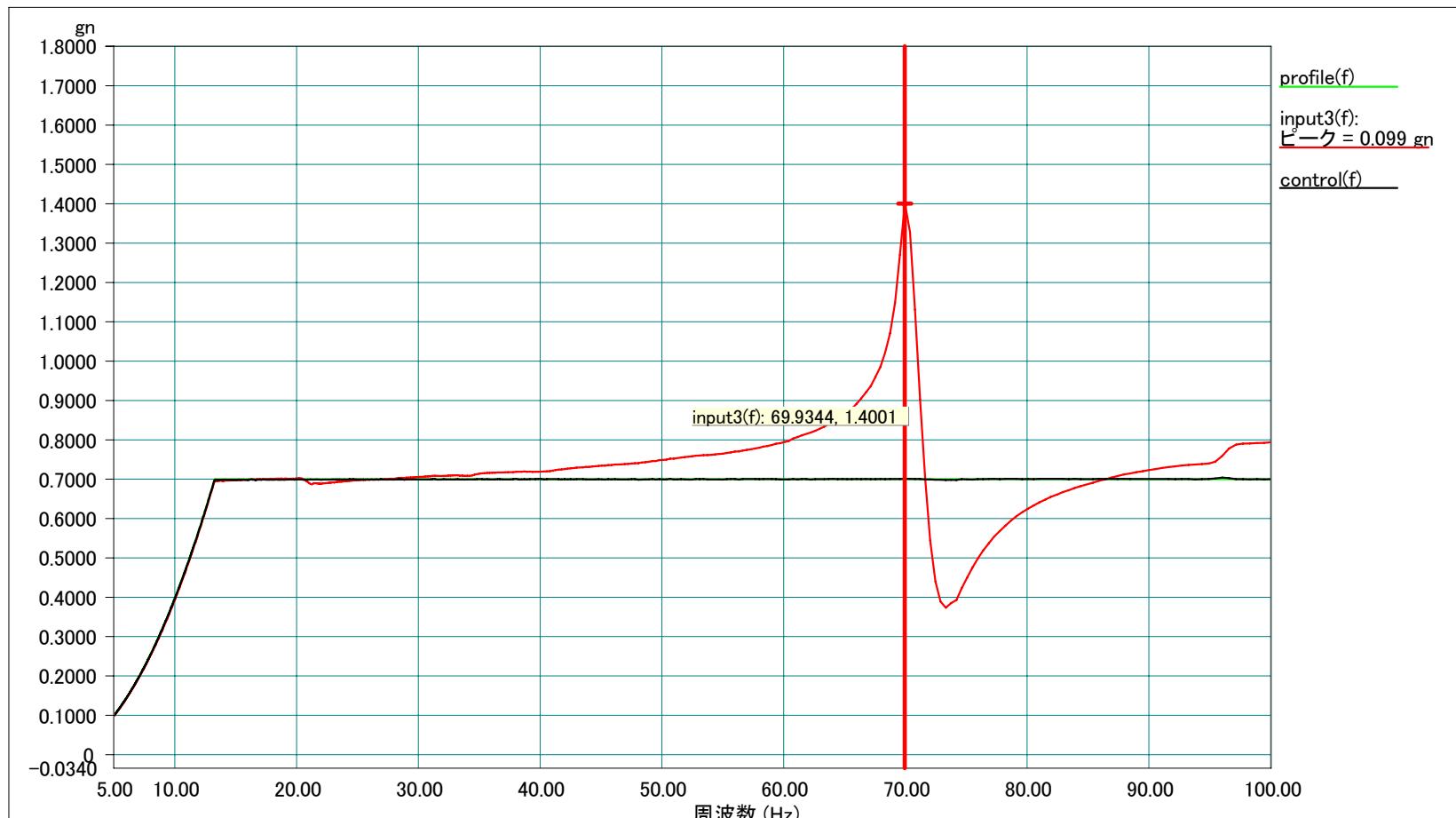
Project File Name: NT-1800 Wheel Mark Approval Test
Data saved at 10:26:39 AM, Thursday, October 18, 2007
Report created at 10:26:41 AM, Thursday, October 18, 2007



7.3 Z-Axis Vibration Resonance Search

Project File Name: NT-1800 Vibration Z-Axis Vibration
Profile Name: IEC60945-Ed4 Test Type: Swept Sine

Run Folder: .\RunDefault Oct 18, 2007 17-21-00



Level: 100 % Control Peak: 0.100367 gn Full Level Time: 00:17:18 Sweep Type: Logarithmic
Frequency: 5.000323 Hz Demand Peak: 0.100642 gn Time Remaining: 00:00:00 Sweep Rate: 0.5 Oct/Min

