

अनिवार्य आवश्यकताएँ

संख्या : TEC54372108

Essential Requirements

ER No. : TEC54372108

HF Radio

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MTCTE के तहत जारी:

Issued under MTCTE by:

दूरसंचार अभियांत्रिकी केंद्र

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Government of India

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Essential Requirements for:

HF Radio

Certification Scheme: **GCS**

Product Fee Group: **C**

This ER covers HF Radio Base Station and User Terminals operating in HF frequency band 3 - 30 MHz. HF equipment could be fixed, transportable, hand-held, portable or mobile etc.

Note: Annexures referred to in this ER are Annexures as mentioned in "Annexures to ERs" No. TEC/SD/DD/TCP-222/02/June19 as updated from time to time and available on MTCTE portal.

This product has the following variants:

1. HF Base Station - Baseband plus Radio
2. HF Base Station - Radio Only
3. HF Baseband Equipment without Radio
4. HF Fixed Station
5. HF Handheld Portable Stations
6. HF Mobile Stations

1. Variant 1 : HF Base Station - Baseband plus Radio

1.1 Parameters Linked with Product Variant

| S.No. | Parameter Name | Standard Name |
|-------|---|--|
| 1.1.1 | Conducted And Radiated Emission - Class A | TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B |
| 1.1.2 | Conformance to standards for HF Radio Systems | ETSI EN 300xxx 301-xxx 303-xxx. Annex-C3 |
| 1.1.3 | Frequency for HF equipments | NFAP. Annex-C1 |

| | | |
|--------|---|--|
| 1.1.4 | Immunity to AC Voltage Dips and Short Interruptions | TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B |
| 1.1.5 | Immunity to DC Voltage Dips and Short Interruptions | EN/IEC:61000-4-29. Annex-B |
| 1.1.6 | Immunity to Electrostatic Discharge | TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B |
| 1.1.7 | Immunity to Fast Transients (Burst) | TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B |
| 1.1.8 | Immunity to Radiated RF | TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B |
| 1.1.9 | Immunity to RF Field Induced Conducted Disturbance | TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B |
| 1.1.10 | Immunity to Surges | TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B |
| 1.1.11 | IT Equipment Safety | IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1 |
| 1.1.12 | IT Equipment Safety for Radio Products | EN/IEC 60215:2016. Annex-A3 |
| 1.1.13 | Max Transmit Power for HF Base Stn | As per DoT/WPC license conditions. Annex-C2 |

1.2 Interface 1 : 1 G Optical Ethernet

| S.No. | Parameter Name | Standard Name |
|-------|-----------------------------------|-----------------------------|
| 1.2.1 | Average Launch power for 1 GE Opt | IEEE 802.3z Cl. 38. Annex-H |
| 1.2.2 | Receiver Sensitivity 1 GE Opt | IEEE 802.3z Cl. 38. Annex-H |
| 1.2.3 | Wavelength for 1 GE Opt | IEEE 802.3z Cl. 38. Annex-H |

1.3 Interface 2 : 10 G Optical Ethernet

| S.No. | Parameter Name | Standard Name |
|-------|------------------------------------|------------------------------|
| 1.3.1 | Average Launch power for 10 GE Opt | IEEE 802.3ae Cl. 52. Annex-H |
| 1.3.2 | Receiver Sensitivity 10 GE Opt | IEEE 802.3ae Cl. 52. Annex-H |
| 1.3.3 | Wavelength for 10 GE Opt | IEEE 802.3ae Cl. 52. Annex-H |

1.4 Interface 3 : 100 G Optical Ethernet

| S.No. | Parameter Name | Standard Name |
|-------|----------------|---------------|
|-------|----------------|---------------|

| | | |
|-------|-------------------------------------|---------------------------------|
| 1.4.1 | Average Launch power for 100 GE Opt | IEEE 802.3ba Cl. 86 88. Annex-H |
| 1.4.2 | Receiver Sensitivity 100 GE Opt | IEEE 802.3ba Cl. 86 88. Annex-H |
| 1.4.3 | Wavelength for 100 GE Opt | IEEE 802.3ba Cl. 86 88. Annex-H |

