GOVERNMENT OF INDIA (Ministry of Home Affairs) DIRECTORATE GENERAL CENTRAL RESERVE POLICE FORCE

EAST BLOCK-7, SEC-1, R.K. PURAM, NEW DELHI-110066

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D. W. 7 / 2010 10 G / O.D.

Dated, the of Jan '2019

No. B.V-7/2018-19-C (QRs) To

- 1. DIG (Comn), ITBP Block No. 2, CGO Complex Lodhi Road, New Delhi-03
- 3. DIG (Comn), SSB East Block-V, R.K Puram New- Delhi-66
- 5. DIG (Prov), BSF Block No. 10, CGO Complex Lodhi Road, New Delhi-03

- 2. DIG (Comn), NSG Meharam Nagar Palam, New Delhi-37
- 4. AIG (Comn), CISF Block No. 13, CGO, Complex Lodhi Road, New Delhi-03
- 6. Liaison Office, Assam Rifle Room No-171, North Block, MHA New Delhi -01

Subject: Regarding QRs/TDs of Comunication items.

Please find enclosed herewith QRs/TDs of Microwave Radio Link and QRs/TDs of Pneumatic Telescopic Mast duly approved by the competent authority for further necessary action.

Encl: (QRs/TDs of Microwave Radio Link and Pneumatic Telescopic Mast).

{P.R.Jha, DC (Comn)}
For DIGP (Equipment)
Directorate General, CRPF



QRs OF MICROWAVE RADIO LINK

S. N.	Parameter	Technical Specifications	
1	Frequency Band	Radio Should Support 2.4/5.8GHz frequency	
		band or unlicensed frequency band as per WPC	
		notification No.G.S.R.1048(E) dated 18.10.2018	
2	Encryption	AES-128, FIPS197	
3	Capacity	(i) 10 net aggregate or better (for 10 Mbps)	
4	Modulation	2x2 MIMO-OFDM, BPSK, QPSK, 16QAM, 64QAM	
5	TX Out put	21 dBm or better	
6	Rx Sensitivity	-88dBm @ 13 Mbps, -86dBm @ 26Mbps or better	
7	RF Channels	7 overlapping channels in frequency band as	
		mentioned in Sl.No 1 in 5/10/20/40 MHz channel	
		width configuration option as per user	
		requirement or better.	
8	Channel	Should support user configurable 5/10/20/40	
	Bandwidth	MHz channel bandwidth. The Radios should	
		also support 40Mhz channel bandwidth to	
		address high capacity backhaul requirements in	
		PTP Radio Links	
9	Wireless Error	Should support FEC 1/2, 2/3, 3/4, 5/6	
	correction		
10	ODU enclosure	IP66 or better	
11	Ethernet ports	Should support minimum 01 port	
12	Diversity	Polarization and Spatial Diversity supported	
13	Topology	Point to point	
14	Through put	For 10 Mbps or better (same ODU must be	
		software scalable up to 50 Mbps)	
15	Security	Mac level authentication/ link Lock	
Operat		TRAL 4 (DOE)	
1	Operating Modes	Ethernet (POE)	
	<u> </u>	Required	
3	V LAN Support Asymmetrical	Should Support Asymmetric Bandwidth	
3	TDD	Should Support Asymmetric Bandwidth	
4	Link Distance	20 Kms or better	
5	Spectrum		
3	Analyzer (in	Link-oriented Spectrum Analyzer: should show the results of both sites	
	built)	resures of portraires	
6	Duplex	TDD(Time Division Duplex)	
	Technology	Dollmo Division Dapiers	
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S. N.	Parameter	Technical Specifications		
7	Redundancy	Should have provision for 1+1 configuration in		
		all respect with automatic switchover of		
		Transmitter and Receiver for Radio link		
		redundancy in less than 150 milli seconds in		
		case of any failure via Ethernet Switch.		
Netw	etwork Management and Security			
1	Network Support	Ethernet, support should be available		
2	Antenna Alignment	Buzzer/ Visual LED's		
	tools			
3	Management	SNMP Based or Local and remote Loop back		
	utilities	testing		
4	Management	Ethernet		
	interface			
5	Network	Should support SNMP		
-	management			
	system			
6	Upgrade	Should have facility to upgrade the software		
	capabilities	over the Air. Should support software backup		
		and Restore through EMS		
Physi	cal Environmental a	nd compliance parameters		
1	Network	Ethernet (POE)		
	Connection			
2	External Antenna	N Type Connector with weather proof cover		
	Connection			
3	POE Adopter	IDU to provide power over Cat 6 cable to ODU		
4.	Power	Less than 35 Watts (IDU + ODU)		
	consumption			
5	LED Indicators	Power and line		
6	Temperature	-25 to + 60°C or above (ODU)		
7	Enclosure	All weather casing for ODU		
8	Environmental	MIL-STD 810 C/D/E/F or IEC 60068-2 or		
	Compliance	JSS-5555		
9	Shock and	MIL-STD 810 C/D/E/ F or EN 300019-2-4 or		
	Vibration	IEC 60068-2 Class- 4 M5 or		
		JSS-5555		
10	Radio Regulation -	EN 300 328; EN 301 893; EN 302 502, EN 302		
	ETSI	326-2		
11	Radio Regulation -	WPC Type approval GSR-38		
	WPC			
12	Power Source ,	230 Volts AC 50 Hz / POE and DC 48 V		

