GOVERNMENT OF INDIA
(Ministry of Home Affairs)
DIRECTORATE GENERAL
CENTRAL RESERVE POLICE FORCE
EAST BLOCK-7, SEC-1, R.K. PURAM, NEW DELHI-110066
Email: comncell@crpf.gov.in Tele Fax: 011-26107493

No. B.V-7/2018-19-C (QRs) Dated, the 09th Jan '2019

To

1. DIG (Comn), ITBP
   Block No. 2, CGO Complex
   Lodhi Road, New Delhi-03

2. DIG (Comn), NSG
   Meharam Nagar
   Palam, New Delhi-37

3. DIG (Comn), SSB
   East Block-V, R.K Puram
   New- Delhi-66

4. AIG (Comn), CISF
   Block No. 13, CGO, Complex
   Lodhi Road, New Delhi-03

5. DIG (Prov), BSF
   Block No. 10, 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

Annexure-"A"

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 Bandwidth	Should support user configurable 5/10/20/40 MHz channel bandwidth. The Radios should also support 40Mhz channel bandwidth to address high capacity backhaul requirements in PTP Radio Links
9	Wireless Error correction	Should support FEC 1/2, 2/3, 3/4, 5/6
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
Operational		
1	Operating Modes	Ethernet (POE)
2	V LAN Support	Required
3	Asymmetrical TDD	Should Support Asymmetric Bandwidth
4	Link Distance	20 Kms or better
5	Spectrum Analyzer (in built)	Link-oriented Spectrum Analyzer: should show the results of both sites
6	Duplex Technology	TDD(Time Division Duplex)

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.
Network Management and Security		
1	Network Support	Ethernet, support should be available
2	Antenna Alignment tools	Buzzer/ Visual LED`s
3	Management utilities	SNMP Based or Local and remote Loop back testing
4	Management interface	Ethernet
5	Network management system	Should support SNMP
6	Upgrade capabilities	Should have facility to upgrade the software over the Air. Should support software backup and Restore through EMS
Physical Environmental and compliance parameters		
1	Network Connection	Ethernet (POE)
2	External Antenna Connection	N Type Connector with weather proof cover
3	POE Adopter	IDU to provide power over Cat 6 cable to ODU
4	Power consumption	Less than 35 Watts (IDU + ODU)
5	LED Indicators	Power and line
6	Temperature	-25 to + 60°C or above (ODU)
7	Enclosure	All weather casing for ODU
8	Environmental Compliance	MIL-STD 810 C/D/E/F or IEC 60068-2 or JSS-55555
9	Shock and Vibration	MIL-STD 810 C/D/E/ F or EN 300019-2-4 or IEC 60068-2 Class- 4 M5 or JSS-55555
10	Radio Regulation - ETSI	EN 300 328; EN 301 893; EN 302 502, EN 302 326-2
11	Radio Regulation - WPC	WPC Type approval GSR-38
12	Power Source	230 Volts AC 50 Hz / POE and DC 48 V

S. N.	Parameter	Technical Specifications
Antenna - Dual Polarized 2X2 MIMO dish antenna		
1	Frequency	Radio Should Support 2.4/5.8 GHz frequency 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)	≥30
10	Cross Poln. (dB)	≥22
11	Connector Termination	2 x N(F)
12	Lightning Protection	DC Ground
13	Temperature Range (°C)	-25°C to +60°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	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	12.8 Gbps
	e) MAC address table size	8,000 entries

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
Software Specification (Optional as per user requirement)		
GIS application software for location tracking on DMR Network		
Minimum 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**	
a	Analogue telephone feature	DTMF detection and generation
		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, Call forward
Other characteristics		
a	Voice feature	(i)DTMF (ii)Voice call
b	Characteristics of data interface	Support DHCP Client
c	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

S. N.	Parameter	Technical Specifications
Additional 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
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K.K.Roy, AD(Tele)
SSB

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BSF

K.Sonairaj, DC
ITBP

P.R.Jha,DC(Comn)
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Raju Bhargava, IPS, IGP(Comn &IT)
CRPF

Md. Jawed Akhtar, IPS,
ADG (Work & Comn),CRPF

Approved/Not Approved

Rajeev Rai Bhatnagar, IPS
DG, CRPF

Annexure-"D"

QRs FOR SELF SUPPORTING TOWER 20 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	420 – 430 mm
	Width Bottom	500 – 520 mm
	Cross Bar	10 - 12 mm
2.	**2 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 – 630mm
	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	620 – 640 mm
	Width Bottom	710- 730 mm
	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
	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

S.N	Parameters	Specifications
	Width Bottom	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 alternate bands of international Orange and White colors 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 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

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

S.N	Parameters	Specifications
	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 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.