1.5 Interface 4 : 2 Mbps - E1

| S.No. | Parameter Name | Standard Name |
|-------|--|---|
| 1.5.1 | Input Jitter Tolerance for 2 Mbps Int | ITU-T G.823 / ETSI TBR-4. Annex-I |
| 1.5.2 | Input Return Loss for 2 Mbps Int | ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I |
| 1.5.3 | Nominal Bit Rate with Tolerance for 2 Mbps Int | ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I |
| 1.5.4 | Output Jitter for 2 Mbps Int | ITU-T G.823 / ETSI TBR-4. Annex-I |
| 1.5.5 | Pulse Mask for 2 Mbps Int | ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I |

1.6 Interface 5 : 40 G Optical Ethernet

| S.No. | Parameter Name | Standard Name |
|-------|------------------------------------|---------------------------------|
| 1.6.1 | Average Launch power for 40 GE Opt | IEEE 802.3ba Cl. 86 87. Annex-H |
| 1.6.2 | Receiver Sensitivity 40 GE Opt | IEEE 802.3ba Cl. 86 87. Annex-H |
| 1.6.3 | Wavelength for 40 GE Opt | IEEE 802.3ba Cl. 86 87. Annex-H |

1.7 Interface 6 : Bluetooth Low Energy

| S.No. | Parameter Name | Standard Name |
|-------|--|-------------------------------|
| 1.7.1 | EIRP for BLE Interface | WPC GSR 45(E). Annex-G4 (4.2) |
| 1.7.2 | Frequency of Operation for BLE Interface | Latest NFAP. Annex-G4(4.1) |
| 1.7.3 | Spurious Emission for BLE Interface | Annex G3 |

1.8 Interface 7 : Fast Ethernet Electrical

| S.No. | Parameter Name | Standard Name |
|-------|--|--------------------|
| 1.8.1 | Link Speed and Autonegotiation Test FE | IEEE 802.3 Annex-H |

1.9 Interface 8 : Gigabit Ethernet Electrical

| S.No. | Parameter Name | Standard Name |
|-------|--|---------------------|
| 1.9.1 | Link Speed and Autonegotiation Test GE | IEEE 802.3. Annex-H |

1.10 Interface 9 : Near Field Communication

| S.No. | Parameter Name | Standard Name |
|--------|------------------------------------|----------------------------|
| 1.10.1 | Frequency of Operation for NFC Int | Latest NFAP. Annex-G6(6.1) |
| 1.10.2 | Spurious Emission for NFC Int | Annex- G3 |

1.11 Interface 10 : STM-1 Electrical

| S.No. | Parameter Name | Standard Name |
|--------|--|----------------------|
| 1.11.1 | Input Jitter Tolerance STM-1 Electrical | ITU-T G.825. Annex-K |
| 1.11.2 | Input Return Loss for STM-1 Electrical | ITU-T G.703. Annex-K |
| 1.11.3 | Nominal Bit Rate with Tolerance STM-1 Electrical Int | ITU-T G.703. Annex-K |
| 1.11.4 | Output Jitter for STM-1 Electrical Int | ITU-T G.825. Annex-K |
| 1.11.5 | Pulse Mask for STM-1 Electrical Int | ITU-T G.703. Annex-K |

1.12 Interface 11 : STM-1 Optical

| S.No. | Parameter Name | Standard Name |
|--------|---|---------------------------|
| 1.12.1 | Input Jitter Tolerance for STM-1 Opt | ITU-T G.825. Annex-K |
| 1.12.2 | Mean Launched Power for STM-1 Opt Int | ITU-T G.957. Annex-K |
| 1.12.3 | Nominal Bit Rate with Tolerance STM-1 Opt Int | ITU-T G.957. Annex-K |
| 1.12.4 | Operating Wavelength Range for STM-1 Opt Int | ITU-T G.957. Annex-K |
| 1.12.5 | Output Jitter for STM-1 Opt Int | ITU-T G.783 G.825 Annex-K |
| 1.12.6 | Receiver Overload for STM-1 Opt Int | ITU-T G.957. Annex-K |
| 1.12.7 | Receiver Sensitivity for STM-1 Opt Int | ITU-T G.957. Annex-K |