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band or unlicensed frequency band as per WPC notification No.G.S.R.1048(E) dated 18.10.2018 2 Gain (dBi) 2 x 26±0.5 3 VSWR (Max) 1.5 : 1 4 H Plane BW (°) 9±0.5 5 E Plane BW (°) 9±0.5 6 Polarization Linear V & H 7 Port to Port Isolation (dB) 8 Impedance (Ω) ≥50 9 Front to Back Ratio (dB) 10 Cross Poln. (dB) ≥22 11 Connector 2 x N(F) Termination 12 Lightning Protection DC Ground 13 Temperature Range (°C) 14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE	S. N.	Parameter	Technical Specifications	
band or unlicensed frequency band as per WPC notification No.G.S.R.1048(E) dated 18.10.2018 2 Gain (dBi) 2 x 26±0.5 3 VSWR (Max) 1.5 : 1 4 H Plane BW (°) 9±0.5 5 E Plane BW (°) 9±0.5 6 Polarization Linear V & H 7 Port to Port Isolation (dB) ≥30 8 Impedance (Ω) ≥50 9 Front to Back Ratio (dB) 10 Cross Poln. (dB) ≥22 11 Connector 2 x N(F) Termination DC Ground 13 Temperature Range (°C) 14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better 3 Performance a) 100 Mb Latency c) Throughput up to 9.5 million pps d Routing/Switching capacity e) MAC address table 8,000 entries	Anteni	na - Dual Polarized 2X2	MIMO dish antenna	
WPC notification No.G.S.R.1048(E) dated 18.10.2018	1	Frequency	Radio Should Support 2.4/5.8 GHz frequency	
18.10.2018			band or unlicensed frequency band as per	
2 Gain (dBi) 2 x 26±0.5 3 VSWR (Max) 1.5 : 1 4 H Plane BW (°) 9±0.5 5 E Plane BW (°) 9±0.5 6 Polarization Linear V & H 7 Port to Port Isolation (dB) ≥50 8 Impedance (Ω) ≥50 9 Front to Back Ratio (dB) 10 Cross Poln. (dB) ≥22 11 Connector 2 x N(F) Termination DC Ground 13 Temperature Range (°C) 14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency c) 4.1 μs (LIFO) b) 1000 Mb Latency c) Throughput d)Routing/Switching capacity e) MAC address table 8,000 entries			WPC notification No.G.S.R.1048(E) dated	
3 VSWR (Max) 1.5 : 1 4 H Plane BW (°) 9±0.5 5 E Plane BW (°) 9±0.5 6 Polarization Linear V & H 7 Port to Port Isolation (dB) ≥ 30 8 Impedance (Ω) ≥50 9 Front to Back Ratio (dB) ≥22 10 Cross Poln. (dB) ≥22 11 Connector 2 x N(F) Termination 12 Lightning Protection DC Ground 13 Temperature Range (°C) 14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 μs (LIFO) b) 1000 Mb Latency < 2.9 μs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching 12.8 Gbps capacity e) MAC address table 8,000 entries			18.10.2018	
4 H Plane BW (°) 9±0.5 5 E Plane BW (°) 9±0.5 6 Polarization Linear V & H 7 Port to Port Isolation (dB) 8 Impedance (Ω) ≥50 9 Front to Back Ratio (dB) 10 Cross Poln. (dB) ≥22 11 Connector 2 x N(F) Termination 12 Lightning Protection DC Ground 13 Temperature Range (°C) 14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T., Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 μs (LIFO) b) 1000 Mb Latency < 2.9 μs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries	2	Gain (dBi)	2 x 26±0.5	
E Plane BW (°) 9±0.5 6 Polarization Linear V & H 7 Port to Port Isolation (dB) 8 Impedance (Ω) ≥50 9 Front to Back Ratio (dB) 10 Cross Poln. (dB) ≥22 11 Connector Termination 12 Lightning Protection DC Ground 13 Temperature Range (°C) 14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T., Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 μs (LIFO) b) 1000 Mb Latency < 2.9 μs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries	3	VSWR (Max)	1.5 : 1	
Fort to Port Isolation (dB) 250 250 250 230	4	H Plane BW (°)	9±0.5	
Port to Port Isolation (dB) ≥ 30	5	E Plane BW (°)	9±0.5	
(dB) 8 Impedance (Ω) ≥50 ≥50 9 Front to Back Ratio (dB) ≥22 10 Cross Poln. (dB) ≥22 11 Connector 2 x N(F) 12 Lightning Protection DC Ground 13 Temperature Range (°C) 14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation 16 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better packet buffer size: 1 MB or better packet buffer size: 1 MB or better 3 Performance 4.1 μs (LIFO) 4 100 Mb Latency 2.9 μs (LIFO) 5 C Throughput Up to 9.5 million pps 6 MAC address table 8,000 entries	6	Polarization	Linear V & H	
8 Impedance (Ω) ≥50 9 Front to Back Ratio (dB) 10 Cross Poln. (dB) ≥22 11 Connector 2 x N(F) Termination 12 Lightning Protection DC Ground 13 Temperature Range (°C) 14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 μs (LIFO) b) 1000 Mb Latency < 2.9 μs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries	7	Port to Port Isolation	≥ 30	
9 Front to Back Ratio (dB) 10 Cross Poln. (dB) ≥22 11 Connector		(dB)		
(dB) 10 Cross Poln. (dB) ≥22 11 Connector 2 x N(F) Termination 12 Lightning Protection DC Ground 13 Temperature Range (°C) 14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and processor SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 μs (LIFO) b) 1000 Mb Latency < 2.9 μs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries	8	Impedance (Ω)	≥50	
10 Cross Poln. (dB) ≥22 11 Connector Termination 12 Lightning Protection 13 Temperature Range (°C) 14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB processor SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 μs (LIFO) b) 1000 Mb Latency < 2.9 μs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries	9	Front to Back Ratio	≥30	
11 Connector Termination 12 Lightning Protection 13 Temperature Range (°C) 14 Wind Speed (km/hr) 15 Humidity 16 Humidity 17 Ports 18 A) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full (b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB processor 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better (a) 100 Mb Latency (c) Throughput (d) Routing/Switching capacity (e) MAC address table 8,000 entries		(dB)		
Termination 12 Lightning Protection 13 Temperature Range (°C) 14 Wind Speed (km/hr) 15 Humidity 16 MDIX Ports 20 A 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full 21 b) 1 RJ-45 serial console port 22 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB processor 23 Performance 24 A 1 µs (LIFO) 25 B 100 Mb Latency < 4.1 µs (LIFO) 26 C Throughput 27 C to +60°C 28 C to +60°C 29 µs (LIFO) 29 µs (LIFO) 20 C Throughput 20 C Throughput 20 C Throughput 21 C LIFO) 22 C Throughput 23 C LIFO) 24 C LIFO) 25 C to +60°C 26 C Throughput 27 A 20 pus (LIFO) 28 C LIFO) 29 µs (LIFO) 29 µs (LIFO) 20 C Throughput 20 C LIFO) 20 C Throughput 21 C LIFO) 22 C LIFO) 23 C LIFO) 24 C LIFO) 25 C Throughput 26 C C C C C C C C C C C C C C C C C C C	10	Cross Poln. (dB)	≥22	
12 Lightning Protection 13 Temperature Range (°C) 14 Wind Speed (km/hr) 15 Humidity 16 MDIX Ports 1 MDIX Ports 2 Memory and processor 2 Memory and processor 3 Performance 2 a) 100 Mb Latency c) Throughput d)Routing/Switching capacity 2 MAC address table 3 Possible Company (Company) 4 MDIX Ports 4 DE Ground 2 DC Ground 2 OC Ground 2 DC Ground 2 DC Ground 2 Non-Condensation 8 (100 Non-Condensation 8 (100 Non-Condensation 9 (100 Non-Condensa	11	Connector	2 x N(F)	
Temperature Range (°C) 14 Wind Speed (km/hr) 15 Humidity 95% Non-Condensation Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 μs (LIFO) b) 1000 Mb Latency < 2.9 μs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries		Termination		
(°C) 14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB processor SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 µs (LIFO) b) 1000 Mb Latency < 2.9 µs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries	12	Lightning Protection	DC Ground	
14 Wind Speed (km/hr) 200 15 Humidity 95% Non-Condensation Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB processor SDRAM or better 3 Performance a) 100 Mb Latency < 4.1 μs (LIFO) b) 1000 Mb Latency < 2.9 μs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries	13	Temperature Range	-25°C to +60°C	
Humidity 95% Non-Condensation		(°C)		
Minimum Specification for Switch 1 MDIX Ports a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 µs (LIFO) b) 1000 Mb Latency < 2.9 µs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries	14	Wind Speed (km/hr)	200	
a) 8/24 auto-sensing 10/100 ports (IEEE 802.3 Type 10/100Base-T, Media Type: Auto-MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better 3 Performance a) 100 Mb Latency < 4.1 µs (LIFO) b) 1000 Mb Latency < 2.9 µs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries	15	Humidity	95% Non-Condensation	
802.3 Type 10/100Base-T, Media Type: Auto- MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB processor SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 μs (LIFO) b) 1000 Mb Latency < 2.9 μs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries	Minim	um Specification for	Switch	
MDIX; Duplex: full b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB processor	1	MDIX Ports	a) 8/24 auto-sensing 10/100 ports (IEEE	
b) 1 RJ-45 serial console port 2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better 3 Performance a) 100 Mb Latency < 4.1 µs (LIFO) b) 1000 Mb Latency < 2.9 µs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries			802.3 Type 10/100Base-T, Media Type: Auto-	
2 Memory and MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 μs (LIFO) b) 1000 Mb Latency < 2.9 μs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries			MDIX; Duplex: full	
processor SDRAM or better packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 µs (LIFO) b) 1000 Mb Latency < 2.9 µs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries			b) 1 RJ-45 serial console port	
packet buffer size: 1 MB or better 3 Performance a) 100 Mb Latency < 4.1 µs (LIFO) b) 1000 Mb Latency < 2.9 µs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries	2	Memory and	MIPS @ 300 MHz, 16 MB flash, 128 MB	
3 Performance a) 100 Mb Latency < 4.1 μs (LIFO) b) 1000 Mb Latency < 2.9 μs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching capacity e) MAC address table 8,000 entries		processor	SDRAM or better	
a) 100 Mb Latency < 4.1 µs (LIFO) b) 1000 Mb Latency < 2.9 µs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching 12.8 Gbps capacity e) MAC address table 8,000 entries			packet buffer size: 1 MB or better	
b) 1000 Mb Latency < 2.9 µs (LIFO) c) Throughput up to 9.5 million pps d)Routing/Switching 12.8 Gbps capacity e) MAC address table 8,000 entries	3	Performance		
c) Throughput up to 9.5 million pps d)Routing/Switching 12.8 Gbps capacity e) MAC address table 8,000 entries		a) 100 Mb Latency	< 4.1 μs (LIFO)	
d)Routing/Switching 12.8 Gbps capacity e) MAC address table 8,000 entries		b) 1000 Mb Latency	< 2.9 µs (LIFO)	
e) MAC address table 8,000 entries		c) Throughput	up to 9.5 million pps	
e) MAC address table 8,000 entries	d)Routing/Switching 12		12.8 Gbps	
		capacity		
size		e) MAC address table	8,000 entries	
		size		

