

Annexure 'A'

Test facilities at BEL (charges are indicative only)

Corporate Office

CENTRAL NODAL OFFICER for the use of Test Facility at all the BEL Units / Offices	Mr. Manoj Yadav, Sr. Dy. Gen. Manager, Management Services, Corporate Office Bharat Electronics Limited, Nagavara, Outer Ring Road, Bangaluru-560045 Phone: 080-25039322, email: manojyadav@bel.co.in
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PANCHKULA

NODAL OFFICER for the use of Test Facility at BEL Panchkula Unit	Mr. Dharendra N Pandey Deputy General Manager - Quality Control Bharat Electronics Limited Plot No. 405, Industrial Area, Phase III, Panchkula - 134113, Haryana Phone: +91-172-2591532 Fax: +91-172-2591463/2591520 e-mail: dnpandey@bel.co.in
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Sl	Test Facility	Specifications	Hourly Rate in Rs
1	COLD HEAT CHAMBERS	Temperature Range : -40°C to +140°C Capacity: 1000L Floor Loading Capacity : 150Kg Temperature accuracy : $\pm 2^\circ\text{C}$	2950
2	THERMAL CYCLING CHAMBER	Humidity range : 10% to 98% RH Working Space : 1300 L Floor Loading Capacity : 150 Kg Temperature accuracy : $\pm 2\text{K}$ Relative Humidity Accuracy : $\pm 3\%$ R.H Temperature Change rate : 10K/	3771
3	VIBRATION TEST FACILITY	Force rating in Sine & random : 9.8KN Displacement : 2.0 INCH (P-P) Slip table size : 600x600mm Head Expander size : 13.4 in Max. Static Load supported : 272 Kg Bare table acceleration : 100 g	2397
4	BUMP TEST MACHINE	Displacement : 25mm $\pm 4\text{mm}$ Slip table size : 600mm x 600mm Max. Static Load supported : 113.5 Kg Bare table acceleration : 40g $\pm 4\text{g}$	

MACHILIPATNAM

NODAL OFFICER for the use of Test Facility at BEL Machilipatnam Unit

Mr. P Durgaprasad,
 Manager-sub-Contract
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SL	Test facility	Specification	Hourly Rate in Rs
5	Vibration Test SystemSAI 30F - 5452-16/ST	Sine Force 5500 lbf (pk) Random force 5500 lbf (rms) Displacement 51mm (pk-pk) frequency up to 2000HZ (Rated Power 50KW)	2585
6	Climatic Chamber (weiss) (WK3 800/70/10)	-70°C to 180°C Ramp 10°/min Humidity 10° C to 95°C (10 to 95% RH Power = 46KW Test space volume - 800 ltr	2585
7	Hot/Cold Chamber (WT-340/40/5)	-40°C to 180° Ramp 5°C/M Volume 340 ltrs Power 8 KW	3575
8	Salt Spray Chamber (Model No.5F-450-CCT) (Make: CM enviro systems)	Test Space : 850Wx700Dx800H in mm Ambient to 55°C Power = 5KW	2585
9	Rain Test Chamber (Model: AQUA - 1000 - XXB) CM enviro systems	Test space volume - 1000 ltr Dimensions: 1200Wx1200Dx2100Hmm Discharge Pressure 200 kPA ±15% Flow rate : 60 lt	1765
10	Bump/Testing Machine Make : Tarang Kinetics – Roorkee Model TBTM - 6060F	Speciman size 600x600 mm Max: Speciman wt 200g Stroke - 50 mm Working Space 100x100x100 cms	
11	Dust Chamber	Temperature Range: Ambient to 60°C	1765