1.13 Interface 12 : STM-16 Optical

| S.No. | Parameter Name | Standard Name |
|--------|--|----------------------|
| 1.13.1 | Input Jitter Tolerance for STM-16 Opt | G.825. Annex-K |
| 1.13.2 | Mean Launched Power for STM-16 Opt Int | ITU-T G.957. Annex-K |
| 1.13.3 | Nominal Bit Rate with Tolerance STM-16 Opt Int | ITU-T G.957. Annex-K |

| | | |
|--------|---|----------------------|
| 1.13.4 | Operating Wavelength Range for STM-16 Opt Int | ITU-T G.957. Annex-K |
| 1.13.5 | Output Jitter for STM-16 Opt Int | ITU-T G.783. Annex-K |
| 1.13.6 | Receiver Overload for STM-16 Opt Int | ITU-T G.957. Annex-K |
| 1.13.7 | Receiver Sensitivity for STM-16 Opt Int | ITU-T G.957. Annex-K |

1.14 Interface 13 : STM-4 Optical

| S.No. | Parameter Name | Standard Name |
|--------|---|----------------------|
| 1.14.1 | Input Jitter Tolerance for STM-4 Opt | ITU-T G.825. Annex-K |
| 1.14.2 | Mean Launched Power for STM-4 Opt Int | ITU-T G.957. Annex-K |
| 1.14.3 | Nominal Bit Rate with Tolerance STM-4 Opt Int | ITU-T G.957 Annex-K |
| 1.14.4 | Operating Wavelength Range for STM-4 Opt Int | ITU-T G.957. Annex-K |
| 1.14.5 | Output Jitter for STM-4 Opt Int | ITU-T G.783. Annex-K |
| 1.14.6 | Receiver Overload for STM-4 Opt Int | ITU-T G.957. Annex-K |
| 1.14.7 | Receiver Sensitivity for STM-4 Opt Int | ITU-T G.957. Annex-K |

1.15 Interface 14 : STM-64 Optical

| S.No. | Parameter Name | Standard Name |
|--------|--|----------------------|
| 1.15.1 | Input Jitter Tolerance for STM-64 Opt | ITU-T G.825. Annex-K |
| 1.15.2 | Mean Launched Power for STM-64 Opt Int | ITU-T G.691. Annex-K |
| 1.15.3 | Nominal Bit Rate with Tolerance STM-64 Opt Int | ITU-T G.707 Annex-K |
| 1.15.4 | Operating Wavelength Range for STM-64 Opt Int | ITU-T G.691. Annex-K |
| 1.15.5 | Output Jitter for STM-64 Opt Int | ITU-T G.783. Annex-K |
| 1.15.6 | Receiver Overload for STM-64 Opt Int | ITU-T G.691. Annex-K |
| 1.15.7 | Receiver Sensitivity for STM-64 Opt Int | ITU-T G.691. Annex-K |

1.16 Interface 15 : WiFi

| S.No. | Parameter Name | Standard Name |
|--------|--------------------------------|--|
| 1.16.1 | 2.4 GHz WiFi Radio Conformance | ETSI EN 300 328 or FCC CFR47 pt 15.247 |

| | | |
|--------|-------------------------------|---|
| | | or FCC CFR47 pt 15.249. Annex-G3 |
| 1.16.2 | 5 GHz WiFi Radio Conformance | ETSI EN 301 893 or FCC CFR47 pt 15.407 or FCC CFR47 pt 15.249. Annex-G3 |
| 1.16.3 | EIRP for Wifi Interface | Latest NFAP and GSRs issued by DoT WPC. Annex-G2 |
| 1.16.4 | Frequency for WiFi equipments | DoT WPC GSR No. 45(E) 1048(E). Annex-G1 |