Data saved at 05:40:49 PM, Thursday, October 18, 2007

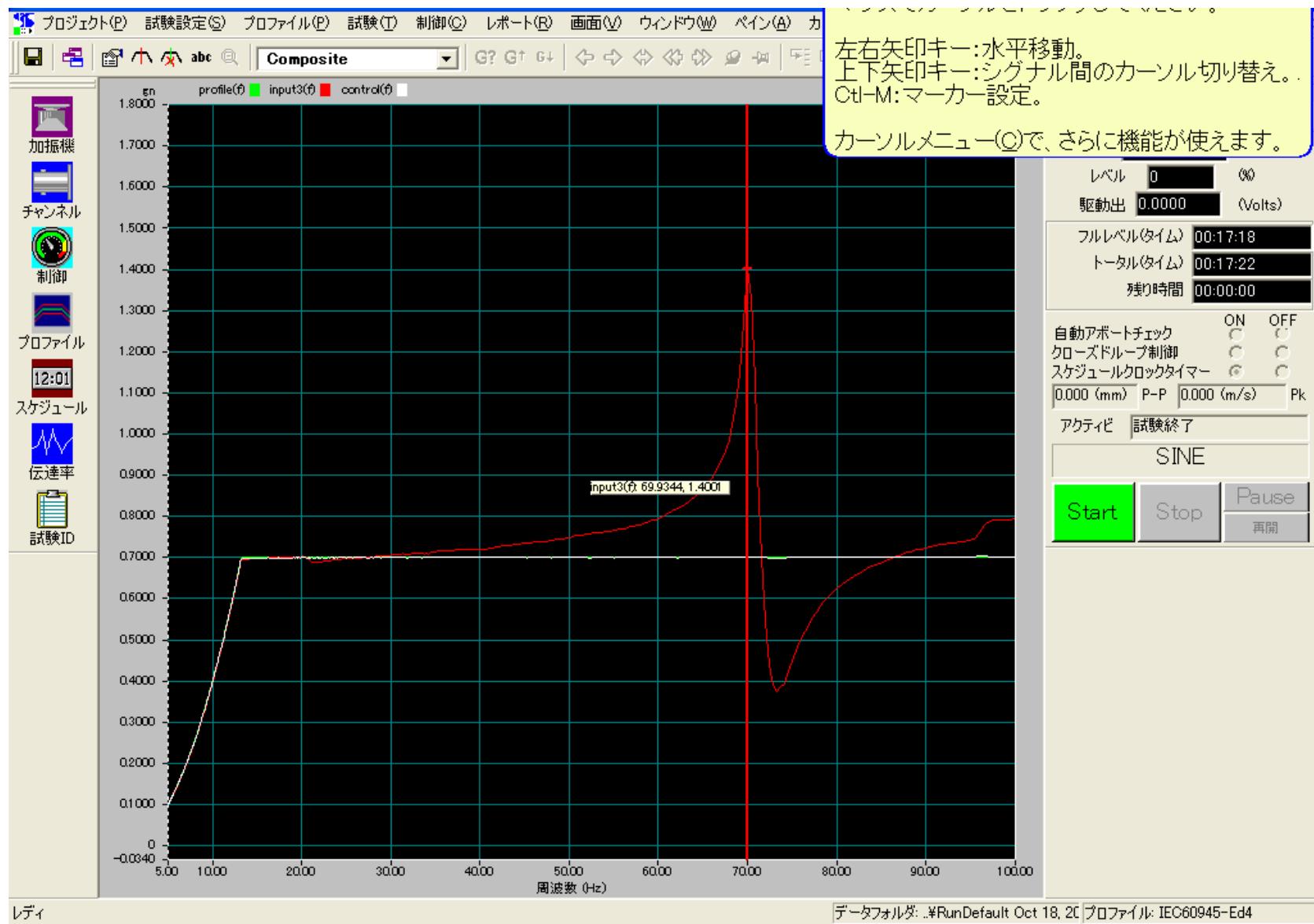
Report created at 05:40:50 PM, Thursday, October 18, 2007

Screen Copy of Z-Axis Resonance Search

Project File Name: NT-1800 Wheel Mark Type Approval Test

Data saved at 05:40:49 PM, Thursday, October 18, 2007

Report created at 05:40:50 PM, Thursday, October 18, 2007





8. Photos Showing Vibration Testing System and Method of Vibration Tests

Photo-1: Vibration Controller and Power Amplifier



Photo-2: Model and Manufacturer's Information of Vibration Testing System at TOKIMEC



