

In order to conduct radiometric calibration we need the following:

#### Radiance Measuring System

This system will permit to compare radiometric sources in order to calibrate the unknown. It will be composed of :

- \* Optical bench.
- \* Standard sources < UV visible, IR >.
- \* Grating spectrometer with different gratings.
- \* Bandpass filters.
- \* Optic < mirrors, lens >.
- \* Photomultiplier and adequate HT power supply.
- \* DMM.
- \* Stabilized power supplies.
- \* Microcontrol tables < to move sources >.
- \* Personal Computer.
- \* Special optical system to compare radiance and irradiation.
- \* Others.

#### Transmission Measuring System

This system will be used to measure the transmission of filters. It will be composed of :

- \* Optical bench.
- \* Length sources.
- \* Grating spectrometer with different gratings.
- \* Optic.
- \* Bandpass filters.
- \* Photomultiplier and adequate high tension power supply.
- \* Stabilized power supply.
- \* DMM.
- \* Personal computer.
- \* Others.

### Sensibility Spectral Measuring System

This system will permit the measurement of the spectral response of photodiodes or others detectors. It will be composed of two subsystems: One to determine the relative spectral response and the other to fix the absolute value.

#### Relative Measurement Subsystem

- \* Optical bench.
- \* Xenon arc .
- \* Grating spectrometers .
- \* Thermopiles.
- \* Filters.
- \* DMM.
- \* Microcontrol table.
- \* Personal computer.
- \* Others.

#### Absolute Measurement System

- \* Standard light source.
- \* Graduate optical bench.
- \* Bandpass filters.
- \* DMM.
- \* Stabilized power supply.
- \* personal computer.
- \* Others.

#### IV - Other Facilities:

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others systems to measure quantities related to pressure ,force , hardness, and flatness , in addition to a small workshop to enable us to make small precise pieces needed for mechanical and optical measurements.



**Attachment (5) : Additional Required Equipment**



ADDITIONAL EQUIPEMENT NEEDED FOR N. S. C. I.

P	TYPE	DESCRIPTION	Manufacturer	Qt	Sec
1	ML4803A	power meter	Anritsu	1	RF
2	HN683A	Unbalance unit	Anritsu	1	RF
3	HP4692D	Dual Directional Coupler	HP	1	RF
4		Programmable filter FC 140 KHz to 1.2GHz		1	RF
5		Accessories for 75 ohm device measurement : - accessories for unbalance unit - SWR, Bridge & its necessary accessories - 75 Ohm dual directional coupler - 75 Ohm power splitter - 75 Ohm cables & adapters		1	RF
6	SA-2500S	AC VOLTAGE REGULATOR (11.4A)	YUTAKA ELEC	3	RF
7	HP 11667a	power splitter.	HP	1	RF
8		Universal high Capacity fine-wire Winding machine.	Heteor	1	Rep

P	TYPE	DESCRIPTION	Manufacturer	Qt	Sec
9		AC Center tap reference transformer		1	AC
10	GR 1288	AC null detector		1	AC
11	2781	Double-walled St'd Resistor 1 ohm	Yokogawa	1	DC
12	9923 & 9606	Range Extender; for measuring standard resistors from 0.001 ohm-0.1ohm at DC current from 1 A to 100 A Accuracy : 1000:1, 100:1, 10:1	Guild line	1	DC
13	720 A	kilven - Varly voltage divider; Ratio range : 0 to 1.0 and 0 to 1.1 Resolution : 0.1 ppm, "seven decades Absolute linearity: +0.1 PPM	Fluke	1	DC
14	721 A	Lead Compensator Resolution of resistance compensation: 0.1 m ohm Max ratio between divider resistance 4000/1	Fluke	1	DC
15	1406- A	1000 PF coaxial capacitance standard stability: 0.05 %/year 50 ppm at 1MHz	G.R.	1	DC
16	1406- D	1000 PF coaxial capacitor standard stability: 0.05 % /year Dissipation factor: 20ppm at 1 MHz	G.R.	1	DC
17	1615-P 2	Coaxial Adapter	G.R.	1	DC&AC

P	TYPE	DESCRIPTION	Manufacturer	Qt	Sec
18	1232-A	Tuned amplifier and null detector Frequency response: 20 HZ to 20KHZ Sensitivity : 0.1 uV	G.R.	2	DC&RC
19	1491-G	Decade inductor : Inductance range : 0.0001 H to 11.111 H	G.R.	1	DC&RC
20	1482-L	Standard Inductor Inductance : 100 mH Accuracy : 0.1 % Stability : 0.01 % / year	G.R.	1	DC&RC
21		Tunable phase and amplitude detector lock in amplifier EG type 5208		1	DC&RC
22		Insulation transformer " for capacitance measurements"		2	DC&RC
23	6500	Digital Teraohmmeter Range : 10 to 10 ohm or 10 to 10 apps. Test voltage : from 1 V to 1000 V	Guildline	1	DC&RC
24		AC generator dc up to 100 KHz variable phase & amplitude		1	AC
25		Ac Resistor 1 n ohm for the active shunt ballantine 125 and current shunt fluke		1	AC
26		Isolation transformer	KROHN HITE	1	AC
27		Curve Tracer-With all options	Tek	1	REP
28	7904 A,7A22,7A26 7B80,7S11,7T11 S-6,S-3A/100X	Oscilloscope Sampling system &Attenuator head	Tek	1	REP