2. Variant 2 : HF Base Station - Radio Only

2.101 Parameters Linked with Product Variant

| S.No. | Parameter Name | Standard Name |
|--------|---|--|
| 2.1.1 | Conducted And Radiated Emission - Class A | TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B |
| 2.1.2 | Conformance to standards for HF Radio Systems | ETSI EN 300xxx 301-xxx 303-xxx. Annex-C3 |
| 2.1.3 | Frequency for HF equipments | NFAP. Annex-C1 |
| 2.1.4 | Immunity to AC Voltage Dips and Short Interruptions | TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B |
| 2.1.5 | Immunity to DC Voltage Dips and Short Interruptions | EN/IEC:61000-4-29. Annex-B |
| 2.1.6 | Immunity to Electrostatic Discharge | TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B |
| 2.1.7 | Immunity to Fast Transients (Burst) | TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B |
| 2.1.8 | Immunity to Radiated RF | TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B |
| 2.1.9 | Immunity to RF Field Induced Conducted Disturbance | TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B |
| 2.1.10 | Immunity to Surges | TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B |
| 2.1.11 | IT Equipment Safety | IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1 |
| 2.1.12 | IT Equipment Safety for Radio Products | EN/IEC 60215:2016. Annex-A3 |
| 2.1.13 | Max Transmit Power for HF Base Stn | As per DoT/WPC license conditions. Annex- |

| | | |
|--|--|----|
| | | C2 |
|--|--|----|

3. Variant 3 : HF Baseband Equipment without Radio

3.1 Parameters Linked with Product Variant

| S.No. | Parameter Name | Standard Name |
|-------|---|--|
| 3.1.1 | Conducted And Radiated Emission - Class A | TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B |
| 3.1.2 | Immunity to AC Voltage Dips and Short Interruptions | TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B |
| 3.1.3 | Immunity to DC Voltage Dips and Short Interruptions | EN/IEC:61000-4-29. Annex-B |
| 3.1.4 | Immunity to Electrostatic Discharge | TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B |
| 3.1.5 | Immunity to Fast Transients (Burst) | TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B |
| 3.1.6 | Immunity to Radiated RF | TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B |
| 3.1.7 | Immunity to RF Field Induced Conducted Disturbance | TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B |
| 3.1.8 | Immunity to Surges | TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B |
| 3.1.9 | IT Equipment Safety | IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1 |

3.2 Interface 1 : 1 G Optical Ethernet

| S.No. | Parameter Name | Standard Name |
|-------|-----------------------------------|-----------------------------|
| 3.2.1 | Average Launch power for 1 GE Opt | IEEE 802.3z Cl. 38. Annex-H |
| 3.2.2 | Receiver Sensitivity 1 GE Opt | IEEE 802.3z Cl. 38. Annex-H |
| 3.2.3 | Wavelength for 1 GE Opt | IEEE 802.3z Cl. 38. Annex-H |

3.3 Interface 2 : 10 G Optical Ethernet

| S.No. | Parameter Name | Standard Name |
|-------|------------------------------------|------------------------------|
| 3.3.1 | Average Launch power for 10 GE Opt | IEEE 802.3ae Cl. 52. Annex-H |

| | | |
|-------|--------------------------------|------------------------------|
| 3.3.2 | Receiver Sensitivity 10 GE Opt | IEEE 802.3ae Cl. 52. Annex-H |
| 3.3.3 | Wavelength for 10 GE Opt | IEEE 802.3ae Cl. 52. Annex-H |

3.4 Interface 3 : 100 G Optical Ethernet

| S.No. | Parameter Name | Standard Name |
|-------|-------------------------------------|---------------------------------|
| 3.4.1 | Average Launch power for 100 GE Opt | IEEE 802.3ba Cl. 86 88. Annex-H |
| 3.4.2 | Receiver Sensitivity 100 GE Opt | IEEE 802.3ba Cl. 86 88. Annex-H |
| 3.4.3 | Wavelength for 100 GE Opt | IEEE 802.3ba Cl. 86 88. Annex-H |

3.5 Interface 4 : 2 Mbps - E1

| S.No. | Parameter Name | Standard Name |
|-------|--|---|
| 3.5.1 | Input Jitter Tolerance for 2 Mbps Int | ITU-T G.823 / ETSI TBR-4. Annex-I |
| 3.5.2 | Input Return Loss for 2 Mbps Int | ITU-T G.703 / ETSI TBR-4 Cl. 9.3.1. Annex-I |
| 3.5.3 | Nominal Bit Rate with Tolerance for 2 Mbps Int | ITU-T G.703 / ETSI TBR-4 Cl. 9.2.3. Annex-I |
| 3.5.4 | Output Jitter for 2 Mbps Int | ITU-T G.823 / ETSI TBR-4. Annex-I |
| 3.5.5 | Pulse Mask for 2 Mbps Int | ITU-T G.703 / ETSI TBR-4 Cl. 9.2.1. Annex-I |