Jmc

Photo-3: EUT Placed on Slip Table before Starting Y-Axis Test – 1/2



Photo-4: EUT Placed on Slip Table before Starting Y-Axis Test – 2/2

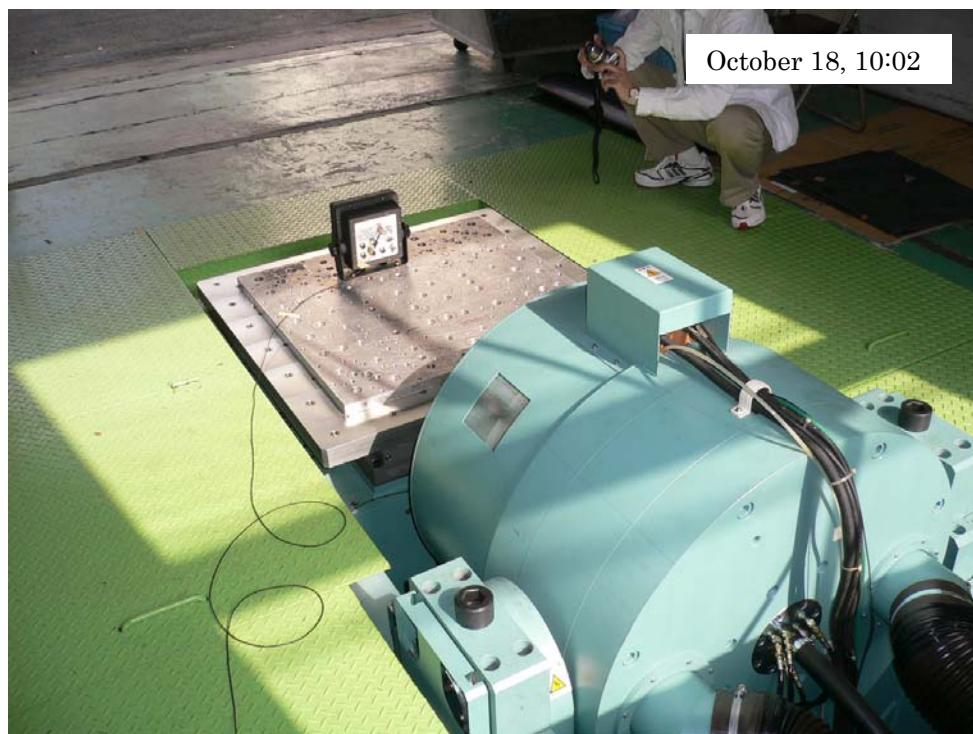




Photo-5: Searching for EUT's Resonance in Y-Axial Direction

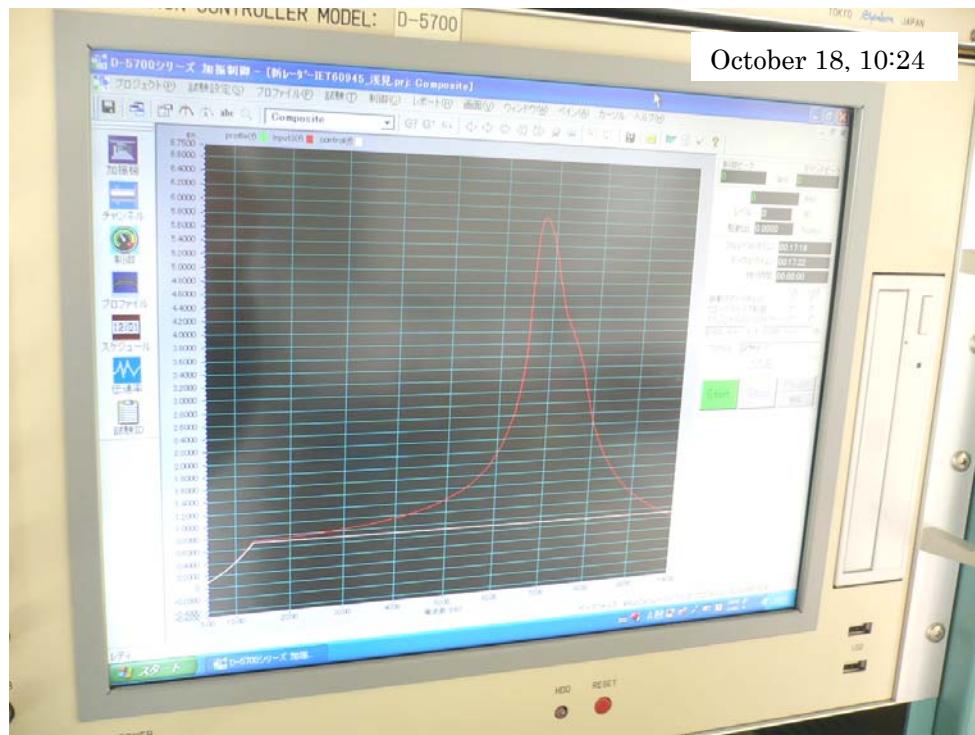


Photo-6: EUT before Completion of 2-Hour Y-Axis Endurance Test at Resonance



Photo-7: EUT Placed on Slip Table for X-Axis Test



Photo-8: Checking EUT's Sensitivity before Starting
2-Hour X-Axis Endurance Test at Resonance – 1/2



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Photo-9: Checking EUT's Sensitivity before Starting
2-Hour X-Axis Endurance Test at Resonance – 2/2



