


BIHAR STATE POWER TRANSMISSION COMPANY LIMITED						
MANUFACTURING QUALITY PLAN -- PLCC						
	<b>Manufacturer's Name</b>	<b>Customer</b> BSPTCL	<b>Vendor's Code</b>	<b>Item:</b> PLCC EQUIPMENTS: ETL, NSD & NSK Series	<b>M.Q.P. No.: 029</b> <b>Rev. No 00</b> <b>Date:</b> 04. 01. 2016	<b>Valid From:</b> 15.01.2016 <b>Valid Upto:</b> Till revision
<b>Code 1</b>	Indicates place <b>where testing is planned</b> to be performed i.e. Inspection location		<b>Code 2</b>	Indicates <b>who has to perform the tests</b> i.e. Testing Agency		
A	At Equipment Manufacturer's works		J	The Equipment Manufacturer		
B	At Component Manufacturer's works		K	The Component Manufacturer		
C	At Authorised Distributor's place		L	The Third Party		
D	At Independent Lab		M	The Turnkey Contractor		
E	At Turn Key Contractor's location					
F	Not specified					
<b>Code 3</b>	Indicates <b>who shall witness</b> the tests i.e. Witnessing Agency		<b>Code 4</b>	Review of Test Reports/Certificates		
P	Component Manufacturer itself		W	By Equipment manufacturer		
Q	Component Manufacturer and Equipment Manufacturer		X	By Contractor during product/process inspection		
R	Component Manufacturer, Equipment Manufacturer and Contractor		Y	By BSPTCL during product/process inspection		
S	Equipment Manufacturer itself		Z	By Contractor and/or BSPTCL during product/process inspection		
T	Equipment Manufacturer and Contractor					
U	Equipment Manufacturer, Contractor and BSPTCL					
V	Third Party itself					
<b>Code 5</b>	Whether specific approval of sub-vendor / Component make is envisaged?		<b>Code 6</b>	Whether test records required to be submitted after final inspection for issuance of Dispatch Clearance/Instructions		
E	Envisaged		Y	Yes		
N	Not Envisaged		N	No		
<p>1. The MQP should be read in conjunction with BSPTCL specification and shall deem to include additional tests if any required as per the contract.</p> <p>2. BSPTCL specification shall include provisions of letter of Award, BSPTCL approved drawings/technical data sheet/BOM/test schedule/test procedure applicable to the specific contract.</p> <p>3. In case of any contradiction between the manufacturer's plant standards, this MQP and BSPTCL specification following precedence shall be followed:-</p> <p>a) BSPTCL specification.</p> <p>b) This Manufacturing Quality plan.</p> <p>c) Manufacturer's plant standards.</p> <p>4. It is the responsibility of the manufacturer to ensure that this document is readily available at their works, as well as at the works of their sub vendors in order to avoid any delay at the time of inspection.</p> <p>5. The manufacturer shall ensure that their as well as their sub vendors control, metering &amp; testing instruments are duly calibrated and should have calibration certificates traceable. to Indian/International standards. Calibration records should be available during inspection by BSPTCL. Key testing instruments will be calibrated only by NABL accredited laboratories.</p> <p>6. In case of any tests being carried out at third party lab, such lab/facility should be NABL accredited/accepted by BSPTCL.</p> <p>7. The manufacturer shall maintain the proper co-relation of test certificates from raw material stage to finished product stage and the records should be available during inspection by BSPTCL.</p> <p>8. Manufacturer shall show the approval of BSPTCL engineering for all contract specific type tests, including specific type tests if any as per the BSPTCL specification, at the time of final inspection.</p> <p>9. All packing cases should be marked with BSPTCL LOA details, name of project, item description and Dispatch Clearance/Instructions number (by which material has been cleared for dispatch).</p> <p>10. One copy of test report, Dispatch Clearance/Instructions shall also be sent along with consignment.</p> <p>11. Inspection of spare items ordered by BSPTCL shall also be governed by the provisions of this MQP. Items if not governed under MQP shall be offered for inspection as per BSPTCL specifications/Relevant-Indian/International Specification.</p> <p>12. The manufacturer shall align their quality system and that of their sub-vendors to the requirements of latest ISO 9000 quality standards in a time bound manner.</p> <p>13. BSPTCL may review the effective implementation of the processes during the product-inspection/process-inspection. In case any violation in process or process parameters are observed, the reason along with corrective &amp; preventive measures shall be conveyed to BSPTCL within 2 weeks.</p> <p>14. The list of component manufacturers for which approval has been envisaged by BSPTCL is attached herewith.</p> <p>15. Any addition/change in new sub-vendor/design/process shall call for review by BSPTCL and change in MQP, if necessary.</p> <p>16. Dispatch Clearance/Instructions to be issued by BSPTCL Inspection office based on record review of final acceptance tests and the final acceptance tests are witnessed by equipment manufacturer only.</p> <p>17. Final Inspection Test Protocols for PLCC shall be approved by BSPTCL Engg.</p>						
EM : Equipment Manufacturer			CM : Component Manufacturer			