3.6 Interface 5 : 40 G Optical Ethernet

| S.No. | Parameter Name | Standard Name |
|-------|------------------------------------|---------------------------------|
| 3.6.1 | Average Launch power for 40 GE Opt | IEEE 802.3ba Cl. 86 87. Annex-H |
| 3.6.2 | Receiver Sensitivity 40 GE Opt | IEEE 802.3ba Cl. 86 87. Annex-H |
| 3.6.3 | Wavelength for 40 GE Opt | IEEE 802.3ba Cl. 86 87. Annex-H |

3.7 Interface 6 : Bluetooth Low Energy

| S.No. | Parameter Name | Standard Name |
|-------|--|-------------------------------|
| 3.7.1 | EIRP for BLE Interface | WPC GSR 45(E). Annex-G4 (4.2) |
| 3.7.2 | Frequency of Operation for BLE Interface | Latest NFAP. Annex-G4(4.1) |
| 3.7.3 | Spurious Emission for BLE Interface | Annex G3 |

3.8 Interface 7 : Fast Ethernet Electrical

| S.No. | Parameter Name | Standard Name |
|-------|----------------|---------------|
|-------|----------------|---------------|

| | | |
|-------|--|--------------------|
| 3.8.1 | Link Speed and Autonegotiation Test FE | IEEE 802.3 Annex-H |
|-------|--|--------------------|

3.9 Interface 8 : Gigabit Ethernet Electrical

| S.No. | Parameter Name | Standard Name |
|-------|--|---------------------|
| 3.9.1 | Link Speed and Autonegotiation Test GE | IEEE 802.3. Annex-H |

3.10 Interface 9 : Near Field Communication

| S.No. | Parameter Name | Standard Name |
|--------|------------------------------------|----------------------------|
| 3.10.1 | Frequency of Operation for NFC Int | Latest NFAP. Annex-G6(6.1) |
| 3.10.2 | Spurious Emission for NFC Int | Annex- G3 |

3.11 Interface 10 : STM-1 Electrical

| S.No. | Parameter Name | Standard Name |
|--------|--|----------------------|
| 3.11.1 | Input Jitter Tolerance STM-1 Electrical | ITU-T G.825. Annex-K |
| 3.11.2 | Input Return Loss for STM-1 Electrical | ITU-T G.703. Annex-K |
| 3.11.3 | Nominal Bit Rate with Tolerance STM-1 Electrical Int | ITU-T G.703. Annex-K |
| 3.11.4 | Output Jitter for STM-1 Electrical Int | ITU-T G.825. Annex-K |
| 3.11.5 | Pulse Mask for STM-1 Electrical Int | ITU-T G.703. Annex-K |

3.12 Interface 11 : STM-1 Optical

| S.No. | Parameter Name | Standard Name |
|--------|---|---------------------------|
| 3.12.1 | Input Jitter Tolerance for STM-1 Opt | ITU-T G.825. Annex-K |
| 3.12.2 | Mean Launched Power for STM-1 Opt Int | ITU-T G.957. Annex-K |
| 3.12.3 | Nominal Bit Rate with Tolerance STM-1 Opt Int | ITU-T G.957. Annex-K |
| 3.12.4 | Operating Wavelength Range for STM-1 Opt Int | ITU-T G.957. Annex-K |
| 3.12.5 | Output Jitter for STM-1 Opt Int | ITU-T G.783 G.825 Annex-K |
| 3.12.6 | Receiver Overload for STM-1 Opt Int | ITU-T G.957. Annex-K |
| 3.12.7 | Receiver Sensitivity for STM-1 Opt Int | ITU-T G.957. Annex-K |

