

**RailTel Corporation of India Ltd
(A Government of India Enterprise)**

Plot No 143, Sector 44, Institutional Area,
Opposite to Gold Souk Mall,
Gurgaon, Haryana- 122003
Work: 0124-4236083
Fax: 0124-4236084

Website: www.railtelindia.com

Corrigendum -II

Sub: Request for proposals for “Design, Supply, Installation, Testing and Commissioning of 5.8 GHz Ethernet Radios for various capacities and ranges, Poles and Masts of various sizes for RailTel’s network on Rate Contract”.

Ref: i) This office Limited Tender No. RailTel/Tender/OT/CO/DNM/2017-18/Radio/353 dated 11.08.2016.

In reference to the above referred Limited Tender, the following amendments are issued in the Tender document. The bids may be submitted in consideration of these amendments.

1. The Point no X, Note under Chapter 1, Schedule of Requirements may be read as:
All the supply items in above mentioned SORs should include not only the following items but all other accessories to commission the link per site:

1. Indoor Unit 2 x FE/2 x E1
2. AC Power Adaptor for Indoor Unit
3. Outdoor AC PoE
4. Outdoor DC PoE
5. CAT-6 Ethernet cable
6. Earthing Cable

Please refer for the specification of the above accessories in Chapter IV.
Railtel will specify the power supply arrangement in the sub Purchase Order after the site survey confirmation for ac or dc requirement by the tenderer. In case not specified in sub PO, tenderer should seek clarification on the power supply arrangement of the above accessories.

2. The Clause 3.3 (V), Chapter 3 for Eligibility criteria for OEM may be read as:
OEM make of the Radio should have its own office and repair/replacement centre for 3 years or more in India. Certification on OEM letter head with address and Contact number will be required in this regard.

3. The Clause 3.3(VI), Chapter 3 for Eligibility criteria for OEM may be read as:
Equipment Type Approval Certificate for the product quoted should be in the name of the OEM & Certification in this regard will be required. The quoted product should be working in the field prior to the date of RFP notification and documentation proof shall be submitted for the working link.

4. The Clause 3.3(VII), Chapter 3 for Eligibility criteria for OEM may be read as:

OEM of Radio to have ISO Certification for design & manufacturing of wireless communication Products and solutions. Certification in this regard will be required.

5. **The Clause 3.3(VIII), Chapter 3 for Eligibility criteria for OEM may be read as:**
OEM make of the Radios should have supplied Radios against 3 or more POs (Govt & Private) worth more than INR 2 Cr (or equivalent in other currencies) or more each in last 6 years in India.
6. **The Schedule of Requirement II & SOR-II under Note as mentioned on page 7 of tender document, may be read as Schedule of Requirement 10.**
7. **The long term maintenance support clause 3.7, Chapter 3 is added in the BDS Sheet and may be read as:**

Reference	Description
Clause 3.7, Chapter 3	36 months

8. **The Clause 8, SOR-2; Clause 8, SOR3; Clause 8, SOR 4; Clause 7, SOR 5; Clause 37, SOR 6 & Clause 10, SOR 7 under Chapter 4 may be read as:**
Tx Power upto 25/30dBm or within allowable limit as per WPC guidelines.
9. **The Clause 13 of SOR 1, SOR 2, SOR 3, SOR 4, SOR 5 and Clause 42 of SOR 6 under Chapter 4 may be treated as deleted.**
10. **The Clause 29 under SOR 1, SOR 2, SOR 3, SOR 4, SOR 5; Clause 60 under SOR 6; Clause 31 under SOR 7; Clause 1.1.18 under SOR 8; under Chapter 4; following clause may be added & read as:**
System should be ipv6 feature ready.
11. **The Clause 16 of SOR 2, SOR 3 & SOR4; Clause 19 of SOR 5; Clause 47 of SOR 6; Clause 14 of SOR 7 under Chapter 4 may be read as**
System should have spectral efficiency better than or equal to 5bps / Hz or system should support spectral efficiency in accordance with throughput delivery requirements.
12. **The Clause 7 of SOR 1 under Chapter 4 may be read as:**
System should Channel Bandwidth 5/10/20/40 MHz user configurable.
13. **The Clause 1.1.9 of SOR 8 under Chapter 4 may be read as:**
System must support Point to Point or Point to Multipoint Topology without any hardware change.
14. **The Clause 3.1 of SOR 8 under Chapter 4 may be read as:**
Management of the system shall be web-base GUI/HTTP/HTTPS, FTP, SNMPv2c/SNMPv1/ SNMPv3 interfaces.
15. **The Clause 4.1 of SOR 8 under Chapter 4 may be read as:**
Bidder's proposed indoor mounted equipment MUST operate as specified under the following room ambient environmental conditions:
 - a. Operating Temperature -30 degrees C to +55 degrees C
 - b. System must have inbuilt surge suppressor. In case of external surge suppressor no additional charges for the external surge suppressor should be quoted & it should be included with the product quoted
16. **The Clause 4.1 of SOR 8 under Chapter 4 may be read as:**
System, should have following certification to ensure regulation
a>WPC GSR-38