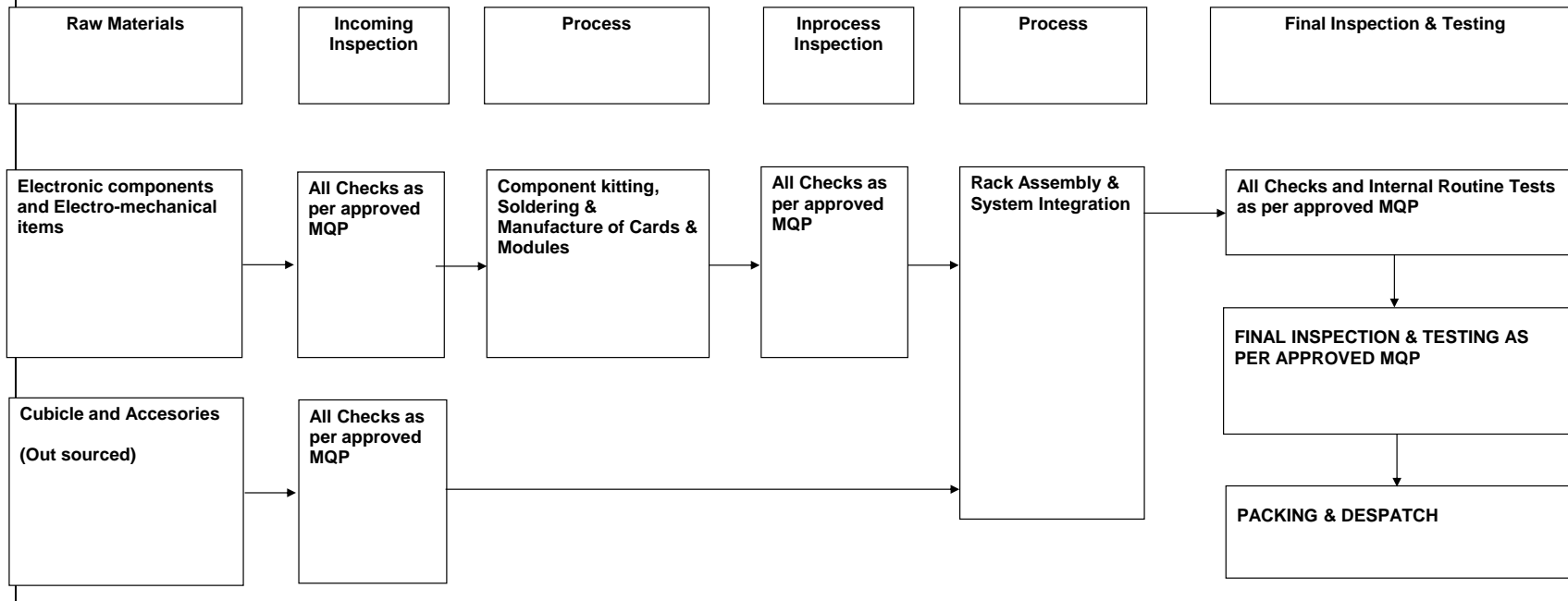


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MANUFACTURING QUALITY PLAN -- PLCC

<b>Manufacturer's Logo</b>	<b>Manufacturer's Name and Address</b>	<b>Customer</b> BSPTCL	<b>Vendor's Code</b>	<b>Item:</b> PLCC EQUIPMENTS: ETL, NSD & NSK Series	<b>M.Q.P. No.:</b> 029 <b>Rev. No.</b> 00 <b>Date:</b> 04. 01. 2016	<b>Valid From:</b> 15.01.2016 <b>Valid Upto:</b> Till revision
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Process Flow Diagram For Power Line Carrier Terminals: ETL, NSD & NSK Series