*ANNEX (4)*

*AGENDA FOR DELIBERATIONS SUBMITTED BY THE JICA TEAM*



議題 ( A G E N D A )

1. 1990年度の進捗状況

(PROGRESSS SITUATION OF FISCAL 1990) AND PLANS OF FISCAL 1991-1992

a. 専門家派遣

(DISPATCH OF EXPERTS)

a - 1 長期

(LONG TERM)

a - 1 短期

(SHORT TERM)

b. 研修員受入れ

(TRAINING OF COUNTERPART PERSONEL IN JAPAN)

c. 機材供与

(PROVISION OF EQUIPEMENT)

(1) 供与

(PROVISION)

(2) 利用状況

(SITUATION OF USE)

d. C / P 配置状況

(SITUATION OF ALLOCATION OF COUNTERPART PERSONNEL)

e. 予算措置

(BUDGETARY MEASURES)

2. その他

(OTHERS)

g. その他実施運営上の問題点

(OTHERS)

(1) 新規要請案件

(FURTHER POSSIBLE COOPERATION PROJECT)

(2) 第三国研修プログラム

(THIRD COUNTRY GROUP TRAINING PROGRAMME)

(3) 第2フェーズ協力

(TECHNICAL COOPERATION TO THE PHASE. 2 ON THIS PROJECT)

(4) 定期会議の開催

(HOLDING PERIODICAL MEETING)

h. 技術協力計画

(TECHNICAL COOPERATION PLAN)

(1) 二次標準校正システム

(SECONDARY STANDARD AND CALIBRATION SYSTEM)

(2) 一次標準校正システム

(PRIMARY STANDARD AND CALIBRATION SYSTEM)

(3) 三次標準校正システム、修理ベンチ

(TERTIARY STANDARD AND CALIBRATION SYSTEM, REPAIR BENCH)

(4) 校正実績、修理実績

(ACHIEVEMENTS OF CALIBRATION AND REPAIR)

(5) 「NSCL規定」の作成

(MAKING STIPULATIONS OF NSCL)

(6) 1991年度および1992年計画

(TECHNICAL COOPERATION PLAN FOR FISCAL 1991 EXTENDING TO FISCAL 1992)

*ANNEX (5)*

*TECHNICAL COOPERATION PLAN*



TECHNICAL CO-OPERATION PLAN

- 1) NSCL property control  
(secondary , tertiary and repair systems)
- 2) Preparation of calibration procedures  
(secondary )  
Or  
Calibration by upper level  
measuring instruments and  
periodic calibration  
( Tertiary + repair benches).
- 3) Preparation of record formats  
(secondary).  
Or  
Practice of trouble-shooting  
(tertiary & repair systems)
- 4) Accuracy checking of measuring  
instruments ( secondary ).  
Or  
Practice of adjustment and calibratio  
calibration ( tertiary ).
- 5) Calibration of lower level  
measuring instruments  
( primary, secondary ).  
Or  
Preparation of repair report  
( tertiary & repair ).
- 6) NSCL property control  
( Primary)
- 7) Preparation of calibration  
procedures ( primary ).  
Or  
Maintenance and Kule of tools  
and auxilliary equipment ,periodic  
check ( tertiary and repair  
work-shop)
- 8) Accuracy checking of measuring  
instruments (primary).
- 9) Calibartion of lower level measuring  
instruments (primary).
- 10) Practice of calibration service  
(primary).
- 11) Evaluation of primary standards  
(primary ).
- 12) Periodic calibartion ( primary ).
- 13) Use of transfer standard check and calibrate  
the national standards of NSCL



1, DC. VOLTAGE AND CURRENT STANDARD AND CALIBRATION SYSTEM

I T E M	1 9 8 9			1 9 9 0		1 9 9 1		1 9 9 2		
	jan	jun	dec	jun	dec	jun	dec	jun	dec	
SECONDARY STANDARD AND CALIBRATION SYSTEM	①		✓							
	②									
	③	✓								
	④			✓		①				
	⑤					✓				
	⑩									
	PRIMARY STANDARD AND CALIBRATION SYSTEM				⑥		✓			
					⑦		✓			
					⑧		✓			
					⑨		✓			
					⑩			⑪		
								⑫		
								⑬		
									⑭	
									⑮	
									⑯	

——— Planned
✓ Realized
To be Continued

2, RESISTANCE AND CAPACITANCE STANDARD AND CALIBRATION SYSTEM

I T E M	1 9 8 9			1 9 9 0		1 9 9 1		1 9 9 2		
	jan	jun	dec	jun	dec	jun	dec	jun	dec	
SECONDARY STANDARD AND CALIBRATION SYSTEM	①			✓						
	②									
	③		✓							
	④			✓			①			
	⑤									
	⑩									
	PRIMARY STANDARD AND CALIBRATION SYSTEM	⑥								
		⑦				✓				
		⑧					✓			
		⑨						✓		
⑩							✓			
⑪										
⑫										
⑬										