b>EMC Standards: EN 310489-1

c>Safety:EN60950-1:2006+Amendment 12:2011,EN 60950-22:2006

17.The SOR 8 under chapter 4 on page 34 may be read as:

Schedule of Requirement – 8 (Line Item: 1)

18.The SOR 1 (Line Item: 7) under chapter 4 on page 36 may be read as:

Schedule of Requirement – 8 (Line Item: 2)

19.The SOR 1 (Line Item: 8) under chapter 4 on page 36 may be read as:

Schedule of Requirement – 8 (Line Item: 3)

20.The SOR 1 (Line Item: 9) under chapter 4 on page 37 may be read as:

Schedule of Requirement – 8 (Line Item: 4)

21.The SOR 1 (Line Item: 11) under chapter 4 on page 38 may be read as

Schedule of Requirement – 9

22.The revised Schedule of Requirement under Chapter 1 may be read as:

CHAPTER-1 SCHEDULE OF REQUIREMENTS
(REVISED)

(Price Schedule)

S No	Description	Unit	Supply item price(Inclusive of all taxes)	Installation and commissioning charges (Inclusive of all taxes)
SOR 1	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Point to Point (PTP) Radio Set of 10 Mbps Aggregate throughput coverage up to 5 kms with Integrated/External Antenna	One set		
SOR 2	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Point to Point (PTP) Radio Set of 20 Mbps Aggregate throughput coverage up to 20 kms with Integrated/External Antenna	One Set		
SOR 3	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Point to Point (PTP) Radio Set of 100 Mbps Aggregate throughput coverage up to 10 kms with Integrated/External Antenna	One Set		

SOR 4	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Point to Point (PTP) Radio Set of 100 Mbps Aggregate throughput coverage up to 20 kms with Integrated/External Antenna	One Set		
SOR 5	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Point to Point (PTP) Radio Set of 150 Mbps Aggregate throughput coverage up to 10 kms	One Set		
SOR 6	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Point to Point (PTP) Radio Set of 200 Mbps Aggregate throughput coverage up to 5 kms	One Set		
SOR 7	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Point to Point (PTP) Radio Set of 250 Mbps Aggregate throughput coverage up to 20 kms	One Set		
SOR 8-A				
1	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Base Station Sector Radio set of 200 Mbps aggregate throughput coverage upto 10 kms	Nos		
2	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Customer Premises Equipment Radio set of 10 Mbps aggregate throughput coverage up to 10 kms with Integrated/External Antenna	Nos		
3	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Customer Premises Equipment Radio set of 20 Mbps aggregate throughput coverage up to 5 kms with Integrated/External Antenna	Nos		
SOR 8-B				

1	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Base Station Sector Radio set of 50 Mbps aggregate throughput coverage upto 10 kms	Nos		
2	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Customer Premises Equipment Radio set of 10 Mbps aggregate throughput coverage up to 10 kms with Integrated/External Antenna	Nos		
3	Supply, Installation, testing and commissioning of 5.8 GHz Ethernet Customer Premises Equipment Radio set of 10 Mbps aggregate throughput coverage up to 5 kms with Integrated/External Antenna	Nos		

23. The Clause 8.28.8 under Chapter 8, may be read as:

After the successful commissioning of the link and acceptance by the RailTel site incharge, the SLA for deduction and penalty will be applicable as per details given below. The same will be followed during the warranty and the long maintenance period (Clause 3.7), excluding the dependencies on account of RailTel. If the Bidder fail to achieve SLA as mentioned, the following penalties will be imposed. It will be calculated on monthly basis and maximum penalties will be 10 % of the cost of link per year.