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Sr. No.	Components/Operations & Description of Test	Type of check	Quantum of Check/Sampling with basis	Reference document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
							1	2	3	4	5	6	
<b>A</b> <b>1</b> <b>RAW MATERIAL</b> <b>ELECTRONIC COMPONENTS</b>													
1.1	<b>RESISTORS</b> (Metal film, Carbon film, Wire wound)	<u>Mechanical:</u> a) Visual, b) Solderability, <u>Electrical:</u> a) Value/Tolerance	ISO-2859 on AQL				B	K	P	W	N	N	
1.2	<b>POTENTIOMETERS</b> (Cermet, Wire wound & Carbon Film)	<u>Mechanical:</u> a) Visual, b) Solderability, <u>Electrical:</u> a) Value/Tolerance	ISO-2859 on AQL				B	K	P	W	E	N	
1.3	<b>CAPACITORS</b> (Ceramic, Polypropylene, Metalized polyester, Electrolytic, Tantalum)	<u>Mechanical:</u> a) Visual, b) Solder ability, <u>Electrical:</u> a) Value/Tolerance, b) D factor	ISO-2859 on AQL				B	K	P	W	N	N	
1.4	<b>FERRITE CORES</b>	<u>Mechanical:</u> a) Visual, b) Dimension, <u>Electrical:</u> a) Value/Tolerance	ISO-2859 ON AQL				B	K	P	W	E	N	
1.5	<b>DIODES/Z-DIODES</b>	<u>Mechanical:</u> a) Visual, b) Solder ability, <u>Electrical:</u> a) Forward Voltage drop, b) Reverse Current, c) Zener Voltage	ISO-2859 on AQL				B	K	P	W	N	N	



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1.6	LED	<u>Mechanical:</u> a) Visual, b) Solderability, <u>Electrical:</u> a) Colour of Light at rated Current b) Reverse Current, c) Voltage drop	ISO-2859 on AQL				A	J	S	W	N	N										
1.7	TRANSISTORS	<u>Mechanical:</u> a) Visual, b) Solderability, c) Package <u>Electrical:</u> a) hfe, b) Leakage Current	ISO-2859 on AQL				B	K	P	W	N	N										
1.8	<b>INTEGRATED CIRCUITS</b> <b>A) LINEAR (OPERATIONAL AMPLIFIER)</b>	<u>Mechanical:</u> a) Visual, <u>Electrical:</u> a) Offset Current Test, b) Offset Voltage Test, c) Bias Current Test, d) Gain Test, e) CMRR Test, f) SVRR Test, g) O/P Voltage Swing Test, h) Supply Current Test	ISO-2859 on AQL				B	K	P	W	N	N										
	<b>INTEGRATED CIRCUITS</b> <b>B) DIGITAL</b>	<u>Mechanical:</u> a) Visual, <u>Electrical:</u> a) Programmed Parametric Check, b) Functional Check	ISO-2859 on AQL				B	K	P	W	N	N										
1.9	SMD COMPONENTS	<u>Mechanical:</u> a) Visual	ISO-2859 on AQL				B	K	P	W	N	N										
1.10	CRYSTAL	<u>Mechanical:</u> a) Visual, b) Dimensions, <u>Electrical:</u> a) Frequency & Tolerance	ISO-2859 on AQL				B	K	P	W	E	N										
1.11	VARISTOR	<u>Mechanical:</u> a) Visual, b) Solder ability, <u>Electrical:</u> a) Value with reference to voltage / tolerance	ISO-2859 on AQL				B	K	P	W	N	N										