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S. N.	Parameter	Technical Specifications		
4	Management	command-line interface; Web browser;		
		configuration menu;		
		out-of-band management (serial RS-232C)		
5	Layer 2 switching	Should support IEEE		
		802.1Q (4,094 VLAN IDs) and 256 VLANs		
Softw	are Specification (Opt	tional as per user requirement)		
GIS ar	oplication software for	location tracking on DMR Network		
Minin	num Specification for	FXO/FXS Gateway		
1	Interface			
i	WAN	10/100M Ethernet uplink port		
ii	LAN	10/100M Ethernet downlink port		
iii	Phone	8 Port FXS + 8 Port FXO		
2.	Protocol			
i	VOIP control protocol	H.323/SIP, easy to switch		
ii	Voice codec	G.711A, G.711U, G.729, G.723, G.726		
3.	Call Features			
а	Analogue telephone	DTMF detection and generation		
	feature	Call progress tones detection and generation		
		Polarity reversal signal		
		Echo cancellation ,VAD, CNG		
		Answer supervision, Disconnect supervision		
		One-stage dialling and two-stage dialling		
b	VoIP call feature	Call waiting, Call transfer, Call hold, Cal		
		forward		
Other	characteristics			
а	Voice feature	(i)DTMF		
		(ii)Voice call		
b	Characteristics of	Support DHCP Client		
data interface				
С	Configuration	Through WEB browser, TELNET		
d	FAX	Support pass through, T.30 and T.38		
e	Power	AC 220V, 50HZ		
f	Switch	1 Reset Switch		

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S. N.	Parameter Technical Specifications		
Addit	ional Features:		
1	Equipment should have support for integration with DMR Dispatch system.		
2	The Equipment should be compatible with existing DMR Radios.		
3	Equipment should have 08 extending/linking PSTN lines.		
4	The OEM should have service centres in India.		
5	Self-supporting tower specification as per annexure-"D". Optional:-As per user requirement		
6	Concrete base of tower should be constructed by vendor.		