Photo-10: 2-Hour X-Axis Endurance Test at Resonance in Progress



Photo-11: Checking EUT's Sensitivity before Staring Z-Axis Test



Photo-12: Searching for Resonance in Z-Axial Direction – 1/2



Photo-13: Searching for Resonance in Z-Axial Direction – 2/2

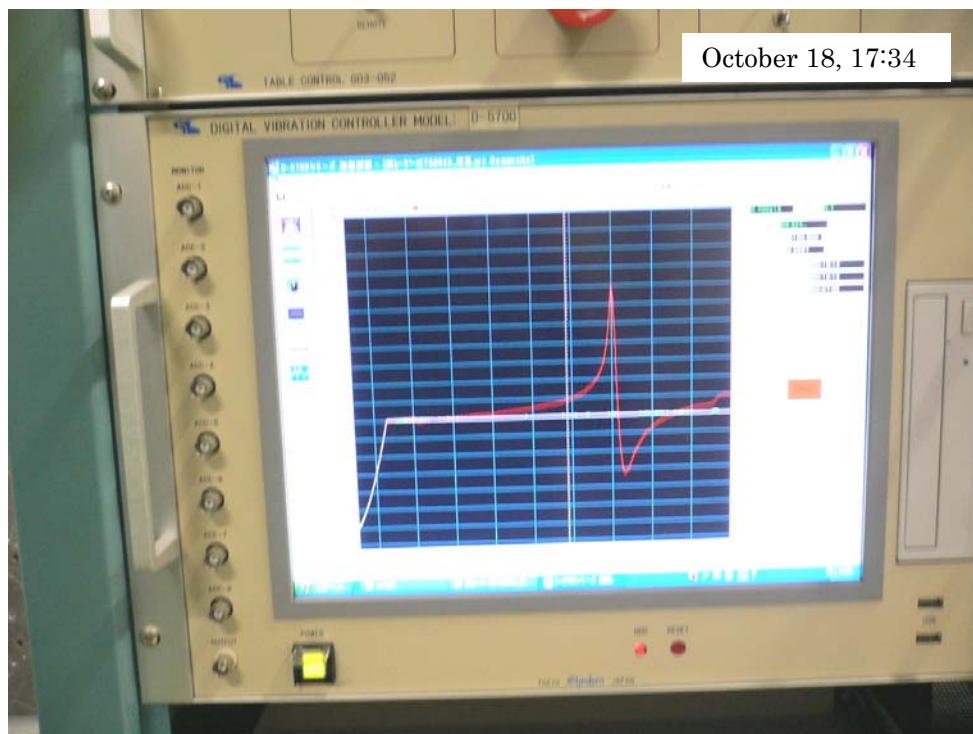


Photo-14: Checking EUT's Sensitivity before Starting
2-Hour Z-Axis Endurance Test at Resonance



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Photo-15: Checking EUT's Sensitivity on Completion of
2-Hour Z-Axis Endurance Test at Resonance





9. Test System and Test Equipment Used

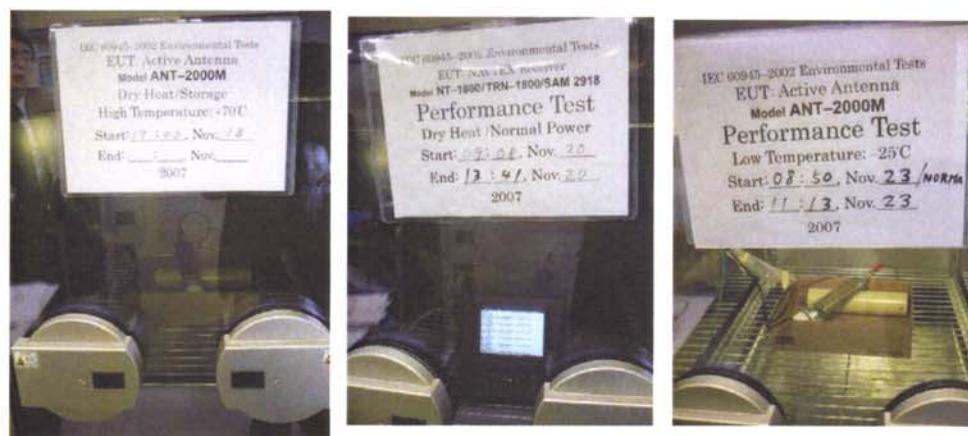
The following test system and test instruments were used for the EUT's vibration tests. The NAVTEX simulators were checked and calibrated in output frequency, waveform and level using the TOKIMEC-controlled electronic voltmeter, standard signal generator, frequency counter and oscilloscope prior to the start of the tests.

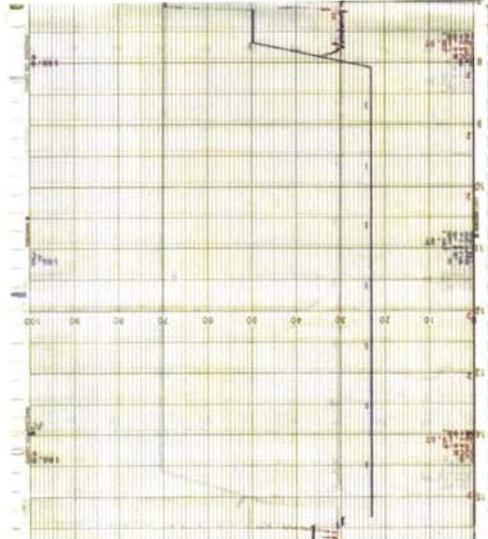
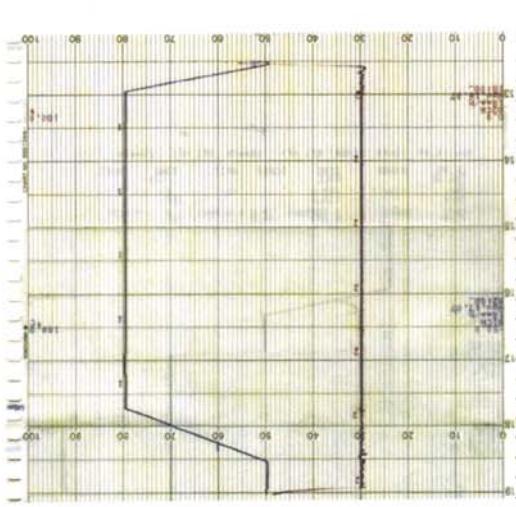
- (1) Vibration Testing System:
 - System Configuration Name: Model G-9230L
 - Manufacturer: Shinken Co. Ltd., Tokyo, Japan
 - TOKIMEC Control No.: 5-83-MKTV-15952 (installed in June, 2007)
 - Shaker (electrodynamic): G-25-230L
 - Vibration Controller: D-5700
 - Power Amplifier: G-14-021
- (2) NAVTEX Simulators:
 - 518 kHz: 8502C, s/n 9301 (on-site calibration, 16 Oct. 2007)
 - 490 kHz: 8502E, s/n 9404 (on-site calibration, 16 Oct. 2007)
 - 4209.5 kHz: MARCONI Standard Signal Generator 2030 (FSK-modulated with RC Audio Oscillator)
- (3) Electronic Voltmeter:
 - TOKIMEC Control No.: AK-3
 - Calibration: Valid till February, 2008
- (4) Standard Signal Generator:
 - TOKIMEC Control No.: MEGP 12051-3
 - Calibration: Valid till August, 2008
- (5) RC Audio Oscillator:
 - TOKIMEC Control No.: MATSUSHITA VP722A
 - Calibration: MEGL-Y012
 - Calibration: Valid till January, 2008
- (6) Frequency Counter:
 - TOKIMEC Control No.: AGILENT 53132A
 - Calibration: MEFH-K001
 - Calibration: Valid till June, 2008
- (7) Oscilloscope:
 - TOKIMEC Control No.: TEKTRONIX TDS684B, digital realtime oscilloscope
 - Calibration: MEOS-12261-1
 - Calibration: Valid till October, 2008
- (8) RF Attenuators:
 - AK-6 (1-dB steps): HEWLETT-PACKARD
 - AK-7 (10-dB steps): On-site Calibration (16 October, 2007)
 - AK-7 (10-dB steps): On-site Calibration (16 October, 2007)
- (9) DC Power Supply:
 - Calibration: METRONIX 411A-63
 - Calibration: On-site Calibration (16 October, 2007)