SN	Link Availability per month	Deduction/Penalties
1	Between 98% to 97%	2% of the cost of the link
2	Between 97% to 95%	4% of the cost of the link
3	Between 95% to 90%	6% of the cost of the link
4	Less than 90%	10% of the cost of the link

24. The Clause 8.28.9 under chapter 8 is added and may be read as:

Availability Clause:

The Monthly link availability in terms of % up-time will be calculated as follows:

$$X = 30 \text{ days} \times 24 \text{ hours} \times 60 \text{ mins}$$

$$Y = (30 \text{ days} \times 24 \text{ hours} \times 60 \text{ mins}) - (\text{Unplanned outage time during quarter})$$

$$\% \text{ Uptime} = (Y/X) \times 100 \text{ rounded off to two-decimal points.}$$

While imposing penalty, the power failure will not be taken into consideration.

25. The Clause 3.12 under Chapter 3, may be read as:

3.12.1 First 90% payment will be made on supply & successful commissioning of Radios/Masts, receipt of materials and acceptance by the consignee against purchase order in satisfactory condition with the following documents.

- a) Invoice
- b) Delivery Challan
- c) Excise Gatepass/ Excise Invoice or Equivalent Replacement if any

- d) Inspection certificate
- e) Consignee receipt
- f) Warranty certificate of OEM
- g) Installation Report
- h) Link performance report
- i) Link visibility in NMS and same should be certified by regional NOC/CNOC.

3.12.2 Second 10% payment will be paid on successful completion of the warranty period i.e. after 2 years from the date of successful commissioning.

- 26.The SOR 1 under Chapter 4, may be read as:**
5.8Ghz upto 10 Mbps Aggregated Throughput for 5 kms
- 27.The SOR 2 under Chapter 4, may be read as:**
5.8Ghz upto 20 Mbps Aggregated Throughput for 20 kms
- 28.The SOR 4 under Chapter 4, may be read as:**
5.8Ghz upto 100 Mbps Aggregated Throughput for 20 kms
- 29.The SOR 5 under Chapter 4, may be read as:**
5.8Ghz upto 150 Mbps Aggregated Throughput for 10 kms
- 30.The SOR 6 under Chapter 4, may be read as:**
5.8Ghz upto 200 Mbps Aggregated Throughput for 5 kms
- 31.The SOR 7 under Chapter 4, may be read as:**
5.8Ghz upto 250 Mbps Aggregated Throughput for 20 kms
- 32.The SOR 8-A (Line Item: 1) under Chapter 4, may be read as:**
5.8Ghz Base Station Sector Radio 200 Mbps Aggregated Throughput for 5 kms
- 33.The SOR 8-B (Line Item: 1) under Chapter 4 is added and may be read as:**
5.8Ghz Base Station Sector Radio 50 Mbps Aggregated Throughput for 15 kms
- 34.The SOR 8-A (Line Item: 3) under Chapter 4, may be read as:**
5.8Ghz Customer Premises Radio 20 Mbps Aggregated Throughput for 5 kms
- 35.The SOR 8-B (Line Item: 3) under Chapter 4, may be read as:**
5.8Ghz Customer Premises Radio 10 Mbps Aggregated Throughput for 5 kms
- 36.The SOR 8-A & SOR 8-B (Line Item: 2) under Chapter 4, may be read as:**
5.8Ghz Customer Premises Radio 10 Mbps Aggregated Throughput for 10 kms
- 37.The Clause 21 of SOR 1 under Chapter 4, may be read as:**
System should deliver 10 Mbps Aggregate capacity for link distance up to 5 kms.
- 38.The Clause 21 of SOR 2 under Chapter 4, may be read as:**
System should deliver 20 Mbps Aggregate capacity for link distance up to 20 kms.
- 39.The Clause 21 of SOR 4 under Chapter 4, may be read as:**
System should deliver 100 Mbps Aggregate capacity for link distance up to 20 kms.
- 40.The Clause 23 of SOR 5 under Chapter 4, may be read as:**
System should deliver 150 Mbps Aggregate capacity for link distance up to 10 kms.