S.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

Annexure-"B"

TDs OF MICROWAVE RADIO LINK

S. N.	Parameter	Technical Specifications	Trial Directives
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	Firm will submit OEM certificate.
2	Encryption	AES-128, FIPS197	Firm will submit OEM certificate.
3	Capacity	(i) 10 net aggregate or better (for 10 Mbps)	Firm will submit OEM certificate and board will check practically.
4	Modulation	2x2 MIMO-OFDM, BPSK, QPSK, 16QAM, 64QAM	BOO will check 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.
6	Rx Sensitivity	-88dBm @ 13 Mbps, -86dBm @ 26Mbps or better	BOO will check practically and firm will submit OEM certificate.
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.	Firm will submit OEM certificate.

S. N	Parameter	Technical Specifications	Trial Directives
8	Channel Bandwidth	Should support user configurable 5/10/20/40 MHz channel bandwidth. The Radios should also support 40Mhz channel bandwidth to address high capacity backhaul requirements in PTP Radio Links	Firm will submit OEM certificate.
9	Wireless Error correction	Should support FEC 1/2, 2/3, 3/4, 5/6	Firm will submit 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 supported	Firm will submit OEM certificate.
13	Topology	Point to point	Board will check practically.
14	Through put	For 10 Mbps or better (same ODU must be software scalable up to 50 Mbps)	Firm will submit OEM certificate.
15	Security	Mac level authentication/ link Lock	Board will check practically and firm will also submit OEM certificate.
Operational			
1	Operating Modes	Ethernet (POE)	Board will check practically.
2	V LAN Support	Required	Board will check practically.
3	Asymmetrical TDD	Should Support Asymmetric Bandwidth	Firm will submit OEM certificate.

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	Board will check practically.
6	Duplex Technology	TDD(Time Division Duplex)	Board will check practically and firm will also submit OEM certificate.
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.	Board will check practically and firm will also submit OEM certificate.
Network Management and Security			
1	Network Support	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.
4	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	Firm will submit OEM certificate.

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

S. N	Parameter	Technical Specifications	Trial Directives
2	Gain (dBi)	2 x 26±0.5	Firm will submit OEM certificate.
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)	≥30	
10	Cross Poln. (dB)	≥22	
11	Connector Termination	2 x N(F)	
12	Lightning Protection	DC Ground	
13	Temperature Range (°C)	-25°C to +60°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	Board will check practically and firm will also submit OEM certificate.
		b) 1 RJ-45 serial console port	
2	Memory and processor	MIPS @ 300 MHz, 16 MB flash, 128 MB SDRAM or better	Firm will submit OEM certificate.
		packet buffer size: 1 MB or better	
3	Performance		
	a) 100 Mb Latency	< 4.1 µs (LIFO)	Firm will submit OEM certificate.
	b) 1000 Mb Latency	< 2.9 µs (LIFO)	
	c) Throughput	up to 9.5 million pps	
	d)Routing/Switching capacity	12.8 Gbps	
	e) MAC address table size	8,000 entries	

S. N	Parameter	Technical Specifications	Trial Directives
4	Management	command-line interface; Web browser; configuration menu;	Firm will submit OEM certificate.
		out-of-band management (serial RS-232C)	
5	Layer 2 switching	Should support IEEE	
		802.1Q (4,094 VLAN IDs) and 256 VLANs	
Software Specification (Optional as per user requirement)			
GIS application software for location tracking on DMR Network			Board will check practically.
Minimum Specification for FXO/FXS Gateway			
1	**Interface**		
i	WAN	10/100M Ethernet uplink port	Firm will submit OEM certificate.
ii	LAN	10/100M Ethernet downlink port	
iii	Phone	8 Port FXS + 8 Port FXO	Board will check practically and firm will submit OEM certificate.
2.	**Protocol**		
i	VOIP control protocol	H.323/SIP, easy to switch	Firm will submit OEM certificate.
ii	Voice codec	G.711A, G.711U, G.729, G.723, G.726	
3.	**Call Features**		
a	Analogue telephone feature	DTMF detection and generation	Firm will submit OEM certificate.
		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, Call forward	Board will check practically.
Other characteristics			
a	Voice feature	(i)DTMF (ii)Voice call	Board will check practically and firm will submit OEM certificate.
b	Characteristics of data interface	Support DHCP Client	

S. N	Parameter	Technical Specifications	Trial Directives
c	Configuration	Through WEB browser, TELNET	Board will check practically
d	FAX	Support pass through, T.30 and T.38	Board will check practically and firm will submit OEM certificate.
e	Power	AC 220V, 50HZ	Board will check practically.
f	Switch	1 Reset Switch	
Additional 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.		Firm will submit OEM certificate.
4	The OEM should have service centres in India.		
5	Self-supporting tower specification as per annexure-"D". Optional:-As per user requirement		Firm will provide undertaking certificate.
6	Concrete base of tower should be constructed by vendor.		