KOTDWARA

NODAL OFFICER for the use of Test Facility at BEL Kotdwara Unit

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 Manager -Sub-Contract
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Sl	Test Facility	Specifications	Hourly Rate in Rs
12	Dust Chamber	Operating range RT to +40°C Dust Proof ness as per JSS 55555, Work area - 1 x1 x 1 M	1310
13	ESS Chamber	Operating range (-70°C to +180°C) Rate of change of Temp. rate 20°C/ min. RH 10 to 95% Working area-1. 3 x 1. 1 x 0. 9M (1300 ltr)	3520
14	ESS Chamber	Operating range (-70°C to +180°C) Rate of change of Temp. rate 25°C/ min. RH 10 to 95% Working area-1. 3 x 1. 1 x 0. 9M (1300 ltr)	3810
15	ESS Chamber	Operating range (-70°C to +180°C) Rate of change of Temp. rate 10°C/ min. RH 10 to 95% Working area-1 x 1 x 0. 9M (900 liter)	3240
16	Vibration Machine	Freq. 5Hz to 3000HZ, Disp. ±51 mm & Up to 90g Force Rating Sine 2200 kgf (peak) Random 2272 kgf (rms) Maximum load capacity- 150 Kg, Working area 36*36 Inch	5450
17	Bump Machine	Bump 0 to 99999 Peak Deceleration 40g ± 4g Bump Repetition 2 to 3 bump / sec Height of Drop 25mm ± 4mm Maximum Load 113.5 Kgs Working area -60x60 Cm	1870
18	Salt Corrosion Test	Salt Spray Test as per JSS 55555, working capacity-450 Liter	1250
19	Shock Test Machine	Half Sine Pulse of Peak 40Pulse Duration of 18 ms Working area - 16x16 inch	2520
20	Driving Rain Chamber	200kpa water pressure & 8 Showers	1350

HYDERABAD

NODAL OFFICER for the use of Test Facility at BEL Hyderabad Unit

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Sl	Test Facility	Specifications	Hourly Rate in Rs
21	High Temp /Low Temp/Damp Heat /Thermal Cycling	Temp Range: (-)70 TO (+)180 ° C Humidity: 95% RH	2500
22	High Temp /Low Temp/Thermal Cycling	Temp Range: (-)70 TO (+)180 ° C	2500
23	High Temp /Low Temp/Thermal Cycling/Altitude	Temp Range: (-)70 TO (+)180 ° C Humidity : 95 % RH Alt Height : 90mts	3000
24	High Temp /Low Temp/Thermal Cycling/Damp Heat	Temp Range: (-)70 TO (+)180 ° C Humidity : 95 % RH	2500
25	High Temp /Low Temp/ Thermal Cycling /Damp Heat	Temp Range: (-)60 TO (+)100 ° C Humidity : 95 % RH	7500
26	High/Cold /Thermal Shock (Only Passive Test)	Temp Range: (-)80 TO (+)220 ° C	2500
27	High/Cold /Thermal Shock (Only Passive Test)	Temp Range: (-)80 TO (+)220 ° C	2500
28	Vibration:Random/Sine/Shock	Frequency Range : 05 TO 2500Hz Acceleration : 100 "g" (Free Table)	4500
29	Vibration:Random /Sine/ Shock/ Random On Random /Sine On Random (Soft)	Frequency Range : 05 TO 2500Hz Acceleration : 180 "g" (Free Table)	10000
30	Vibration:Random /Sine/ Shock/ Random On Random /Sine On Random(Soft)	Frequency Range : 05 TO 2500Hz Acceleration : 100 "g" (Free Table)	4500
31	Half Sine Bump	Repetition: 2-3 BUMPS/SEC	4000
32	Drop /Toppling	Platform Height: 0.4 Mt	
33	Rain Test	Rain Fall Rate :250mm/Hour TO 450 mm/Hour	4000
34	Rain Test	Rain Fall Rate :250mm/Hour TO 450 mm/Hour	