WO/RM R.S. Dhaka Assam Rifles SI/RO. Awasthi CISF

-I R.K. Giri NSG

K.K.Roy, AD(Tele) SSB

J.P.Azad, AC(CEW) BSF

K.Solairaj, DC

P.R.Jha,DC(Comn) CRPF Harjinder Singh, DIG(Eqpt) CRPF

D.S.Rawat, I.S. (Comn) CRPF

Raju Bhargava, IPS, IGP(Comn &IT)

Md. Jawes Mintar, 1PS, ADG (Work & Comn), CRPF

Approved/Not Approved

Rajeev Ral Bhatnagar, IPS

dg, ¢rpf

S.N	Parameters	ING TOWER 20 METERS(OPTIONAL)		
1.	1 TOP Section	Specifications		
	Pipe Size			
	Outer Dimension	30 - 31 mm		
	Wall Thickness	2.0 - 2.5 mm		
	Class			
	Width Top	GI pipe conforming of ISI ERW Medium 420 – 430 mm		
	Width Bottom	500 – 520 mm		
	Cross Bar	10 - 12 mm		
2.	2 TOP Section	10 - 12 11111		
	Pipe Size			
	Outer Dimension	40 – 42 mm		
	Wall Thickness	2.5 – 3.0 mm		
	Class			
	Width Top	GI pipe conforming of ISI ERW Medium 520 – 540 mm		
	Width Pottom	610 – 630mm		
	Cross Bar			
3.	Cross Bar 10 – 12 mm			
J.	Pipe Size			
	Outer Dimension	40 40		
	Wall Thickness	40 – 42 mm		
. !	Class	2.5 – 3.0 mm		
	Width Top	GI pipe conforming of ISI ERW Medium		
	Width Bottom	620 – 640 mm		
		710- 730 mm		
4	Cross Bar 12- 14 mm			
4.	4 TOP Section			
	Pipe Size			
	Outer Dimension	47 – 49 mm		
	Wall Thickness	3.0 – 3.5 mm		
	Class	GI pipe conforming of ISI Light		
	Width Top	730 – 750 mm		
ĺ	Width Bottom	820 – 840 mm		
	Cross Bar	12 – 14 mm		
5.	5 TOP Section			
	Pipe Size			
	Outer Dimension	47 – 49 mm		
	Wall Thickness	3.0 – 3.5 mm		
	Class	GI pipe conforming of ISI Light		
	Width Top	830 – 850 mm		

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	Width Bottom	Specifications		
		920 – 940 mm		
	Cross Bar	12 – 14 mm		
6	6 TOP Section			
	Pipe Size			
	Outer Dimension	47 – 49 mm		
.	Wall Thickness	3.5 – 4.0 mm		
	Class	GI pipe conforming of ISI medium		
	Width Top	930 – 950 mm		
	Width Bottom	1030 – 1050 mm		
	Cross Bar	12 – 14 mm		
7	BASE Section			
	Pipe Size			
	Outer Dimension	47 – 49 mm		
	Wall Thickness	3.5 – 4.0 mm		
	Class	GI pipe conforming of ISI medium		
	Width Top	1035 – 1055 mm		
	Width Bottom	1130 – 1150 mm		
	Cross Bar	15 – 17 mm		
8.	General			
a)	Coating			
i)	Primary	Zinc- Phosphate Eposy Resin		
ii)	Final The tower shall be painted to have equal alter			
		bands of international Orange and White color		
		with top and bottom bands painted as per civil		
		aviation regulation.		
b)	GI Pipe	Should be made by reputed OEM		
c)	Nut, Bolt and Washers	All fasteners, plain washers, nut bolts and		
		washers should be galvanized as per applicable		
		relevant standards.		
d)	Earthings & Others			
i)	Earthing	The tower shall be grounded properly and the		
		Earthing shall be of Copper wire as per relevant		
		standards and industrial practice.		
ii)	Lighting Arrestor	Lighting arrestor to be installed on the top of the		
	$\mathbf{s}^{-1} = \mathbf{s}^{-1}$	tower.		
iii)	Aviation Lamp	02 Nos to be installed on the top of the tower as		
		per civil aviation rules.		
e)	Installation	To be carried out by the Firm.		

Note:- Concrete base is to be constructed by firm

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QRs FOR SELF SUPPORTING TOWER 25 METERS (OPTIONAL)

S.N	Parameters	Specifications	
1.	1 TOP Section		
	Pipe Size		
	Outer Dimension	30 - 31 mm	
	Wall Thickness	2.0 - 2.5 mm	
	Class	GI pipe conforming of ISI ERW Medium	
	Width Top	310 – 320 mm	
	Width Bottom	410 – 530 mm	
	Cross Bar	8 – 10 mm	
2.	2 TOP Section		
	Pipe Size		
	Outer Dimension	30 – 31 mm	
	Wall Thickness	2.0 – 2.5 mm	
	Class	GI pipe conforming of ISI ERW Medium	
	Width Top	420 – 430 mm	
	Width Bottom	500 – 520mm	
	Cross Bar	10 – 12 mm	
3.	3 TOP Section		
	Pipe Size		
	Outer Dimension	40 – 42 mm	
	Wall Thickness	2.5 – 3.0 mm	
	Class	GI pipe conforming of ISI ERW Medium	
	Width Top	520 – 540 mm	
	Width Bottom	610 - 630 mm	
	Cross Bar	10 - 12 mm	
4.	4 TOP Section		
	Pipe Size		
	Outer Dimension	40 – 42 mm	
	Wall Thickness	2.5 – 3.0 mm	
	Class	GI pipe conforming of ISI ERW Medium	
	Width Top	620 – 640 mm	
	Width Bottom	710 – 730 mm	
	Cross Bar	12 – 14 mm	
5	5 TOP Section		
	Pipe Size		
·	Outer Dimension	47 – 49 mm	
	Wall Thickness	3.0 – 3.5 mm	