- 41. The Clause 52 of SOR 6 under Chapter 4, may be read as:**
System should deliver 200 Mbps Aggregate capacity for link distance up to 5 kms.
- 42. The Clause 21 of SOR 7 under Chapter 4, may be read as:**
System should deliver 250 Mbps Aggregate capacity for link distance up to 20 kms.
- 43. The Clause 21 of SOR 8-A (Line item 3) under chapter 4, may be read as:**
System should support 20 Mbps Aggregate capacity for link distance up to 5 kms.
- 44. The Clause 21 of SOR 8-A (Line item 2) under chapter 4, may be read as:**
System should support 10 Mbps Aggregate capacity for link distance up to 10 kms.
- 45. The Clause 29 of SOR 1, SOR 2, SOR 3 & SOR 4 under chapter 4, may be added & read as:**
The outdoor Radio system should confirm to Ingress Protection of IP55 or better and provide necessary certifications.
- 46. The Clause 30 of SOR 5, Clause 58 of SOR 6, Clause 29 of SOR 7, may be read as:**
The outdoor Radio system should confirm to Ingress Protection of IP66 or better and provide necessary certifications.
- 47. The Clause 30 of SOR 1, SOR 2, SOR 3 & SOR 4; Clause 31 of SOR 5; Clause 60 of SOR 6 and Clause 31 of SOR 7 may be added and read as:**
The Radio should support the Quality of Service according to IEEE 802.1p, TOS/Diffserv.
- 48. The Clause 6.5 under Chapter 6, may be read as:**
The successful tenderer shall submit 10% of total value of the stores detailed in the Acceptance Offer towards security deposit in the form of DD/FDR or irrevocable Bank Guarantee from any scheduled bank for due fulfillment of contract as per the details given below:
- i) Security Deposit/Performance Bank Guarantee of 2.5% of total value of the stores is required to be submitted within 15 days of issue of Rate Contract. The PBG should be valid for a period 3 months beyond warranty period from the date of issue of APO to cover Validity of Advance Purchase Order, delivery period and Warranty period in the Corporate office Gurugram.
- ii) Security Deposit/Performance Bank Guarantee of 7.5 % of Sub PO value of the stores is required to be submitted within 15 days of issue of Sub PO with validity of 3 months beyond warranty period in the respective regions.
- 49. The Clause 1.1.18 of SOR 8-A (Line Item: 1) may be read as:**
System should be IP55 or better.
- 50. Technical specifications for SOR 8-B (Line Item: 1) under chapter 4, may be added & read as:**
- 1.1.1 System should be operating in ISM band 5.825-5.875GHz as per WPC guidelines.
- 1.1.2 System should ensure that the frequency that they employ would not be affected by other surrounding radio interference and by their own radios.
- 1.1.3 To ensure flexibility in design it should be possible to have multiple radios on the same location using GPS synchronization. On the same mast, frequency channel reuse for multiple radios should be possible with Ethernet sync or GPS sync
- 1.1.4 System must support synchronization to reduce the effect of on channel interference.
- 1.1.5 System should employ bandwidth per channel of 5, 10 20 MHz and 40 Mhz bandwidth channel.
- 1.1.6 System efficiency should be at least 5 bps/Hz or system should support Transmit Power Control in accordance with throughput delivery requirements.
- 1.1.7 System must support actual aggregate throughput of 50 mbps or more.