GAZIABAD

NODAL OFFICER for the use of Test Facility at BEL Gaziabad Unit

Mr.Sanjay Srivastava

AGM - Central Materials Manager

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Sl	Test Facility	Specifications	Hourly Rate in RS
35	High Temp /Low Temp/Damp Heat (WK 3-600/70)	Temp Range: -75 to +180 ° C Humidity : 10% to 98 % RH	3575/
36	High Temp /Low Temp/Damp Heat (WK 3/340/70)	Temp Range: -72 to +180 ° C Humidity : 10% to 95 % RH	3575/
37	Altitude (1000SDd/70DU)	(H×W×D) in MM : 750× 580× 540 Temp Range: -70 to +100 ° C Humidity : 15% to 95 % RH Ground To 1 Lakh ft.(up to 10 mbar) (H×W×D) in MM : 900×1000×1150	4500/-
38	Altitude (WK 300/70/D)	Temp Range: -70 to +100 ° C Humidity : 15% to 95 % RH Ground To 1 Lakh ft.(upto 10 mbar) (H×W×D) in MM : 900×1000×1150	4500/-
39	Rapid Thermal Cycling (WK 270/70/25)	to 10 mbar) Temp Range: -70 to +180 ° C Humidity : 10% to 95 % RH Temperature Change Rate: 25°C/m (H×W×D) in MM : 750× 580× 620	4800/
40	Rapid Thermal Cycling (WK 1300/70/30)	Temp Range: -70 to +180 ° C Humidity : 10% to 95 % RH Temperature Change Rate: 25°C/mi (H×W×D) in MM: 920x 1100x 1325	
41	Rapid Thermal Cycling (WK 1300/70/25)	Temp Range: -70 to +180 ° C Humidity : 10% to 98 % RH Temperature Change Rate: 25°C/min (H×W×D) in MM : 920× 1100× 1325	5400/-
42	Rapid Thermal Cycling	Temp Range: -70 to +180 ° C	

	(WKS/3/800/70/10)	Humidity : 10% to 98 % RH	
43	Walk-in chamber SD 19/60)	Temperature Change Rate: 12°C/min Humidity : 10% to 98 % RH Temp Range: -70 to +95 ° C	12500/-
44	Walk-in chamber (WZH/10/A2)	H×W×D) in MM : 3000× 2600× 2400 Temp Range: -70 to +150 ° C Humidity : 10% to 98 % RH (H×W×D) in MM : 2000× 2060× 1160	10500/-
45	Thermal Shock (TS 130)	Temp Range: -75 to +220°C Sliding bucket type	3400/-
46	Thermal Shock (TS 300)	Temp Range: -80 to +220 ° C Sliding bucket type	4500/-
47	Salt Spray Chamber (SC 1000)	Temperature Range: Ambient to +50°C Humidity Range: From ambient up to saturation Working space volume: 950 liter	3600/-
48	Salt Spray Chamber (SC 1000)	Force Rating: Sine 60kN (Peak), Random 60 kN (RMS) Max. Shock Force: 106 kN Shaker Stroke: 76 mm pk-pk Freq Range: 5-2000 Hz. Slip table Size: 900x 900 mm Type of Test Modes: Random Vibration, Sine Vibration, Shock Test	10600/-
49	Vibration: Random /Sine/Shock SAB15-S202/ST)	Force rating: Sine 9.8kN (Peak), Random 9.8kN (RMS)	7500/-
50	Bump Test Machine (P-1010)	Max. Shock Force: 20 kN Pay load capacity: 500 Kg Bed Size : 1000 x 1000 mm Pulse Duration : 6 to 18 ms Pulse repeating freq: 1 to 3 Bumps /sec Acceleration Range : 5 to 40g Acceleration Range : 5 to 40g Pulse Waveform : Half Sine Test Axis : Vertical	5500/- Per

BANGALORE

NODAL OFFICER for the use of Test Facility at BEL Bangalore Unit

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S/	Test Facility	Specifications	Hourly Rate in RS
51	X-Ray Inspection XIDAT XD6500 For Printed Circuit Assemblies	Minimum feature recognition : < 2 microns Tube Voltage : 30 - 160 kV Maximum Board size : 20" x 17.5" (508 x 444 mm) Maximum Inspection Area : 18" x 16" (458 x 407 mm) Maximum Sample Weight : 5 Kg Oblique Angle View : 0 - 45° for any view, 360 degrees around any position over entire inspection area System Magnification (geometric) : Upto 2725 x (700 X)	2058
52	Driving Rain Shower	JSS 55555	23200
53 .. 66	ENVIRONMENTAL TEST FACILITIES	Annexure A1	
67 .. 157	Calibration Test Facilities	Annexure A2	
158..189	EMI/EMC TEST Facilities	Annexure A3	