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1.12	RESISTOR NETWORKS	<u>Mechanical:</u> a) Visual, b) Solder ability, c) Dimensions, d) No. of pins, <u>Electrical:</u> a) Value / Tolerance, b) Wattage	ISO-2859 on AQL				B	K	P	W	N	N																											
<b>2 ELECTRO-MECHANICAL ITEMS</b>																																							
2.1	ENAMELED WIRE	<u>Mechanical:</u> a) Visual, b) Gauge, c) Thickness of Insulation	ISO-2859 on AQL				A	J	S	W	N	N																											
2.2	CHOKES	<u>Mechanical:</u> a) Visual, b) Solder ability, <u>Electrical:</u> a) Inductance, b) Insulation Resistance Test at 500V DC, c) Q Factor	ISO-2859 on AQL				B	K	P	W	N	N																											
2.3	CONNECTORS	<u>Mechanical:</u> a) Visual, b) Solder ability, c) Continuity, d) No. of Pins, e) Pitch, f) Mating	ISO-2859 on AQL				A	J	S	W	N	N																											
2.4	RELAYS	<u>Mechanical:</u> a) Visual, b) Solder ability, <u>Electrical:</u> a) Pick up and Drop out voltage, b) Coil Resistance, c) H.V. Test, d) Contact Insulation Resistance test	ISO-2859 on AQL				B	K	P	W	E	N																											



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2.5	BARE PCB (GLASS EPOXY)	<u>Mechanical:</u> a) Visual, b) Dimensions, c) Warp & Twist, d) Drilling, e) Gold Plating Thickness, f) Gold Plating Adhesion, g) Board Thickness, h) Legend, i) Check for Correct Positioning of Slot, f) BBT/Continuity	ISO-2859 on AQL				B	K	P	W	N	N	
2.6	SWITCHES/TOGGLE/ROTARY	<u>Mechanical:</u> a) Visual, b) Solder ability, c) Functional test, d) Dimensions	ISO-2859 on AQL				A	J	S	W	N	N	
2.7	VENTILATION FANS	<u>Mechanical:</u> a) Visual, b) Functional Test, c) High Voltage Test	ISO-2859 on AQL				B	K	P	W	E	N	
2.8	WIRES/PVC CABLES (ISI Marked)	<u>Mechanical:</u> a) Visual, b) Solder ability, c) Dimensions, d) Continuity, <u>Electrical:</u> a) H.V. Withstand	ISO-2859 on AQL				A	J	S	W	N	N	
2.9	SLEEVES	<u>Mechanical:</u> a) Visual, b) Internal dia	ISO-2859 on AQL				A	J	S	W	N	N	
2.10	TAG BLOCK/ TERMINAL BLOCKS	<u>Mechanical:</u> a) Visual, b) Plating Thickness, c) Solder ability(if Applicable)	ISO-2859 on AQL				A	J	S	W	E	N	
2.11	HEAT SINK	<u>Mechanical:</u> a) Visual, b) Dimensions, c) Finish	ISO-2859 on AQL				B	K	P	W	N	N	



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2.12	SUB.RACKS/ FABRICATED PARTS	<u>Mechanical:</u> a) Visual, b) Plating thickness, c) Dimensions,	ISO-2859 on AQL				B	K	P	W	N	N																						
2.13	MOULDED PLASTIC PARTS & RUBBER PARTS	<u>Mechanical:</u> a) Visual, b) Dimensions, c) Finish, d) Surface defects	ISO-2859 on AQL				B	K	P	W	E	N																						
2.14	FUSE & FUSE HOLDERS	<u>Mechanical:</u> a) Visual, b) Dimensions, <u>Electrical:</u> a) Parametric value, b) IR Tests on Fuse Holders at 500 VDC	ISO-2859 on AQL				A	J	S	W	E	N																						
2.15	LUGS & CRIMPED TERMINALS	<u>Mechanical:</u> a) Visual Check, b) Dimensional Check, c) Finish	ISO-2859 on AQL				A	J	S	W	N	N																						
2.16	COUNTERS /DISPLAYS	<u>Mechanical:</u> a) Visual Check, b) Dimensional Check, c) Functional test	ISO-2859 on AQL				B	K	P	W	N	N																						
2.17	METERS	<u>Mechanical:</u> a) Visual, b) Solder ability if applicable b) Mechanical Zero, <u>Electrical:</u> a) Accuracy, b) Coil Resistance	ISO-2859 on AQL				B	K	P	W	E	N																						