- 1.1.8 All System should be able to operate in a LOS and nLOS environment to ensure complete flexibility in choosing deployment locations.
- 1.1.9 System must support Point to Point and Point to Multipoint Topology without any hardware change.
- 1.1.10 System should support 90 degree or 120 degree sector antenna with minimum 15 /14 dBi gain respectively.
- 1.1.11 System must support Asymmetric bandwidth configuration.
- 1.1.12 Transmit power standard of system should range within allowable EIRP as per WPC guidelines.
- 1.1.13 Transmit power should employ automatic power back off (Automatic Transmit Power Control).System should change TX power in accordance with predefine required receive signal.
- 1.1.14 Deleted
- 1.1.15 Rx sensitivity of the system must be -89 dBm or better
- 1.1.16 System must support the 100/1000 Ethernet port .
- 1.1.17 Single Access Point must support at least 30 CPE without any additional license.
- 1.1.18 System should be IP55 or better.

1.2 Interference Mitigation and Radio Performance

- 1.2.1 All units should have a basic spectrum analyzer for monitoring the spectrum noise floor in which the system is operating on.
- 1.2.2 System should have the capability to adapt the modulation mode depending on the link environment ensure best throughput while maintaining the link despite drop in link budget due to nLOS/NLOS situation.
- 1.2.3 System should support modulation from QPSK ½ to 64 QAM 5/6.
- 1.2.4 Mac layer should be designed to carry small size of packets i.e. 64 bytes to minimize the impact of interference without compromising on throughput.
- 1.2.5 System must operate with scheduled mac access rather than CSMA to avoid collision in network.
- 1.2.6 System must support the MTU size of 1700 Bytes
- 1.2.7 System Should support Spanning tree protocol for Layer 2 redundancy.
- 1.2.8 System should also define the priority of Broadcast ,and voice traffic
- 1.2.9 System should support the traffic classification and prioritization by, QOS, VLAN ID, , IP and mac address.

2 Security

- 2.1 System should support WPA-2, AES128 proprietary security encoding.
- 2.2 System should also support a management VLAN and data vlan for further security measure
- 2.3 Deleted
- 2.4 System must support Radius authentication for all radio. Customer end should be able to communicate with master radio only after the successful authentication from Radius Server. After authentication, should be able to accept the QOS, Vlan configuration pushed from Radius Server.
- 2.5 System must support device event log

3. INTERFACES

- 3.1 Management of the system shall be web-base GUI/HTTP/HTTPS , FTP, SNMPv2c/SNMPv1/SNMPv3 interfaces
- 3.2 System should have a Spectrum Management channel that is able to show individual channel interference
- 3.3 System must support the prioritization of voice ,video and data.
- 3.4 System should provide the complete statistic of Ethernet and wireless with detail of sent/receive packet of unicast ,multicast and broadcast .
- 3.5 System must support the syslog feature.
- 3.6 System must support the basic troubleshooting feature such as Ping, Traceroute etc..
- 3.7 Software upgrade to system is done over the air as well as through the network
- 3.8 System must support backup and restore of the configuration from web GUI.

4. Environmental Requirements

- 4.1 Bidder's proposed indoor mounted equipment MUST operate as specified under the

following room ambient environmental conditions:

- a. Operating Temperature -30 degrees C to +55 degrees C
- b System must have inbuilt surge suppressor

5. Certifications:

System, should have following certification to ensure regulation:

a>WPC GSR-38

b>EMC Standards: EN 310489-1

c>Safety:EN60950-1:2006+Amendment 12:2011,EN 60950-22:2006

51. The Clause 6.11.6 under Chapter VI has been added and read as:

In case the successful tenderer is not liable to be registered under CGST/IGST/UTGST/SGST Act, the Railtel shall deduct the applicable GST from his/their bills under reverse charge mechanism (RCM) and deposit the same to the concerned Tax authority.