✓

Planned

Realized

To be Continued

3, TEMPERATURE STANDARD AND CALIBRATION SYSTEM

I T E M	1 9 8 9			1 9 9 0		1 9 9 1		1 9 9 2		
	jan	jun	dec	jun	dec	jun	dec	jun	dec	
PRIMARY STANDARD AND CALIBRATION SYSTEM	①		✓							
	②		✓							
	③			✓						
	④				✓	✓				
	⑤				✓					
	⑩									
	⑪									
	⑬									
	SECONDARY STANDARD AND CALIBRATION SYSTEM	①		✓						
		②		✓						
③				✓						
⑤						✓				
⑩					✓					

----- Planned                      ✓                      Realized                      To be Continued

4, AC. VOLTAGE AND CURRENT

I T E M	1 9 8 9			1 9 9 0		1 9 9 1		1 9 9 2		
	jan	jun	dec	jun	dec	jun	dec	jun	dec	
SECONDARY STANDARD AND CALIBRATION SYSTEM	①		✓							
	②									
	③	✓								
	④		✓			i				
	⑤			✓		⑤				
PRIMARY STANDARD AND CALIBRATION SYSTEM	⑥			⑥						
	⑦				✓					
	⑧									
	⑨					✓				
	⑩							ii		
									ii	
										iii

----- Planned                      ✓                      Realized                      To be continued

5, ELECTRIC POWER AND ENERGY

I T E M	1 9 8 9			1 9 9 0		1 9 9 1		1 9 9 2	
	Jan	Jun	dec	Jun	dec	Jun	dec	Jun	dec
PRIMARY,						5	12		
SECONDARY					2	7			
STANDARD					3				
AND					4				
CALIBRATION								5	
SYSTEM								9	
								10	

Planned

√

Realized

To be Continued

6, RF. POWER AND ATTENUATION

I T E M	1 9 8 9			1 9 9 0		1 9 9 1		1 9 9 2	
	jan	jun	dec	jun	dec	jun	dec	jun	dec
RF. POWER AND ATTENUATION CALIBRATION SYSTEM	①								
	②	√							
	③	√							
	④								
	⑤			√		√			
	⑥								
	⑦	√			√				

√

——— Planned
- - - - - Realized
- - - - - To be Continued

7, FREQUENCY

I T E M	1 9 8 9			1 9 9 0					
	jan	jun	dec	jun	dec	jun	dec	jun	dec
FREQUENCY	①								
	②	-----							
CALIBRATION	③	✓							
	④	-----	✓						
SYSTEM	⑤	-----	✓		✓				
	⑥	-----		⑩	-----				
	⑦	-----						⑫	
									⑬

----- Planned      ✓      ----- Realized      To be Continued

8, MULTIMETERS AND RECORDERS

I T E M	1 9 8 9			1 9 9 0		1 9 9 1		1 9 9 2	
	jan	jun	dec	jun	dec	jun	dec	jun	dec
MULTIMETERS AND RECORDER REPAIR BENCH		✓							
	①	—	—	—	—	—	—	—	—
		✓	✓	✓	✓				
	②	—	—	—	—	—	—	—	—
		✓							
	③	—	—	—	—	—	—	—	—
		✓							
④	—	—	—	—	—	—	—	—	
				⑤	—				
	✓								
⑦	—	—	—	—	—	—	—	—	—

— Planned



— Realized

— To be Continued



9, DC. POWER SUPPLIES

I T E M	1 9 8 9			1 9 9 0		1 9 9 1		1 9 9 2	
	jan	jun	dec	jun	dec	jun	dec	jun	dec
DC. POWER	① ✓		✓		✓		✓		
SUPPLIES	② ✓								
REPAIR BENCH	③ ✓								
	④				✓				
		⑤							
		✓			✓				
	⑦								

——— Planned
 ——— Realized
 ——— To be Continued

10, OSCILLOSCOPES

I T E M	1 9 8 9			1 9 9 0		1 9 9 1		1 9 9 2	
	jan	jun	dec	jun	dec	jun	dec	jun	dec
OSCILLOSCOPES	①	✓	✓			✓			
	②	✓							
	③	✓							
	④	✓							
	⑤								
	⑥								
	⑦			✓			✓		

✓

----- Planned ----- Realized ----- To be Continued

11, SIGNAL GENERATOR

I T E M	1 9 8 9			1 9 9 0		1 9 9 1		1 9 9 2	
	jan	jun	dec	jun	dec	jun	dec	jun	dec
SIGNAL  GENERATOR	①	✓		✓		✓			
	②	✓							
	③	✓							
	④	✓							
	⑤								
			⑦	✓		✓			

✓

Planned

Realized

To be Continued