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S.N	Parameters	Specifications			
1	Class	GI pipe conforming of ISI Light			
	Width Top	730 – 750 mm			
	Width Bottom	820 – 840 mm			
	Cross Bar	12 – 14 mm			
6	6 TOP Section				
	Pipe Size				
	Outer Dimension	47 – 49 mm			
	Wall Thickness	3.0 – 3.5 mm			
	Class	GI pipe conforming of ISI light			
	Width Top	830 – 850 mm			
	Width Bottom	920 – 940 mm			
	Cross Bar	12 – 14 mm			
7	7 TOP Section				
	Pipe Size				
	Outer Dimension	48 mm			
	Wall Thickness	3.5 mm			
	Class	GI pipe conforming of ISI medium			
	Width Top	940 mm			
	Width Bottom	1040 mm			
	Cross Bar	12 mm			
8	Base Section				
	Pipe Size				
	Outer Dimension	48 mm			
	Wall Thickness	3.5 mm			
	Class	GI pipe conforming of ISI medium			
	Width Top	1045 mm			
	Width Bottom	1140 mm			
	Cross Bar	16 mm			
9.	General				
-a)	Coating				
i)	Primary	Zinc- Phosphate Eposy Resin			
ii)	Final	The tower shall be painted to have equal			
		alternate bands of internationals Orange and			
		White colors with top and bottom bands			
painted as per o		painted as per civil aviation regulation.			
b) -	GI Pipe	Should be made by reputed OEM			
c)	Nut, Bolt and Washers	All fasteners, plain washers, nut bolts and			
		washers should be galvanized as per			
		applicable relevant standards.			

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5.N	Parameters	Specifications	
d)	Earthings & Others		
i)	Earthing	The tower shall be grounded properly and the Earthing shall be of Copper wire as per relevant standards and industrial practice.	
ii)	Lighting Arrestor	Lighting arrestor to be installed on the top of the tower.	
iii)	Aviation Lamp	02 Nos to be installed on the top of the tower as per civil aviation rules.	
e)	Installation	To be carried out by the Firm.	

Note:- Concrete base is to be constructed by firm

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TDs OF MICROWAVE RADIO LINK

S. N.	Parameter	Technical Specifications	Trial Directives
1	Frequency Band	Radio Should Support	Firm will submit OEM
		2.4/5.8GHz frequency band or	certificate.
		unlicensed frequency band as	
		per WPC notification	
		No.G.S.R.1048(E) dated	
		18.10.2018	
2	Encryption	AES-128, FIPS197	Firm will submit OEM
			certificate.
3	Capacity	(i) 10 net aggregate or better (for	Firm will submit OEM
		10 Mbps)	certificate and board
			will check practically.
4	Modulation	2x2 MIMO-OFDM, BPSK, QPSK,	•
		16QAM, 64QAM	practically and firm
			will also submit OEM
			certificate.
5	TX Out put	21 dBm or better	BOO will check
			practically and firm
			will submit OEM
			certificate.
		00 ID 0 10 Mb - 96 ID - 0	BOO will check
6	Rx Sensitivity	-88dBm @ 13 Mbps, -86dBm @	practically and firm
		26Mbps or better	will submit OEM
			certificate.
			cerunicate.
7	RF Channels	7 overlapping channels in	Firm will submit OEM
		frequency band as mentioned in	certificate.
		Sl.No 1 in 5/10/20/40 MHz	. '
		channel width configuration	
		option as per user requirement	
		or better.	

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S. N	Parameter	Technical Specifications	Trial Directives
8	Channel	Should support user	Firm will submit OEM
	Bandwidth	configurable 5/10/20/40 MHz	certificate.
:		channel bandwidth. The Radios	
		should also support 40Mhz	
		channel bandwidth to address	
,		high capacity backhaul	
		requirements in PTP Radio	
		Links	and the second s
9	Wireless Error	Should support FEC 1/2, 2/3,	
	correction	3/4, 5/6	OEM certificate.
10	ODU enclosure	IP66 or better	Firm will submit
			certificate of any
			Govt. Lab or NABL
			or ILAC accredited
			laboratory.
11	Ethernet ports	Should support minimum 01 port	Board will check
			practically.
12	Diversity	Polarization and Spatial Diversity	Firm will submit
	•	supported	OEM certificate.
13	Topology	Point to point	Board will check
			practically.
14	Through put	For 10 Mbps or better (same ODU	Firm will submit
		must be software scalable up to 50	
		Mbps)	
15	Security	Mac level authentication/ link	Board will check
		Lock	practically and firm
			will also submit
			OEM certificate.
Opera	tional		
1	Operating	Ethernet (POE)	Board will check
	Modes	4	practically.
2	V LAN Support	Required	Board will check
			practically.
3	Asymmetrical	Should Support Asymmetric	Firm will submit
	TDD	Bandwidth	OEM certificate.