NT-1800 Temperature test data Date: Nov. 19th – 23rd, 2007

Test site: TOKIMEC Head office environmental test room S/NoS05600001

NT-1800 Performance test equipment





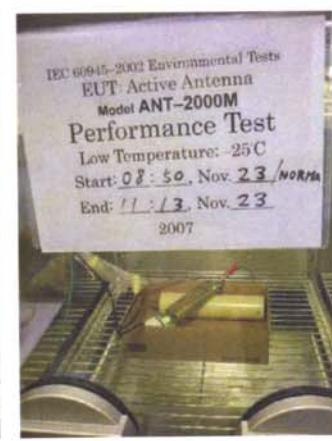
NT-1800Test system Photo Page: #1

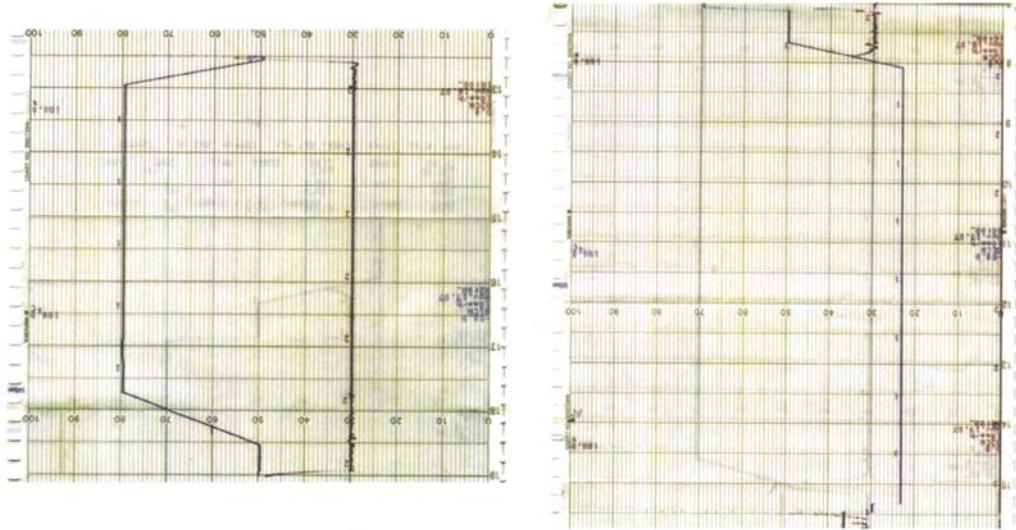
NT-1800 Temperature test data Date: Nov. 19th – 23rd, 2007

Test site: TOKIMEC Head office environmental test room

S/NoS05600001

NT-1800 Performance test equipment





Corrosion (Salt mist) (all equipment categories)

The corrosion test shall be waived where the manufacturer is able to produce evidence that the component, materials and finishes employed in the equipment would satisfy the test.

The building materials used for Navtex NT-1800 are the same as used for Navigation Sounder F-2000.



Corrosion Test Report
for
Navigation Echo Sounder Model F-2000/SAM 4620

Date: July 8, 2005

1. Introduction

This report is compiled from the results of the corrosion tests (salt mist spraying tests) conducted on a production unit of the Model **F-2000/SAM 4620** at an official laboratory (Industrial Research Institute) in Aichi Prefecture where ^{*1}JMC's manufacturing subcontractor (Makino Electronics Inc.) is located. The test specifications employed are based on the relevant international standards specified below.

The documents (test certificates and photos) attached to this report show how the tests were conducted and the test results obtained. The original certificates issued by the laboratory are in Japanese. Their English-translated version is also attached to the overleaf of each certificate.