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2.18	IC & RELAY SOCKET	Mechanical: a) Visual, b) Mating, c) Continuity	ISO-2859 on AQL				A	J	S	W	N	N																					
2.19	BUZZER	Mechanical: a) Visual, b) Functional	ISO-2859 on AQL				A	J	S	W	N	N																					
2.20	FASTENERS & SPACERS	Mechanical: a) Visual Check, b) Dimensional Check, c) Finish	ISO-2859 on AQL				A	J	S	W	N	N																					
2.21	PRESSURE DIE PARTS, TURNED PARTS & EXTRUDED PARTS (Including channels, brackets, housing etc.)	Mechanical: a) Visual, b) Dimensional, c) Functional test, d) Surface defects	ISO-2859 on AQL				B	K	P	W	N	N																					
2.22	TELEPHONES	Mechanical: a) Visual, b) Functional	ISO-2859 on AQL				B	K	P	W	E	N																					





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<b>3 CUBICLE</b>															
3.1	RAW MATERIAL - CRCA SHEET	<u>Mechanical:</u> a) Visual check, b) Tensile Tests, i) Yield strength, ii) Ultimate strength, iii) Elongation, c) Thickness of CRCA Sheet of cabinet, <u>Chemical:</u> a) Chemical Analysis	100%				B	K	P	W	E	N			
3.2	FABRICATION	<u>Mechanical:</u> a) Visual check, b) Dimension	100%				B	K	P	W	E	N			
3.3	PRE TREATMENT BY 7 TANK PROCESS	<u>Mechanical &amp; Chemical:</u> a) Degreasing i) Check for concentration of Bath & temper, ii) Check for Water Rinsing, b) Derusting / Pickling i) Check for concentration of bath, ii) Check for Water Rinsing c) Phosphating-Check concentration bath, d) Fresh DM Water Rinsing i) Water Drying, ii) Electrophoretic Dip Coating(if powder coated), e) Final Finish i) Visual Check, ii) Nail Scratch Test	100%				B	K	P	W	E	N			
3.4	<b>PAINTING</b> a) Primer - two coats (within 24 hours of phosphating baking) b) Putty (wherever required) c) Painting ( 1st Coat ) (spray painting or powder coating) d) Final Coat	<u>Mechanical &amp; Chemical:</u> a) Visual check after baking, b) Visual Check after primer coating, c) Visual Check after putty, d) i) Visual Check for surface finish, ii) Check for thickness of paint, iii) Check for colour shading, iv) Paint Adhesion Check e) Final finish i) visual check	100%				B	K	P	W/ Z	E	N			



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<b>B INPROCESS INSPECTION</b>																																							
<b>1 COILS</b>																																							
1.1	COMPONENT KITTING	Mechanical: a) Quantity, b) Identification	100%				A	J	S	W		N																											
1.2	MANUFACTURING / TESTING	Mechanical: a) Visual, Electrical: a) Inductance, b) Q Factor, c) Insulation resistance test at 500V DC	100%				A	J	S	W		N																											
<b>2 SMT PROCESS</b>																																							
2.1	COMPONENT KITTING	Mechanical: a) Quantity, b) Identification	100%				A	J	S	W		N																											
2.2	COMPONENT LOADING (in Automatic Component Placement machine)	Mechanical: a) Visual check	100%				A	J	S	W		N																											
2.3	STENCIL / SCREEN PRINTING OF SOLDER PASTE ON PCB	Mechanical: a) Visual check	5 nos. per lot As per EM Specn.				A	J	S	W		N																											
2.4	AUTO COMPONENT PLACEMENT ON PCB'S.	Mechanical: a) Visual check	5 nos. per lot As per EM Specn.				A	J	S	W		N																											
2.5	REFLOW SOLDERING PROFILE GENERATION	Mechanical: a) Visual check	100%				A	J	S	W		N																											
2.6	REFLOW SOLDERING	Mechanical: a) Solder Paste Bridging, b) Excess Solder Paste, c) Insufficient Solder Paste, d) No Component, e) Wrong Component, f) Wrong Orientation, g) Dry Solder, h) Solder Balls i) Tomb Stoning	100%				A	J	S	W		N																											