3.13 Interface 12 : STM-16 Optical

| S.No. | Parameter Name | Standard Name |
|--------|--|----------------------|
| 3.13.1 | Input Jitter Tolerance for STM-16 Opt | G.825. Annex-K |
| 3.13.2 | Mean Launched Power for STM-16 Opt Int | ITU-T G.957. Annex-K |
| 3.13.3 | Nominal Bit Rate with Tolerance STM-16 Opt Int | ITU-T G.957. Annex-K |
| 3.13.4 | Operating Wavelength Range for STM-16 Opt Int | ITU-T G.957. Annex-K |
| 3.13.5 | Output Jitter for STM-16 Opt Int | ITU-T G.783. Annex-K |
| 3.13.6 | Receiver Overload for STM-16 Opt Int | ITU-T G.957. Annex-K |
| 3.13.7 | Receiver Sensitivity for STM-16 Opt Int | ITU-T G.957. Annex-K |

3.14 Interface 13 : STM-4 Optical

| S.No. | Parameter Name | Standard Name |
|--------|---|----------------------|
| 3.14.1 | Input Jitter Tolerance for STM-4 Opt | ITU-T G.825. Annex-K |
| 3.14.2 | Mean Launched Power for STM-4 Opt Int | ITU-T G.957. Annex-K |
| 3.14.3 | Nominal Bit Rate with Tolerance STM-4 Opt Int | ITU-T G.957 Annex-K |
| 3.14.4 | Operating Wavelength Range for STM-4 Opt Int | ITU-T G.957. Annex-K |
| 3.14.5 | Output Jitter for STM-4 Opt Int | ITU-T G.783. Annex-K |
| 3.14.6 | Receiver Overload for STM-4 Opt Int | ITU-T G.957. Annex-K |
| 3.14.7 | Receiver Sensitivity for STM-4 Opt Int | ITU-T G.957. Annex-K |

3.15 Interface 14 : STM-64 Optical

| S.No. | Parameter Name | Standard Name |
|--------|--|----------------------|
| 3.15.1 | Input Jitter Tolerance for STM-64 Opt | ITU-T G.825. Annex-K |
| 3.15.2 | Mean Launched Power for STM-64 Opt Int | ITU-T G.691. Annex-K |
| 3.15.3 | Nominal Bit Rate with Tolerance STM-64 Opt Int | ITU-T G.707 Annex-K |
| 3.15.4 | Operating Wavelength Range for STM-64 Opt Int | ITU-T G.691. Annex-K |
| 3.15.5 | Output Jitter for STM-64 Opt Int | ITU-T G.783. Annex-K |
| 3.15.6 | Receiver Overload for STM-64 Opt Int | ITU-T G.691. Annex-K |

| | | |
|--------|---|----------------------|
| 3.15.7 | Receiver Sensitivity for STM-64 Opt Int | ITU-T G.691. Annex-K |
|--------|---|----------------------|

3.16 Interface 15 : WiFi

| S.No. | Parameter Name | Standard Name |
|--------|--------------------------------|---|
| 3.16.1 | 2.4 GHz WiFi Radio Conformance | ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3 |
| 3.16.2 | 5 GHz WiFi Radio Conformance | ETSI EN 301 893 or FCC CFR47 pt 15.407 or FCC CFR47 pt 15.249. Annex-G3 |
| 3.16.3 | EIRP for Wifi Interface | Latest NFAP and GSRs issued by DoT WPC. Annex-G2 |
| 3.16.4 | Frequency for WiFi equipments | DoT WPC GSR No. 45(E) 1048(E). Annex-G1 |

4. Variant 4 : HF Fixed Station

4.1 Parameters Linked with Product Variant

| S.No. | Parameter Name | Standard Name |
|--------|---|--|
| 4.1.1 | Conducted And Radiated Emission - Class B | TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B |
| 4.1.2 | Conformance to standards for HF Radio Systems | ETSI EN 300xxx 301-xxx 303-xxx. Annex-C3 |
| 4.1.3 | Frequency for HF equipments | NFAP. Annex-C1 |
| 4.1.4 | Immunity to AC Voltage Dips and Short Interruptions | TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B |
| 4.1.5 | Immunity to DC Voltage Dips and Short Interruptions | EN/IEC:61000-4-29. Annex-B |
| 4.1.6 | Immunity to Electrostatic Discharge | TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B |
| 4.1.7 | Immunity to Fast Transients (Burst) | TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B |
| 4.1.8 | Immunity to Radiated RF | TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B |
| 4.1.9 | Immunity to RF Field Induced Conducted Disturbance | TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B |
| 4.1.10 | Immunity to Surges | TEC EMI EMC Standard EN/IEC:61000-4-5. |