ENVIRONMENTAL TEST FACILITIES

Sl	CATEGORY OF TESTS	Charges per hour (Value in Rs)
53	High Temperature Test	3400
54	Low Temperature Test	3400
55	Humidity Test	3400
56	Corrosion (Salt Spray) Test	3400
57	Dust Test	3400
58	Thermal Cycling / Thermal Shock Test	3400
59	Altitude Test	3400
60	Bump Test	3400
61	Drop Test	3400
62	Vibration test (Sinusoidal / Random / SOR / ROR) and Shock test in UD 2, 3, 4, 5, 6, 7 and Shinken 1 & 2 vibration systems	5350
63	Tests in Walkin Chamber (Unified Chamber)	11200
64	Tests in Walkin chamber (Two independent chambers for each chamber) and Altitude Walk-in-chamber	8300
65	Vibration test (Sinusoidal / Random / SOR / ROR) and Shock test in 8900 Kgf vibration system	9500
66	Tests in HALT/HASS Chamber	

EMI/EMC TEST Facilities at EMID/QA

S	Instruments - Category	Charges (in Rs)
158	CE01/101 - single phase	11300
159	CE01/101 - Three phase	22500
160	CE03 - Single phase	21800
161	CE03 - Three phase	43600
162	CE102 - Single phase	10900
163	CE102 - Three phase	21700
164	CE06/106 (10kHz-40 GHz) per frequency	43400
165	CE07	5300
166	CS01/101 - Single phase	8700
	CS01/101 - Single phase	8700
	CS01/101 - Three phase	17300
	CS02 - Single phase	14500
167	CS02 - Three phase	29000
168	CS03/CS103/CS04/CS104/CS05/CS105 (30 Hz to 20 GHz) per frequency	42300
169	CS06/106 - Single phase	8700
	CS06/106 - Three phase	17400
	CS09/109	13100
170	CS114 per cable	6900
	CS115 per cable	8500
	CS116 per cable	5300
171	RE01/101	22000
172	RE02/RE102 (upto 1 GHz)	22800
	RE02/RE102 (1 GHz-18 GHz)	22600
	RE02/RE102 (10 kHz-18 GHz)	45400
173	RS01/101 (30Hz - 100 kHz)	16400
174	RS02	20500
175	RS103/RS03 - upto 1 GHz	73800
	RS103/RS03 - 1 GHz-18 GHz	87900
	RS103/RS03 - 18 GHz-40 GHz	122400

	RS103/RS03 - 2 MHz-18 GHz	161700
	RS103/RS03 - 2 MHz-40 GHz	284000
176	RS06 (DC magnetic field)	15600
179	CE - CISPR 11/22	21700
180	RS - IEC 61000-4-3 (80 MHz - 6 GHz)	136400
	RS-IEC 61000-4-3 less than 1 GHz/Hour	27300
181	EFT - IEC 61000-4-4	14300
	Surge - IEC 61000-4-5	14300
	IEC 61000-4-9 (Pulsed magnetic field)	14300
	IEC 61000-4-11 (Voltage Dips, Short Interruptions and Voltage variations on AC supplies)	14300
	IEC 61000-4-12 (Ring Wave - power lines)	14300
	IEC 61000-4-29 (Voltage Dips, Short Interruptions and Voltage variations on DC supplies)	14300
	IEC 61000-4-2-ESD	24000
182	Shielding Effectiveness test, Per freq/test Point	16800
183	MIL 704 - LDC 102 - Normal Steady State	11,200
	MIL 704 - LDC 301 -Abnormal Steady State	11200
	MIL 704 - LDC 401 - Emergency Starting	11200
	MIL 704 - LDC 103 - Voltage Distortion Spectrum	22300
	MIL 704 - LDC 104 - Total Ripple	22300
	MIL 704 - LDC105 - Normal Voltage Transients	18600
	MIL 704 - LDC302 - Abnormal Voltage Transients	18600
	MIL 704 - LDC 201 - Power interrupt	5600
	MIL 704 - LDC 601 - Power failure	5600
	MIL 704 - LDC 602 - Phase reversal	5600
184	Compliance Test Report	10000
185	EUT SET UP TIME inside SAC (for every 30 min)	6000
186	Waiting Time inside SAC (for every 30min)	6000
187	Diagnostic testing per hour	12000
189	Others	