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<b>3 THROUGH HOLE COMPONENTS PLACEMENT PROCESS</b>																						
3.1	COMPONENT KITTING	Mechanical: a) Quantity, b) Identification	100%				A	J	S	W		N										
3.2	COMPONENT PREPARATION	Mechanical: a) Visual check	100%				A	J	S	W		N										
3.3	COMPONENT PLACEMENT/ ASSEMBLY	Mechanical: a) Visual check	100%				A	J	S	W		N										
3.4	WAVE SOLDERING / HAND SOLDERING & ULTRASONIC CLEANING	Mechanical: Visual inspection for: a) Dry Solder, b) Less solder, c) Solder Bridge, d) Wetting Faults, e) Damaged Joints, f) Spikes, g) Solder Spatters, h) Blow Holes, i) Pin Holes, j) Shrink Holes	100%				A	J	S	W		N										
3.5	MISC.ASSEMBLY	Mechanical: a) Visual check	100%				A	J	S	W		N										
<b>4 ELECTRONIC MODULE ASSEMBLY &amp; TESTING</b>																						
4.1	MODULE TESTING	Mechanical: a) Visual Check, b) Proper Jacking of Modules, c) Functional Test	100%				A	J	S	W		N										
<b>5 FINAL ASSEMBLY</b>																						
5.1	SUB-RACK ASSEMBLY	Mechanical: a) Visual Check, b) Proper Jacking of Modules, c) Continuity Check	100%				A	J	S	W		N										



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5.2	CABINET ASSEMBLY INTER CONNECTION & CABINET WIRING	<u>Mechanical:</u> a) Visual Check for identification of labels, proper Housing of Sub-Racks, Modules & Accessories b) Check for physical ,General appearance / Finish c) Check for Continuity & completeness of wiring & connections. d) cabinet dimensional measurement e) paint thickness measurement	100%				A	J	S	W		N																						
5.3	SOAK (BURN IN)	<u>Electrical:</u> Test on complete equipment for 120 hours and functional tests after burn-in	100%				A	J	S	W		N																						



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<b>C</b> <b>1</b> <b>FINAL INSPECTION &amp; TESTING</b> <b>ROUTINE TESTS</b>													
1.1	<b>CARRIER EQUIPMENT - ETL 41/42/81/82</b> System Integration & Testing for functions	<u>Routine Tests:</u> System Integration & Testing for functions	100%			Equipment manufacturer's Test certificate	A	J	S	W/ Z		Y	
1.2	<b>PROTECTION COUPLERS INTEGRATED WITH ETL/STAND ALONE (Type: NSD 50,70C,70D)</b> System Integration & Testing for functions	<u>Routine Tests:</u> System Integration & Testing for functions	100%			Equipment manufacturer's Test certificate	A	J	S	W/ Z		Y	
1.3	<b>VFT EQUIPMENT WITH PLCC/STAND ALONE (Model NSK-5).</b> System Integration & Testing for functions	<u>Routine Tests:</u> System Integration & Testing for functions	100%			Equipment manufacturer's Test certificate	A	J	S	W/ Z		Y	



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<b>2 ACCEPTANCE TESTS</b>																																							
2.1	<b>CARRIER EQUIPMENT ETL 41/42/81/82</b> System Integration & Testing for functions	<u>Acceptance Tests:</u> Electrical Tests: a) Carrier Frequency Level, b) Frequency Accuracy, c) Loss of Speech/Signal Level (Frequency response), d) Automatic Gain Control,	0%				A	J	U	W/ Z		Y																											
2.2	<b>PROTECTION COUPLERS - INTEGRATED WITH ETL AND STAND ALONE (Type: NSD 50,70C,70D)</b> System Integration & Testing for functions	<u>Acceptance Tests:</u> Electrical Test: Integration & testing for functions a) Transmitter & receive levels, b) Transmission time measurement, c) Command prolongation, d) Alarms, e) Loop test	0%				A	J	U	W/ Z		Y																											
2.3	<b>VFT EQUIPMENT INTEGRATED WITH ETL /STAND ALONE (Model NSK-5).</b> System Integration & Testing for functions	<u>Acceptance Tests:</u> Electrical: Integration & testing for functions a) Transmit signal frequency b) Transmit output level	0%				A	J	U	W/ Z		Y																											
2.4	<b>SPARES/PTK</b>	<u>Physical</u> a) Visual inspection	100%				A	J	S	W/ Z		N																											
<b>D PACKING &amp; DESPATCH</b>																																							
1.1	<b>Completeness of equipment</b>	<u>Physical</u> a) Visual inspection	100%				A	J	S	W		N																											
1.2	<b>Check for finish</b>	<u>Physical</u> a) Visual inspection	100%				A	J	S	W		N																											
1.3	<b>Check for packing</b>	<u>Physical</u> a) Visual inspection	100%				A	J	S	W		N																											