^{*1}JMC = Japan Marina Company Limited

2. Equipment-under-Test (EUT), Test Standards and Test Equipment

- EUT: **F-2000/SAM 4620** (serial # 0510000) including AC-2000 AC Power Adapter
- Test Standards: Japan Industrial Standards (JIS) Z 2371, compatible with corrosion test defined in para. 8.12 of IEC 60945 (2002)
- Test Specifications:
 - Salinity: 40 to 60 grams/liter
 - Spray Solution pH: 6.5 to 7.2
 - Rate of Spray: 1.0 to 2.0 milliliters/80 cm² / hour
 - Test Duration: 2 hours for each test
- Test Equipment:
 - Corrosion Tester: Model BQ-1 Complex Corrosion Tester (serial # 6211088)
 - Temperature Chamber: Model FX206C Constant Temperature Test Chamber (Serial #: 119810021), Manufacturer: ETAC Engineering Corp.
- Participating Engineers:
 - Ind. Research Institute: Y. Matsuda, Research Engineer, Supervisor of Tests
 - Makino Electronics Inc.: T. Nagura, Chief Development Engineer, K. Ohusa
 - Japan Marina Co. Ltd.: H. Ichikawa, Tech. Manager, T. Hashimoto, Consultant

3. Dates of Tests Conducted and Corresponding Test Certificates

All test certificates were issued on 6th July, 2005 after completion of the tests.

- First Test: 10th June, 2005, certificate #I-678
- Second Test: 17th June, 2005, certificate #I-737
- Third Test: 24th June, 2005, certificate #I-798
- Fourth Test: 1st July, 2005, certificate #I-876

4. Test Results

4.1. View of Corrosion Test Equipment

- Photo 1: Entrance to Industrial Research Institute
- Photo 2: Front View (1) of Model BQ-1 Complex Corrosion Tester
- Photo 3: Front View (2) of Model BQ-1 Complex Corrosion Tester
- Photo 4: EUT & AC-2000 Placed in Tester, just before First Test, 10th June

4.2. Test Results

4.2.1. Intermediate Results

- Photo 5: View of EUT Just after Completion of First Saltwater Mist Spray Test
- Photo 6: View of EUT in Model FX206C Constant Temperature Test Chamber
- Photo 7: View of EUT Just before Start of 2nd Saltwater Mist Spray Test
- Photo 8: View of EUT Just after Completion of 2nd Saltwater Mist Spray Test
- Photo 9: View of EUT in Model FX206C Constant Temperature Test Chamber
- Photo 10: View of EUT Just before Start of 3rd Saltwater Mist Spray Test
- Photo 11: View of EUT Just after Completion of 3rd Saltwater Mist Spray Test
- Photo 12: View of EUT in Model FX206C Constant Temperature Test Chamber
- Photo 13: View (1) of EUT Just after Completion of 4th Saltwater Mist Spray Test
- Photo 14: View (2) of EUT Just after Completion of 4th Saltwater Mist Spray Test
- Photo 15: View of EUT in Model FX206C Constant Temperature Test Chamber

4.2.2. Final Results

- Photo 16: Test Results #1, View of EUT upon Completion of One Week of Drying Up
- Photo 17: Test Results #2, Checking EUT's Performance after Removal From Chamber
- Photo 18: Test Results #3, Rear Panel of EUT
- Photo 19: Test Results #4, Bottom View of AC-2000 AC Adapter
- Photo 20: Test Results #5, Front View of AC-2000 AC Adapter

4.2.3. Observation of Test Results

Corrosion Checks:

• EUT (**F-2000/SAM 4620**)

Photos 18 shows the rear panel condition on completion of one week of drying up after the 4th salt water spray testing. The whitened parts on the anodized aluminum panel and connectors indicate crystalline formation of salt, and could be removed easily. The equipment cabinet is made of ABS-plastic and free from corrosion.

• AC-Adapter (**AC-2000**)

Photos 19 and 20 show the surface condition on completion of one week of drying up after the 4th salt water spray testing. A certain degree of corrosion (rust) was observed around the edges of the case on the bottom side and around the AC input connector. However this corrosion did not affect the performance of the unit in any way, and the original surface condition could be restored easily with a coat of anti-rusting paint after its removal with emery paper.

Performance Checks:

Photo 17 shows the EUT working normally on completion of one week of drying up after the 4th salt water spray testing. No sign of malfunction was found after completion of each test cycle. The AC adapter provided the specified DC output to the EUT each time.

5. Test Certificates

Certificate #I-678 for First Spray Test, 10th June 2005

					
様式第4 (第2条関係)					
17産研 第1-678号					
成績書					
依 頼 者	住 所	愛知県蒲郡市御幸町13-2			
	氏 名 名称 及び 代表者氏名	株式会社マキノ電気			
依頼事項		塩水噴霧試験			
試 料		品 名	ナブサウンダー F-2000		数 量
成 績	依頼年月日 平成17年6月10日				
	1. 試験条件 使用機器 複合腐食試験機 BQ-1 特殊型(板橋理化工業製) NaCl濃度 50 ± 5 g/L 試験温度 26~35 °C 試験日 平成17年6月10日 試験時間 2時間				
	2. 試験結果 試料のとおり 以下余白				
	績				
受付施設		産業技術研究所 工業技術部			
試料の成績は上記のとおりです。					
平成17年7月6日					
愛知県産業技術研究所長			瀧森 鉄生		
					