Calibration Charges of Instruments at Cal lab EMID/OA

Sl#	Instruments - Category	Calibration Charges (Rs.)
1	Amplifier AF	14,000
2	Amplifier RF up to 1 GHz	23,300
	Amplifier >1 GHz TO 18 GHz	32,600
	Amplifier >18 GHz to 40 GHz	41,900
3	Attenuator(Fixed)(For 3 Freq points)	8,100
4	Attenuator Variable	23,300
5	Audio Analyzer	30,200
6	Bias current source	30,200
7	Breakdown Tester	15,100
8	Impedance Meter (Bridge)/Analyzer	30,200
9	(a) RLC Bridge < 1kHz	15,100
	(b) RLC Bridge >1kHz	30,200
10	Oscilloscope Calibrator	90,700
11	Calibrator (Meter General)	90,700
12	Calibrator (Meter Precision)	95,300
13	Communication Test Set/Digital Radio Test set	90,700
14	Continuous Wave Simulator	45,300
15	Curve Tracer	30,200
16	Curve Tracer (High Precision)	90,700
17	Decade RLC/ Decade	8,100
18	(a) Digital Multimeter (<= 4.5 Digits)	15,100
	(b) Digital Multimeter (4.5 to 5.5 Digits)	30,200
	(c) Digital Multimeter (>= 6.5 Digits)	45,300
	(d) Digital Multimeter (>= 8.5 Digits)	90,700
19	Directional Coupler	15,100
20	Distortion Analyzer	15,100
21	Electrical Instruments	15,100
22	Electronic Load/ Module	23,300
23	EMI Meter	45,300
24	(a) EMI Receiver (upto 3 GHz)	45,300
	(b) EMI Receiver (>3 GHzto 6GHz)	52,300
	(c) EMI Receiver (>6 GHzto 20GHz)	80,200
	(d) EMI Receiver (>20 GHzto 26.5GHz)	93,000
	(e) EMI Receiver (upto 40 GHz)	1,18,600
25	Frequency Response Analyzer	45,300
26	(a) Frequency Counter <2 GHz	23,300
	(b) Frequency Counter (> 2 - 18 GHz)	30,200
	(c) Frequency Counter (18 - 40 GHz)	45,300
27	Frequency Meter	8,100
28	Function Generator	30,200
29	GPS simulator Tester	45,300
30	High Voltage Probe	8,100
31	High Resistance Meter	15,100
32	Level Generator /Level Meter	30,200
33	Megohm Meter	15,100
34	Microwave Components/For 3 Frequency points	8,100
35	Microwave link analyser	45,300
36	Milli / Micro Ohm Meter	23,300
37	Modulation Analyzer	30,200
38	Modulation Meter	15,100

Calibration Charges of Instruments at Cal lab EMID/OA

SI#	Instruments - Category	Calibration Charges (Rs.)
39	Modulator	15,100
40	Multi Source Generator	45,300
41	Nano Volt/Micro ohmmeter	45,300
42	(a) Network Analyzer (Scalar) <= 3GHz	51,200
	(b) Network Analyzer (Scalar) 3 GHz to 6 GHz	53,500
	(c) Network Analyzer (Scalar) (6 GHz to 20 GHz)	69,800
	(d) Network Analyzer (Scalar) (20 - 26.5GHz)	76,700
	(e) Network Analyzer (scalar) (26.5 - 40 GHz)	90,700
43	(a) Network Analyzer (Vector) <= 3 GHz	61,600
	(b) Network Analyzer (Vector) (3 - 6.0GHz)	63,900
	(c) Network Analyzer (Vector) (6 - 20.0GHz)	74,400
	(d) Network Analyzer (Vector) (20 -26.5 GHz)	80,200
	(e) Network Analyzer (Vector) (26.5 - 40 GHz)	90,700
44	Noise meter/Generator	30,200
45	Oscillator (AF)	15,100
46	Oscillator (RF)	23,300
47	(a) Oscilloscope(Upto 100 MHz)	23,300
	(b) Oscilloscope(>100 MHz to 500 MHz)	25,600
	(c) Oscilloscope(500 MHz - 3 GHz)	29,100
	(d) Oscilloscope(> 3 GHz to 6GHz)	30,200
	(e) Oscilloscope 6 GHz to 18 GHz	38,400
	(f) Oscilloscope(> 18 GHz to 26.5 GHz)	44,200
	(g) Oscilloscope(> 26.5 GHz)	45,300
48	PCM Channel Measurement Set	30,200
49	Power Meter (AF)	15,100
50	Power Meter (RF) without sensor	8,100
51	Power Meter/Sensor (Microwave upto 18 GHz) or Stand alone Power Sensor Power Standard	30,200
52	Power Meter/Sensor (Microwave >18 GHz)	45,300
53	Power Meter (RF)	15,100
54	Power Supply	15,100
55	Probes	8,100
56	Pulse/Function Generator	45,300
57	Pulse Generator	30,200
58	Q Meter	23,300
59	Quasi Peak Adapter	30,200
60	Quartz Oscillator	23,300
61	RF Power Analyst	15,100
62	Receiver	30,200
63	(a) Signal Generator (<= 3 GHz)	30,200
	(b) Signal Generator (<= 3 -6 GHz)	32,600
	(c) Signal Generator (<=6GHz-20 GHz)	43,000
	(d) Signal Generator (<=20GHz-26.5 GHz)	46,500
	(e) Signal Generator (Upto 40 GHz)	55,800
64	Soldering Station/ tester	8,100
65	(a) Spectrum/ Signal Analyzer (<= 3 GHz)	47,700
	(b) Spectrum/Signal Analyzer (3-6 GHz)	51,200
	(c) Spectrum/ Signal Analyzer (6GHz - 20 GHz)	66,300
	(d) Spectrum/Signal Analyzer (20 GHz to 26.5 GHz)	72,100
	(e) Spectrum/Signal Analyzer (26.5 GHz to 40 GHz)	88,400