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S. N	Parameter	Technical Specifications	Trial Directives
4	Link Distance	20 Kms or better	Board will check practically.
5	Spectrum Analyzer (in built)	Link-oriented Spectrum Analyzer: should show the results of both sites	
6	Duplex Technology	TDD(Time Division Duplex)	Board will check practically and firm will also submit OEM certificate.
7	Redundancy	1+1 configuration in all respect with automatic switchover of Transmitter and Receiver for Radio link redundancy in less than 150 milli seconds in case of any failure via	Board will check practically and firm will also submit OEM certificate.
Netw	ork Management	Ethernet Switch.	
L		Ethernet, support should be available	Board will check practically.
2	Antenna Alignment tools	Buzzer/ Visual LED's	Board will check practically.
3	Management utilities	SNMP Based or Local and remote Loop back testing	Board will check practically.
	Management interface	Ethernet	Board will check practically.
5	Network management system	Should support SNMP	Firm will submit OEM certificate.
6	Upgrade capabilities	Should have facility to upgrade the software over the Air. Should support software backup and Restore through EMS	certificate.

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s. N	Parameter	Technical	Trial Directives
•		Specifications	
Physi	cal Environmental and	i compliance parameters	
1	Network Connection	Ethernet (POE)	Board will check practically.
2	External Antenna	N Type Connector with	
	Connection	weather proof cover	
3	POE Adopter	IDU to provide power	
		over Cat 6 cable to ODU	·
4	Power consumption	Less than 35 Watts (IDU	Firm will submit OEM
		+ ODU)	certificate.
5	LED Indicators	Power and line	Board will check practically.
6	Temperature	-25 to + 60°C or above	Firm will submit certificate
		(ODU)	of any Govt. Lab or NABL
7	Enclosure	All weather casing for	or ILAC accredited
. •		ODU	laboratory.
8	Environmental	MIL-STD 810 C/D/E/F	
Ü	Compliance	or IEC 60068-2 or	
	Companie	JSS-55555	
9	Shock and	MIL-STD 810 C/D/E/ F	<u> </u>
	Vibration	or EN 300019-2-4 or IEC	· I
		60068-2 Class- 4 M5 or	
		JSS-55555	
10	Radio Regulation -	EN 300 328; EN 301	Firm will submit OEM
	ETSI	893; EN 302 502, EN	certificate.
	Bioi	302 326-2	
11	Radio Regulation -	WPC Type approval	Firm will submit WPC
11	WPC	GSR-38	certificate.
12	Power Source	230 Volts AC 50 Hz /	Firm will submit OEM
12	Tower Source	POE and DC 48 V	certificate.
Ante	nna - Dual Polarized 2	X2 MIMO dish antenna	
1	Frequency	Radio Should Support	Firm will submit OEM
		2.4/5.8 GHz frequency	certificate.
		band or unlicensed	
- N		frequency band as per	
		WPC notification	
		No.G.S.R.1048(E) dated	
		18.10.2018	

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6. N	Parameter	Technical Specifications	Trial Directives
2	Gain (dBi)	2 x 26±0.5	Firm will submit OEM
3	VSWR (Max)	1.5:1	certificate.
4	H Plane BW (°)	9±0.5	
5	E Plane BW (°)	9±0.5	
6	Polarization	Linear V & H	
7	Port to Port Isolation (dB)	≥ 30	
8	Impedance (Ω)	≥50	
9	Front to Back Ratio (dB)	≥30	
10	Cross Poln. (dB)	≥22	
11	Connector Termination	2 x N(F)	
12	Lightning Protection	DC Ground	
13	Temperature Range	-25°C to +60°C	
14	Wind Speed (km/hr)	200	
15	Humidity	95% Non-Condensation	
Minir	num Specification for	Switch	
1	MDIX Ports	a) 8/24 auto-sensing	Board will check
		10/100 ports (IEEE 802.3	practically and firm will
		Type 10/100Base-T,	also submit OEM
		Media Type: Auto-MDIX;	certificate.
		Duplex: full	
		b) 1 RJ-45 serial console	
		port	
2	Memory and processor	MIPS @ 300 MHz, 16 MB	
		flash, 128 MB SDRAM or	certificate.
		better	
		packet buffer size: 1 MB or better	
3	Performance		
	a) 100 Mb Latency	< 4.1 μs (LIFO)	Firm will submit OEM
	b) 1000 Mb Latency	< 2.9 µs (LIFO)	certificate.
	c) Throughput	up to 9.5 million pps	
	d)Routing/Switching capacity	12.8 Gbps	
	e) MAC address table size	8,000 entries	

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8. N	Parameter	Technical Spec	ifications	Trial I	Directiv	es
	Management	command-line		Firm will	submit	OEM
•	managomono	Web		certificate.		
		configuration me	·	1		
		out-of-band ma				
		(serial RS-232C)				
5	Layer 2 switching	Should support	EEE			
J	Dayer 2 Switching	802.1Q (4,094 V				
		and 256 VLANs				
Softw	vare Specification	Optional as per use	r requiren	nent)		
		for location tracking		Board	will	check
Sis a Netwo		ior rocation tracining	011 21111	practically		
		for FXO/FXS Gatev	WAY.	Processor-J		
	Interface	IOI FAO/FAS Gate	· ay			
1		10/100M Ethernet u	inlink nort	Firm will	submit	OEM
<u>i</u>	WAN	10/100M Ethernet				O D
ii	LAN	•	downing	cer unicate.		
		port 8 Port FXS + 8 Port	EVO.	Board	will	check
iii	Phone	8 Port FAS + 8 Port	rau	practically		
				submit OF		
				Submit Of	Sivi Cei tii	icate.
2.	Protocol		1, 1	Firm will	anhmit	OFM
i		H.323/SIP, easy to s	witch	certificate		. OEW
	protocol		700	ceruncate	•	
ii	Voice codec	G.711A, G.711U, G.7	729,		•	ē
		G.723, G.726				
3.	Call Features			TD: :11	1	OFN
a	. •	DTMF detection and				OEW
	telephone feature	Call progress tones of	letection	certificate	•	
		and generation		 -		
		Polarity reversal sign		_		
		Echo cancellation ,V	AD, CNG	_		
		Answer supervision,				
		Disconnect supervis				
		One-stage dialling a	nd two-			
		stage dialling				
b	VoIP call feature	Call waiting, Call tra	ansfer, Ca	ll Board	will	chec
		hold, Call forward		practically	у	
Othe	r characteristics	<u> </u>				
а	Voice feature	(i)DTMF		Board	will	chec
~		(ii)Voice call		practicall	y and fi	rm wi
	i	(11) 1 0100 0011		Ι. ·	,	
b	Characteristics of	Support DHCP Clier	it	submit O	•	