| | | |
|--------|-------------------------------------|--|
| | | Annex-B |
| 4.1.11 | IT Equipment Safety | IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1 |
| 4.1.12 | Max Transmit Power for HF Fixed Stn | As per DoT/WPC license conditions. Annex-C2 |

4.2 Interface 1 : Bluetooth Low Energy

| S.No. | Parameter Name | Standard Name |
|-------|--|-------------------------------|
| 4.2.1 | EIRP for BLE Interface | WPC GSR 45(E). Annex-G4 (4.2) |
| 4.2.2 | Frequency of Operation for BLE Interface | Latest NFAP. Annex-G4(4.1) |
| 4.2.3 | Spurious Emission for BLE Interface | Annex G3 |

4.3 Interface 2 : Near Field Communication

| S.No. | Parameter Name | Standard Name |
|-------|------------------------------------|----------------------------|
| 4.3.1 | Frequency of Operation for NFC Int | Latest NFAP. Annex-G6(6.1) |
| 4.3.2 | Spurious Emission for NFC Int | Annex- G3 |

4.4 Interface 3 : WiFi

| S.No. | Parameter Name | Standard Name |
|-------|--------------------------------|---|
| 4.4.1 | 2.4 GHz WiFi Radio Conformance | ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3 |
| 4.4.2 | 5 GHz WiFi Radio Conformance | ETSI EN 301 893 or FCC CFR47 pt 15.407 or FCC CFR47 pt 15.249. Annex-G3 |
| 4.4.3 | EIRP for Wifi Interface | Latest NFAP and GSRs issued by DoT WPC. Annex-G2 |
| 4.4.4 | Frequency for WiFi equipments | DoT WPC GSR No. 45(E) 1048(E). Annex-G1 |

5. Variant 5 : HF Handheld Portable Stations

5.1 Parameters Linked with Product Variant

| S.No. | Parameter Name | Standard Name |
|-------|---|----------------------------------|
| 5.1.1 | Battery Safety | IS 16046. EN/IEC 62133. Annex-A2 |
| 5.1.2 | Conducted And Radiated Emission - Class B | TEC EMI EMC Standard CISPR 22/32 |

| | | |
|-------|---|--|
| | | EN55022/32. Annex-B |
| 5.1.3 | Conformance to standards for HF Radio Systems | ETSI EN 300xxx 301-xxx 303-xxx. Annex-C3 |
| 5.1.4 | Frequency for HF equipments | NFAP. Annex-C1 |
| 5.1.5 | Immunity to Electrostatic Discharge | TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B |
| 5.1.6 | Immunity to Radiated RF | TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B |
| 5.1.7 | IT Equipment Safety | IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1 |
| 5.1.8 | Max Transmit Power for HF HH Stn | As per DoT/WPC license conditions. Annex-C2 |

5.2 Interface 1 : Bluetooth Low Energy

| S.No. | Parameter Name | Standard Name |
|-------|--|-------------------------------|
| 5.2.1 | EIRP for BLE Interface | WPC GSR 45(E). Annex-G4 (4.2) |
| 5.2.2 | Frequency of Operation for BLE Interface | Latest NFAP. Annex-G4(4.1) |
| 5.2.3 | Spurious Emission for BLE Interface | Annex G3 |

5.3 Interface 2 : Near Field Communication

| S.No. | Parameter Name | Standard Name |
|-------|------------------------------------|----------------------------|
| 5.3.1 | Frequency of Operation for NFC Int | Latest NFAP. Annex-G6(6.1) |
| 5.3.2 | Spurious Emission for NFC Int | Annex- G3 |