Translation of Certificate #I-678

FORM #4 (2nd Clause)

17 SANKEN No.1-678

Test Certificate

Applicant	Address	13-2 Miyuki-cho, Gamagori City, Aichi Prefecture		
	Name	Makino Electronics Inc.		
Type of Test Applied		Salt water spray test		
Equipment under Test (EUT)		Product Name	Navigation Sounder F-2000	Quantity 1
Test Details	Date of Application:	10th June, 2005		
	Test Specifications:			
	Test Equipment:	Complex Corrosion Tester BQ1 Special Version (Manufactured by Itabashi Rika Industry Co. Ltd.)		
	NaCl Salinity:	50 ± 5 grams / liter		
	Test Chamber Temp.:	26 to 35°C		
	Test Date:	10th June, 2005		
	Test Duration:	2 hours		
Test Results:	*2As shown			
<i>Nothing written below in this column</i>				
This certifies that the test results are as described above.				
6th July, 2005				
Signed by:				
Tetsuo Takimori, Head Officer Industrial Research Institute, Aichi Prefectural Government				

*2: Result was shown in photo 5.

Certificate #I-737 for Second Spray Test, 17th June 2005

大

様式第4 (第2条関係)

17産研 第1-737号						
成績書						
依 頼 者	住 所	愛知県蒲郡市御幸町13-2				
	氏 名 名称 及び 代表者氏名	株式会社マキノ電気				
依頼事項		塩水噴霧試験				
試 料		品 名	ナブサウンダー F-2000		数 量	1
成 績	依頼年月日 平成17年6月17日					
	1. 試験条件 使用機器 複合腐食試験機BQ-1特殊型(板橋理化工業製) NaCl濃度 50 ± 5 g/L 試験温度 26~35 °C 試験日 平成17年6月17日 試験時間 2時間					
	2. 試験結果 試料のとおり 以下余白					
受付施設		産業技術研究所 工業技術部				
試料の成績は上記のとおりです。 平成17年7月6日						
愛知県産業技術研究所長			瀧森 鉄生			



Translation of Certificate #I-678

FORM #4 (2nd Clause)

17 SANKEN No.1-737

Test Certificate

Applicant	Address Name	13-2 Miyuki-cho, Gamagori City, Aichi Prefecture Makino Electronics Inc.		
Type of Test Applied		Salt water spray test		
Equipment under Test (EUT)		Product Name	Navigation Sounder F-2000	Quantity 1
Test Details	<p>Date of Application: 17th June, 2005 Test Specifications: Test Equipment: Complex Corrosion Tester BQ1 Special Version (Manufactured by Itabashi Rika Industry Co. Ltd.) NaCl Salinity: 50 ± 5 grams / liter Test Chamber Temp.: 26 to 35°C Test Date: 17th June, 2005 Test Duration: 2 hours Test Results: *³As shown</p> <p><i>Nothing written below in this column</i></p>			
<p>This certifies that the test results are as described above. 6th July, 2005</p> <p>Signed by: Tetsuo Takimori, Head Officer Industrial Research Institute, Aichi Prefectural Government</p>				

*³: Result was shown in photo 8.

Certificate #I-798 for Third Spray Test, 24th June 2005

大

様式第4 (第2条関係)

17産研 第1-798号

成績書

依頼者	住所	愛知県蒲郡市御幸町13-2		
	氏名 名称及び 代表者氏名	株式会社マキノ電気		
依頼事項		塩水噴霧試験		
試料	品名	ナブサウンダー F-2000	数量	1
成績	依頼年月日	平成17年6月24日		
	1. 試験条件	使用機器 複合腐食試験機BQ-1特殊型(板橋理化工業製) NaCl濃度 50 ± 5 g/L 試験温度 26~35 °C 試験日 平成17年6月24日 試験時間 2時間		
	2. 試験結果	試料のとおり 以下余白		
受付施設	産業技術研究所 工業技術部			
試料の成績は上記のとおりです。 平成17年7月6日				
愛知県産業技術研究所長		瀧森鉄生		



Translation of Certificate #I-798

FORM #4 (2nd Clause)

17 SANKEN No.1-798

Test Certificate

Applicant	Address	13-2 Miyuki-cho, Gamagori City, Aichi Prefecture		
	Name	Makino Electronics Inc.		
Type of Test Applied		Salt water spray test		
Equipment under Test (EUT)		Product Name	Navigation Sounder F-2000	Quantity 1
Test Details	Date of Application:	24th June, 2005		
	Test Specifications:			
	Test Equipment:	Complex Corrosion Tester BQ1 Special Version (Manufactured by Itabashi Rika Industry Co. Ltd.)		
	NaCl Salinity:	50 ± 5 grams / liter		
	Test Chamber Temp.:	26 to 35°C		
	Test Date:	24th June, 2005		
	Test Duration:	2 hours		
Test Results:	* ⁴ As shown			
<i>Nothing written below in this column</i>				
This certifies that the test results are as described above.				
6th July, 2005				
Signed by:				
Tetsuo Takimori, Head Officer Industrial Research Institute, Aichi Prefectural Government				

*⁴: Result was shown in photo 11.