WO/RM R.S. Dhaka
Assam Rifles

SI/RO. Awasthi
CISF

AC-I R.K.Giri
NSG

K.K.Roy, AD(Tele)
SSB

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BSF

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ITBP

P.R.Jha,DC(Comn)
CRPF

Harjinder Singh,DIG(Eqpt)
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D.S.Rawat,DIG(Comn)
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Raju Bhargava, IPS, IGP(Comn &IT)
CRPF

Md. Jawed Akhtar, 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 Dimension	30 - 31 mm	Board will check practically.
	Wall Thickness	2.0 - 2.5 mm	Board will check practically.
	Class	GI pipe conforming of ISI ERW Medium	Firm will provide undertaking 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 Dimension	40 – 42 mm	Board will check practically.
	Wall Thickness	2.5 – 3.0 mm	Board will check practically.
	Class	GI pipe conforming of ISI ERW Medium	Firm will provide undertaking 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 Dimension	40 – 42 mm	Board will check practically.
	Wall Thickness	2.5 – 3.0 mm	Board will check practically.
	Class	GI pipe conforming of ISI ERW Medium	Firm will provide undertaking 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 Dimension	47 – 49 mm	Board will check practically.
	Wall Thickness	3.0 – 3.5 mm	Board will check practically.
	Class	GI pipe conforming of ISI Light	Firm will provide undertaking Certificate.
	Width Top	730 – 750 mm	Board will check practically.
	Width Bottom	820 – 840 mm	Board will check practically.

S.N	Parameters	Specifications	Trial directives
	Cross Bar	12 – 14 mm	Board will check practically.
5.	**5 TOP Section**		
	Pipe Size		
	Outer Dimension	47 – 49 mm	Board will check practically.
	Wall Thickness	3.0 – 3.5 mm	Board will check practically.
	Class	GI pipe conforming of ISI Light	Firm will provide undertaking 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 Dimension	47 – 49 mm	Board will check practically.
	Wall Thickness	3.5 – 4.0 mm	Firm will provide undertaking certificate.
	Class	GI pipe conforming of ISI medium	Board will check practically.
	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 Dimension	47 – 49 mm	Board will check practically.
	Wall Thickness	3.5 – 4.0 mm	Board will check practically.
	Class	GI pipe conforming of ISI medium	Firm will provide undertaking 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 Resin	Firm will provide undertaking certificate.

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

Note:- Concrete base is to be constructed by firm

TRIAL DIRECTIVES FOR SELF SUPPORTING TOWER 25 METERS (OPTIONAL)

S.N	Parameters	Specifications	Trial directive
1.	**1 TOP Section**		
	Pipe Size		
	Outer Dimension	30 - 31 mm	Board will check practically.
	Wall Thickness	2.0 - 2.5 mm	Board will check practically.
	Class	GI pipe conforming of ISI ERW Medium	Firm will provide undertaking 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 Dimension	30 – 31 mm	Board will check practically.
	Wall Thickness	2.0 – 2.5 mm	Board will check practically.
	Class	GI pipe conforming of ISI ERW Medium	Firm will provide undertaking 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 Dimension	40 – 42 mm	Board will check practically.
	Wall Thickness	2.5 - 3.0 mm	Board will check practically.
	Class	GI pipe conforming of ISI ERW Medium	Firm will provide undertaking 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 Dimension	40 – 42 mm	Board will check practically.
	Wall Thickness	2.5 – 3.0 mm	Board will check practically.

S.N	Parameters	Specifications	Trial directive
	Class	GI pipe conforming of ISI ERW Medium	Firm will provide undertaking 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 Dimension	47 – 49 mm	Board will check practically.
	Wall Thickness	3.0 – 3.5 mm	Board will check practically.
	Class	GI pipe conforming of ISI Light	Firm will provide undertaking 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 TOP Section**		
	Pipe Size		
	Outer Dimension	47 – 49 mm	Board will check practically.
	Wall Thickness	3.0 – 3.5 mm	Board will check practically.
	Class	GI pipe conforming of ISI light	Firm will provide undertaking 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 Dimension	48 mm	Board will check practically.
	Wall Thickness	3.5 mm	Board will check practically.
	Class	GI pipe conforming of ISI medium	Firm will provide undertaking certificate.
	Width Top	940 mm	Board will check practically.
	Width Bottom	1040 mm	Board will check practically.
	Cross Bar	12 mm	Board will check practically.

S.N	Parameters	Specifications	Trial directive
8.	**Base Section**		
	Pipe Size		
	Outer Dimension	48 mm	Board will check practically.
	Wall Thickness	3.5 mm	Board will check practically.
	Class	GI pipe conforming of ISI medium	Firm will provide undertaking 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 Resin	Firm will provide undertaking certificate.
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 civil aviation regulation.	Board will check practically.
b)	GI Pipe	Should be made by reputed OEM.	Board will check practically.
c)	Nut, Bolt and Washers	All fasteners, plain washers, nut bolts and washers should be galvanized as per applicable relevant standards.	Firm will provide undertaking certificate.
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.	Board will check practically.

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

Note:- Concrete base is to be constructed by firm