5.4 Interface 3 : WiFi

| S.No. | Parameter Name | Standard Name |
|-------|--------------------------------|---|
| 5.4.1 | 2.4 GHz WiFi Radio Conformance | ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3 |
| 5.4.2 | 5 GHz WiFi Radio Conformance | ETSI EN 301 893 or FCC CFR47 pt 15.407 or FCC CFR47 pt 15.249. Annex-G3 |
| 5.4.3 | EIRP for Wifi Interface | Latest NFAP and GSRs issued by DoT WPC. Annex-G2 |
| 5.4.4 | Frequency for WiFi equipments | DoT WPC GSR No. 45(E) 1048(E). Annex-G1 |

6. Variant 6 : HF Mobile Stations

6.1 Parameters Linked with Product Variant

| S.No. | Parameter Name | Standard Name |
|--------|---|---|
| 6.1.1 | Battery Safety | IS 16046. EN/IEC 62133. Annex-A2 |
| 6.1.2 | Conducted And Radiated Emission - Class B | TEC EMI EMC Standard CISPR 22/32 EN55022/32. Annex-B |
| 6.1.3 | Conformance to standards for HF Radio Systems | ETSI EN 300xxx 301-xxx 303-xxx. Annex-C3 |
| 6.1.4 | Frequency for HF equipments | NFAP. Annex-C1 |
| 6.1.5 | Immunity to AC Voltage Dips and Short Interruptions | TEC EMI EMC Standard EN/IEC:61000-4-11. Annex-B |
| 6.1.6 | Immunity to DC Voltage Dips and Short Interruptions | EN/IEC:61000-4-29. Annex-B |
| 6.1.7 | Immunity to Electrostatic Discharge | TEC EMI EMC Standard EN/IEC:61000-4-2. Annex-B |
| 6.1.8 | Immunity to Fast Transients (Burst) | TEC EMI EMC Standard EN/IEC:61000-4-4. Annex-B |
| 6.1.9 | Immunity to Radiated RF | TEC EMI EMC Standard EN/IEC:61000-4-3. Annex-B |
| 6.1.10 | Immunity to RF Field Induced Conducted Disturbance | TEC EMI EMC Standard EN/IEC:61000-4-6. Annex-B |
| 6.1.11 | Immunity to Surges | TEC EMI EMC Standard EN/IEC:61000-4-5. Annex-B |
| 6.1.12 | IT Equipment Safety | IS 13252-1 or IEC:60950-1 or IEC 62368-1. Annex-A1 |
| 6.1.13 | Max Transmit Power for HF Mob Stn | As per DoT/WPC license conditions. Annex-C2 |

6.2 Interface 1 : Bluetooth Low Energy

| S.No. | Parameter Name | Standard Name |
|-------|--|-------------------------------|
| 6.2.1 | EIRP for BLE Interface | WPC GSR 45(E). Annex-G4 (4.2) |
| 6.2.2 | Frequency of Operation for BLE Interface | Latest NFAP. Annex-G4(4.1) |

| | | |
|-------|-------------------------------------|----------|
| 6.2.3 | Spurious Emission for BLE Interface | Annex G3 |
|-------|-------------------------------------|----------|

6.3 Interface 2 : Near Field Communication

| S.No. | Parameter Name | Standard Name |
|-------|------------------------------------|----------------------------|
| 6.3.1 | Frequency of Operation for NFC Int | Latest NFAP. Annex-G6(6.1) |
| 6.3.2 | Spurious Emission for NFC Int | Annex- G3 |

6.4 Interface 3 : WiFi

| S.No. | Parameter Name | Standard Name |
|-------|--------------------------------|---|
| 6.4.1 | 2.4 GHz WiFi Radio Conformance | ETSI EN 300 328 or FCC CFR47 pt 15.247 or FCC CFR47 pt 15.249. Annex-G3 |
| 6.4.2 | 5 GHz WiFi Radio Conformance | ETSI EN 301 893 or FCC CFR47 pt 15.407 or FCC CFR47 pt 15.249. Annex-G3 |
| 6.4.3 | EIRP for Wifi Interface | Latest NFAP and GSRs issued by DoT WPC. Annex-G2 |
| 6.4.4 | Frequency for WiFi equipments | DoT WPC GSR No. 45(E) 1048(E). Annex-G1 |