52.The technical specifications for SOR 8-B (Line Item: 2) may be read as:

1. Frequency must operate in Unlicensed band 5.8Ghz as India WPC
2. System should also support future proof licensed band acquired by RailTelwith software up-gradation without additional cost.
3. Must support nLOS deployment
4. Modulation 2x2 MIMO-OFDM, MCS1 to MCS15
5. System Should support adaptive modulation with feature to limit maximum modulation level
6. System should Channel Resolution 5 MHz
7. System should Channel Bandwidth 5/10/20/40 MHz user configurable
8. Tx Power Up to 30 dBm
9. System should Channel Accuracy \pm 20 PPM
10. System must have integrated surge suppressor
11. System should Duplex Technology TDD
12. System should support Asymmetrical Bandwidth
13. System should also define the priority of Broadcast, Multicast and voice traffic
14. System should support the traffic classification and prioritization by QOS, VLAN ID, source and destination at /L2 level.
15. System must support Radius authentication for all radios or should be there in roadmap.
16. Split Configuration Separate Indoor Unit and Outdoor Unit
17. System should Spectral Efficiency Better than or equal to 5bps / Hz or system should support Transmit Power Control in accordance with throughput delivery requirements.
18. System should support Automatic channel selection.
19. System should support Transmit Power Control - within allowable EIRP based on WPC guidelines.
20. System should have Built-in Spectrum Scanner/Spectrum Analyzer
21. System Should have Error Correction Method FEC 1/2,2/3,3/4and 5/6
22. System Should support 10 Mbps Aggregate capacity for link distance up to 10 Kms
23. System should have LAN Interface 10/100 Base T interface with Auto negotiation (IEEE802.3)
24. System should support frame Size of 1700 bytes or above
25. Framing/Coding IEEE802.3/U
26. System should support Bridging Self-learning up to 2047 MAC addresses IEEE 802.1Q
27. System should support Ring Protection and support for redundancy
28. Link Latency Upto 8ms
29. System should provide the statistics of total traffic, broadcast traffic, multicast traffic, packet error, packet drop on Ethernet and wireless to identify the problem

53. The technical specifications for SOR 8-B (Line Item: 3) may be read as:

1. Frequency must operate in Unlicensed band 5.8Ghz as India WPC
2. System should also support future proof licensed band acquired by RailTel with software up-gradation without additional cost.
3. Must support nLOS deployment
4. Modulation 2x2 MIMO-OFDM, MCS1 to MCS15
5. System Should support adaptive modulation with feature to limit maximum modulation level
6. System should Channel Resolution 5 MHz
7. System should Channel Bandwidth 5/10/20/40 MHz user configurable
8. Tx Power Up to 30 dBm
9. System should Channel Accuracy ± 20 PPM
10. System must have integrated surge suppressor
11. System should Duplex Technology TDD
12. System should support Asymmetrical Bandwidth
13. System should also define the priority of Broadcast, Multicast and voice traffic
14. System should support the traffic classification and prioritization by QOS, VLAN ID, source and destination at /L2 level.
15. System must support Radius authentication for all radios or should be there in roadmap.
16. Split Configuration Separate Indoor Unit and Outdoor Unit
17. System should Spectral Efficiency Better than or equal to 5bps / Hz or system should support Transmit Power Control in accordance with throughput delivery requirements.
18. System should support Automatic channel selection.
19. System should support Transmit Power Control - within allowable EIRP based on WPC guidelines.
20. System should have Built-in Spectrum Scanner/Spectrum Analyzer
21. System Should have Error Correction Method FEC 1/2,2/3,3/4 and 5/6
22. System Should support 10 Mbps Aggregate capacity for link distance up to 5 Kms
23. System should have LAN Interface 10/100 Base T interface with Auto negotiation (IEEE802.3)
24. System should support frame Size of 1700 bytes or above
25. Framing/Coding IEEE802.3/U
26. System should support Bridging Self-learning up to 2047 MAC addresses IEEE 802.1Q
27. System should support Ring Protection and support for redundancy
28. Link Latency Upto 8ms
29. System should provide the statistics of total traffic, broadcast traffic, multicast traffic, packet error, packet drop on Ethernet and wireless to identify the problem

54. The last date of submission of tender for "Design, Supply, Installation, Testing and Commissioning of 5.8 GHz Ethernet Radios for various capacities and ranges, Poles and Masts of various sizes for RailTel's network on Rate Contract" no issued vide this E-tender notice number RailTel/Tender/OT/CO/DNM/2017-18/Radio/353 is extended from 29.08.2017 to 12.09.2017 upto 15:00 Hrs. Tender will be opened at 15:30 Hrs on 12.09.2017.



(A.K. Sablania)
Group General Manager/DNM