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S. N	Parameter	Technical Specifications	Trial Directives
c	Configuration	Through WEB browser,	Board will check
		TELNET	practically
d	FAX	Support pass through,	Board will check
		T.30 and T.38	practically and firm will
			submit OEM certificate.
e	Power	AC 220V, 50HZ	Board will check
			practically.
f	Switch	1 Reset Switch	
Addit	ional Features:		
1	Equipment should h	nave support for integration	
	with DMR Dispatch	system.	
2	The Equipment show	ıld be compatible with	
	existing DMR Radios		
3	Equipment should h	ave 08 extending/ linking	Firm will submit OEM
	PSTN lines.		certificate.
4	The OEM should have	ve service centres in India.	
5	Self-supporting towe	r specification as per	Firm will provide
	annexure-"D".		undertaking certificate.
	Optional:-As per use		
6		er should be constructed by	
	vendor.		

WO/RM R.S. Dhaka **Assam Rifles**

SI/RO. Awa CISF

NSG

K.K.Roy, AD(Tele) SSB

J.P.Azad, AC(O

BSF

K. Solairaj, DC ITBP

P.R.Jha,DC(Comn) CRPF

Harjinder Singh,DIG(Eqpt) CRPF

D.S.Rawat, G(Comn)

CRPF

,tGP(Comn &IT) Raju Bhargava, IPS

ADG (Work & Comn), CRPF

Approved/Not Approved

Rajeev Rai Bhatnagar, IPS DG, CRPF

TRIAL DIRECTIVES FOR SELF SUPPORTING TOWER 20 METERS(OPTIONAL)

S.N	Parameters	Specifications	Trial directives		
1.	1 TOP Section				
	Pipe Size				
	Outer	30 - 31 mm	Board will check practically.		
	Dimension				
	Wall Thickness	2.0 - 2.5 mm	Board will check practically.		
	Class	GI pipe conforming of ISI	Firm will provide undertaking		
		ERW Medium	certificate.		
	Width Top	420 – 430 mm	Board will check practically.		
	Width Bottom	500 – 520 mm	Board will check practically.		
	Cross Bar	10 - 12 mm	Board will check practically.		
2.	2 TOP Section				
	Pipe Size				
	Outer	40 – 42 mm	Board will check practically.		
	Dimension				
	Wall Thickness	2.5 – 3.0 mm	Board will check practically.		
	Class	GI pipe conforming of ISI	Firm will provide undertaking		
		ERW Medium	certificate.		
	Width Top	520 – 540 mm	Board will check practically.		
	Width Bottom	610 – 630mm	Board will check practically.		
	Cross Bar	10 – 12 mm	Board will check practically.		
3.	3 TOP Section				
	Pipe Size				
	Outer	40 – 42 mm	Board will check practically.		
	Dimension				
	Wall Thickness	2.5 – 3.0 mm	Board will check practically.		
	Class	GI pipe conforming of ISI	Firm will provide undertaking		
		ERW Medium	certificate.		
	Width Top	620 – 640 mm	Board will check practically.		
	Width Bottom	710- 730 mm	Board will check practically.		
	Cross Bar	12- 14 mm	Board will check practically.		
4.	4 TOP Section				
	Pipe Size				
	Outer	47 – 49 mm	Board will check practically.		
	Dimension				
	Wall Thickness	3.0 – 3.5 mm	Board will check practically.		
	Class	GI pipe conforming of ISI	Firm will provide undertaking		
		Light	Certificate.		
	Width Top	730 – 750 mm	Board will check practically.		
	Width Bottom	820 – 840 mm	Board will check practically.		

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S.N	Parameters	Specifications	Trial directives			
1	Cross Bar	12 – 14 mm	Board will check practically.			
5.	5 TOP Section		-			
	Pipe Size					
,	Outer	47 – 49 mm	Board will check practically.			
	Dimension					
	Wall Thickness	3.0 – 3.5 mm	Board will check practically.			
	Class	GI pipe conforming of ISI	Firm will provide undertaking			
		Light	certificate.			
	Width Top	830 – 850 mm	Board will check practically.			
	Width Bottom	920 – 940 mm	Board will check practically.			
	Cross Bar	12 – 14 mm	Board will check practically.			
6.	6 TOP Section					
	Pipe Size					
	Outer	47 – 49 mm	Board will check practically.			
	Dimension					
	Wall Thickness	3.5 – 4.0 mm	Firm will provide undertaking			
			certificate.			
	Class	GI pipe conforming of ISI	Board will check practically.			
	•	medium				
	Width Top	930 – 950 mm ·	Board will check practically.			
	Width Bottom	1030 – 1050 mm	Board will check practically.			
	Cross Bar	12 – 14 mm	Board will check practically.			
7.	BASE Section					
	Pipe Size					
	Outer	47 – 49 mm	Board will check practically.			
	Dimension					
	Wall Thickness	3.5 – 4.0 mm	Board will check practically.			
	Class	GI pipe conforming of ISI	Firm will provide undertaking			
		medium	certificate.			
	Width Top	1035 – 1055 mm	Board will check practically.			
	Width Bottom	1130 – 1150 mm	Board will check practically.			
	Cross Bar	15 – 17 mm	Board will check practically.			
8.	General					
a)	Coating	-				
i)	Primary	Zinc- Phosphate Eposy	Firm will provide undertaking			
		Resin	certificate.			