Calibration Charges of Instruments at Cal lab EMID/OA

Sl#	Instruments - Category	Calibration Charges (Rs.)
66	Static Sensor	8,100
67	(a) Sweep Oscillator (upto 3 GHz)	30,200
	(b) Sweep Oscillator (upto 3 GHz- 6 GHz)	32,600
	(c) Sweep Oscillator (upto 6 GHz-20 GHz)	44,200
	(d) Sweep Oscillator (upto 20 GHz-26.5 GHz)	50,000
	(e) Sweep Oscillator (upto 26.5 GHz-40 GHz)	60,500
68	Telecom Instruments	30,200
69	Timer	8,100
70	Tracking Generator	30,200
71	Voltmeter <=10 MHz	15,100
72	Voltmeter > 10MHz	23,300
73	LISN (Line Impedance Stabilization Network)	15,100
74	Frequency standard	41,900
75	Injection/ RFprobe	8,100
76	Transient/ Pulse Generator	29,100
77	OPTICAL ATTENUATOR 2 wave length	30,200
78	OPTICAL POWER METER	30,200
79	PORTABLE APPLIANCE TESTER	23,300
80	POWER ANALYZER SINGLE PHASE	23,300
81	POWER ANALYZER THREE PHASE	30,200
82	EFT/Surge Simulator	24,400
83	ESD SIMULATOR WITH DISCHARGE GUN	45,300
84	ESD SIMULATOR WITHOUT DISCHARGE GUN	23,300
85	ACTIVE MONOPOLE ANTENNA PRE AMPLIFIER	30,200
86	DATA ACQUISITION UNIT	15,100
87	RANGE CALIBRATOR	30,200
88	HIGH VOLTAGE METER	15,100
89	PRECISION MAGNETIC ANALYZER	30,200
90	HIGH VOLTAGE POWER SUPPLY	22,100
91	Open, Short, Load Terminations (up to 3 Freq points)	8,100
92	ULTRA COMPACT SIMULATOR	32,600
93	POWER SWEEP GENERATOR	30,200
94	EM CLAMP / ABSORBING CLAMP	15,100
95	COUPLING/DE COUPLING NETWORK	15,100
96	ESD TARGET	15,100
97	EMI/EMC INSTRUMENTS	15,100
98	Multiple Impedance Copuling clamp	15,100
99	(a) Spectrum/ Network Analyzer(Vector) up to 3 GHz	65,100
	(b) Spectrum/ Network Analyzer (Vector) (>=3 to 6 GHz)	67,400
	(c) Spectrum/ Network Analyzer(>=6 to 20 GHz)	79,100
	(d) Spectrum/ Network Analyzer(> 20GHz-26.5 GHz)	83,700
	(e) Spectrum/ Network Analyzer (> 26.5 GHz to 40 GHz)	95,300
100	Digital Radio Test set	69,800
101	ESD Generator	11,600
102	EM Injection Clamp	30,200
103	Angle Position Indicator	30,200
104	Optical Transreciver	30,200
105	Meggar (Megohmmeter)	23,300