Certificate #I-876 for Fourth Spray Test (Final Test), 1st July 2005

大

様式第4 (第2条関係)

成績書					
依頼者	住 所	愛知県蒲郡市御幸町13-2			
	氏 名 名称 及び 代表者氏名	株式会社マキノ電気			
依頼事項		塩水噴霧試験			
試 料		品名	ナブサウンダー F-2000	数 量	1
成 績	依頼年月日 平成17年7月1日				
	1. 試験条件 使用機器 複合腐食試験機BQ-1特殊型(板橋理化工業製) NaCl濃度 50 ± 5 g/L 試験温度 26~35 °C 試験日 平成17年7月1日 試験時間 2時間				
	2. 試験結果 試料のとおり 以下余白				
受付施設		産業技術研究所 工業技術部			
試料の成績は上記のとおりです。					
平成17年7月6日					
愛知県産業技術研究所長			瀧森 鉄生		

Translation of Certificate #I-876

FORM #4 (2nd Clause)

17 SANKEN No.1-876

Test Certificate

Applicant	Address	13-2 Miyuki-cho, Gamagori City, Aichi Prefecture		
	Name	Makino Electronics Inc.		
Type of Test Applied	Salt water spray test			
Equipment under Test (EUT)	Product Name	Navigation Sounder F-2000	Quantity	1
Test Details	Date of Application:	1st July, 2005		
	Test Specifications:			
	Test Equipment:	Complex Corrosion Tester BQ1 Special Version (Manufactured by Itabashi Rika Industry Co. Ltd.)		
	NaCl Salinity:	50 ± 5 grams / liter		
	Test Chamber Temp.:	26 to 35°C		
	Test Date:	1st July, 2005		
	Test Duration:	2 hours		
Test Results:	*5As shown			
<i>Nothing written below in this column</i>				
This certifies that the test results are as described above.				
6th July, 2005				
Signed by:				
Tetsuo Takimori, Head Officer Industrial Research Institute, Aichi Prefectural Government				

*5: Result was shown in photos 13 and 14.

Photo 1: Entrance to Industrial Research Institute
Kariya City, Aichi Prefecture 448-0003, Japan
Phone: 0566-24-1841, FAX: 0566-22-8033
Website: <http://www.arii.aichi-iic.or.jp/>



Photo 2: Front View (1) of Model BQ-1 Complex Corrosion Tester
(Pressure Gauge)



Photo 3: Front View (2) of Model BQ-1 Complex Corrosion Tester
(Recorder, Programmable Temp. Controller, Alarm Monitor Lamps)



Photo 4: EUT & AC-2000 Placed in Chamber, Just before 1st Saltwater Mist Spray Test
10th June 2005 at 13:37



Photo 5: View of EUT Just after Completion of 1st Saltwater Mist Spray Test
10th June, 2005 at 16:52



Photo 6: View of EUT in Model FX206C Constant Temperature Test Chamber
10th June, 2005 at 17:57 (Chamber set to $40 \pm 2^\circ \text{C}$ and 90 to 95% RH)



The EUT was left in the chamber until the start of the 2nd test on 17th June, 2005.

Photo 7: View of EUT Just before Start of 2nd Saltwater Mist Spray Test
17th June, 2005 at 13:39



The above photo shows the EUT working normally after one week (10th to 17th June) of continuous placement in the environment test chamber.

Photo 8: View of EUT Just after Completion of 2nd Saltwater Mist Spray Test
17th June, 2005 at 15:41



Photo 9: View of EUT in Model FX206C Constant Temperature Test Chamber
17th June, 2005 at 17:06 (Chamber set to $40 \pm 2^\circ \text{C}$ and 90 to 95% RH)



The EUT was left in the chamber until the start of the 3rd test on 24th June, 2005.

Photo 10: View of EUT Just before Start of 3rd Saltwater Mist Spray Test
24th June, 2005 at 13:35



The above photo shows the EUT working normally after one week (17th to 24th June) of continuous placement in the environment test chamber.

Photo 11: View of EUT Just after Completion of 3rd Saltwater Mist Spray Test
24th June, 2005 at 15:38



Photo 12: View of EUT in Model FX206C Constant Temperature Test Chamber
24th June, 2005 at 16:49 (Chamber set to $40 \pm 2^\circ \text{C}$ and 90 to 95% RH)



The EUT was left in the chamber until the start of the 4th test on 1st July, 2005.

Photo 13: View (1) of EUT Just after Completion of 4th Saltwater Mist Spray Test
1st July, 2005 at 15:42



Photo 14: View (2) Of EUT Just after Completion of 4th Saltwater Mist Spray Test
1st July, 2005 at 15:42



Photo 15: View of EUT in Model FX206C Constant Temperature Test Chamber
1st July, 2005 at 17:30 (Chamber set to $40 \pm 2^\circ \text{C}$ and 90 to 95% RH)



Photo 16: Test Results #1
View of EUT upon Completion of One Week of Drying Up
8th July, 2005 at 16:01



Photo 17: Test Results #2
Checking EUT's Performance after Removal from Chamber
8th July, 2005 at 16:34



Photo 18: Test Results #3
Rear Panel of EUT,
8th July, 2005 at 16:35



Photo 19: Test Results #4
Bottom View of AC-2000 AC Adapter
8th July, 2005 at 16:35



Photo 20: Test Results #5
Front View of AC-2000 AC Adapter
8th July, 2005 at 16:35