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S.N	Parameters	Specifications	Trial directives
ii)	Final	The tower shall be painted to	Board will check
		have equal alternate bands of	practically.
		international Orange and	
		White colors with top and	
		bottom bands painted as per	
		civil aviation regulation.	
b)	GI Pipe	Should be made by reputed	Board will check
		OEM	practically.
c)	Nut, Bolt and	All fasteners, plain washers,	Firm will provide
	Washers	nut bolts and washers should	undertaking certificate.
		be galvanized as per	
		applicable relevant standards.	
d)	Earthings & Oth	iers	
i)	Earthing	The tower shall be grounded	Board will check
		properly and the Earthing	practically.
	1	shall be of Copper wire as per	
		relevant standards and	
		industrial practice.	
ii)	Lighting	Lighting arrestor to be	Board will check
	Arrestor	installed on the top of the	practically.
		tower.	
iii)	Aviation Lamp	02 Nos to be installed on the	Board will check
		top of the tower as per civil	practically.
		aviation rules.	
e)	Installation	To be carried out by the Firm.	Board will check
			practically.

Note:- Concrete base is to be constructed by firm

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TRIAL DIRECTIVES FOR SELF SUPPORTING TOWER 25 METERS (OPTIONAL)

S.N	Parameters	Specifications	Trial directive	
1.	1 TOP Section			
	Pipe Size			
	Outer	30 - 31 mm	Board will check practically.	
	Dimension			
	Wall Thickness	2.0 - 2.5 mm	Board will check practically.	
	Class	GI pipe conforming of ISI	Firm will provide undertaking	
	·	ERW Medium	certificate.	
	Width Top	310 – 320 mm	Board will check practically.	
	Width Bottom	410 – 530 mm	Board will check practically.	
	Cross Bar	8 – 10 mm	Board will check practically.	
2.	2 TOP Section			
	Pipe Size			
	Outer	30 – 31 mm	Board will check practically.	
	Dimension			
	Wall Thickness	2.0 – 2.5 mm	Board will check practically.	
	Class	GI pipe conforming of ISI	Firm will provide undertaking	
		ERW Medium	certificate.	
	Width Top	420 – 430 mm	Board will check practically.	
	Width Bottom	500 – 520mm	Board will check practically.	
	Cross Bar	10 – 12 mm	Board will check practically.	
3.	3 TOP Section			
	Pipe Size			
	Outer	40 – 42 mm	Board will check practically.	
	Dimension			
	Wall Thickness	2.5 – 3.0 mm	Board will check practically.	
	Class	GI pipe conforming of ISI	Firm will provide undertaking	
		ERW Medium	certificate.	
	Width Top	520 – 540 mm	Board will check practically.	
	Width Bottom	610 - 630 mm	Board will check practically	
	Cross Bar	10 - 12 mm	Board will check practically.	
4.	4 TOP Section			
	Pipe Size			
	Outer	40 – 42 mm	Board will check practically.	
	Dimension			
	Wall Thickness	2.5 – 3.0 mm	Board will check practically.	

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S.N	Parameters	Specifications	Trial directive
	Class	GI pipe conforming of	Firm will provide undertaking
		ISI ERW Medium	certificate.
	Width Top	620 – 640 mm	Board will check practically.
	Width Bottom	710 – 730 mm	Board will check practically.
	Cross Bar	12 – 14 mm	Board will check practically.
5.	5 TOP Section		
	Pipe Size		
	Outer	47 – 49 mm .	Board will check practically.
	Dimension		
	Wall Thickness	3.0 – 3.5 mm	Board will check practically.
	Class	GI pipe conforming of	Firm will provide undertaking
		ISI Light	certificate.
	Width Top	730 – 750 mm	Board will check practically.
	Width Bottom	820 – 840 mm	Board will check practically.
	Cross Bar	12 – 14 mm	Board will check practically.
6.	6. 6 TOP Section		
	Pipe Size		
	Outer	47 49 mm	Board will check practically.
	Dimension		
	Wall Thickness	3.0 – 3.5 mm	Board will check practically.
	Class	GI pipe conforming of	Firm will provide undertaking
		ISI light	certificate.
	Width Top	830 – 850 mm	Board will check practically.
	Width Bottom	920 - 940 mm	Board will check practically.
	Cross Bar	12 – 14 mm	Board will check practically.
7.	7 TOP Section		
	Pipe Size		
	Outer	48 mm	Board will check practically.
A	Dimension		
	Wall Thickness	3.5 mm	Board will check practically.
	Class	G! pipe conforming of	Firm will provide undertaking
		ISI medium	certificate.
	Width Top	940 mm	Board will check practically.
	Width Bottom	1040 mm	Board will check practically.
i	Cross Bar	12 mm	Board will check practically.

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S.N	Parameters	Specifications	Trial directive
8.	Base Section		
	Pipe Size		
	Outer	48 mm	Board will check practically.
	Dimension		•
	Wall Thickness	3.5 mm	Board will check practically.
	Class	GI pipe conforming of ISI	Firm will provide undertaking
		medium	certificate.
	Width Top	1045 mm	Board will check practically.
	Width Bottom	1140 mm	Board will check practically.
	Cross Bar	16 mm	Board will check practically.
9.	General		
a)	Coating		
i)	Primary	Zinc- Phosphate Eposy	Firm will provide undertaking
		Resin	certificate.
ii)	Final	The tower shall be painted	Board will check practically.
		to have equal alternate	·
		bands of internationals	
		Orange and White colors	
		with top and bottom bands	
		painted as per civil	
		aviation regulation.	
b)	GI Pipe	·	Board will check practically.
		reputed OEM.	
c)	Nut, Bolt and	All fasteners, plain	1
	Washers	washers, nut bolts and	certificate.
		washers should be	
	(galvanized as per	
		applicable relevant	
4)	Fouthings % Oth	standards	
d)	Earthings & Other		Do and will about a section 11
i)	Earthing	The tower shall be	Board will check practically.
		grounded properly and the Earthing shall be of	
		Copper wire as per relevant standards and	
		industrial practice.	
	1	muusirai practice.	

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S.N	Parameters	Specifications	Trial directive
ii)	Lighting Arrestor	Lighting arrestor to be installed on the top of the tower.	
iii)	Aviation Lamp	02 Nos to be installed on the top of the tower as per civil aviation rules.	
e)	Installation	To be carried out by the Firm.	Board will check practically.

Note:- Concrete base is to be constructed by firm

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