14 Technical Specifications for the BTS3012

About This Chapter

The technical specifications for the BTS3012 consist of capacity specifications, RF specifications, engineering specifications, lightning protection specifications, and other specifications concerned with physical ports and environment.

14.1 Capacity Specifications for the BTS3012/BTS3012AE
The capacity specifications for the BTS3012/BTS3012AE are concerned with the number of TRXs and cells.

14.2 RF Specifications for the BTS3012/BTS3012AE
The BTS3012/BTS3012AE RF specifications are concerned with the working frequency bands, Tx specifications, and Rx specifications.

14.3 Engineering Specifications for the BTS3012
The BTS3012 engineering specifications are concerned with dimensions, weight, power supply, and power consumption of the BTS3012.

14.4 Lightning Protection Specifications for the BTS3012/BTS3012AE Ports
The BTS3012/BTS3012AE provides lightning protection mechanism for various ports. The lightning protection specifications for the BTS3012/BTS3012AE ports are concerned with the power supply, E1 links, antenna system, and dry contact point.

14.5 Physical Ports of the BTS3012
The BTS3012 provides a variety of physical ports to connect the external equipment. The BTS3012 physical ports consist of transmission port, clock port, power port, grounding port, monitoring port, and antenna port.

14.6 Environment Requirements for the BTS3012
The environment requirements for the BTS3012 consists of working environment requirements, transport environment requirements, and storage environment requirements.

14.7 Compliant Standards of the BTS3012
The BTS3012 complies with the specifications associated with ITU and ETSI, Abis interface and Um interface, environment adaptability, EMC, lightning protection, safety, physical protection, working environment, transportation environment, storage environment, and acoustic noise environment.

14.1 Capacity Specifications for the BTS3012/BTS3012AE

The capacity specifications for the BTS3012/BTS3012AE are concerned with the number of TRXs and cells.

The capacity specifications for the BTS3012/BTS3012AE are as follows:

- The maximum cell configuration of one cabinet is S4/4/4, supporting 12 TRXs.
- One cabinet supports a maximum of six cells.
- The BTS3012/BTS3012AE supports omnidirectional cells and directional cells. A maximum of 36 TRXs can be configured for the synchronized cells.
- One site can be configured with a maximum of 36 TRXs (S12/12/12) through combined cabinets and cabinet groups.
- When the combination mechanism is applied, one dual polarization (or two omnidirectional antennas) supports a maximum of eight TRXs within one cell.

14.2 RF Specifications for the BTS3012/BTS3012AE

The BTS3012/BTS3012AE RF specifications are concerned with the working frequency bands, Tx specifications, and Rx specifications.

Working frequency bands

Table 14-1 lists the frequency bands supported by the BTS3012/BTS3012AE. The spacing between two frequencies is 200 kHz.

Table 14-1 Working frequency bands

Frequency Band	Receive Band	Transmit Band
Band I (900M)	1920–1980 MHz	921–960 MHz
Band II (1800M)	1710–1785 MHz	1805–1880 MHz
Band III (1800M)	824–849 MHz	869–894 MHz
Band IV (1900M)	1850–1910 MHz	1930–1990 MHz

Transmit Specifications

Table 14-2 lists the rated output power of the DTRU in the BTS3012/BTS3012AE.

Table 14-2 Output power

Modulation Scheme	Bypass		Output Power (with the PBT Function)
	Mode 1	Mode 2	
GMSK	40 W (45.00 dBm)	60 W (46.78 dBm)	100 W (50.00 dBm)

Modulation Scheme	Bypass		Output Power (with the PBT Function)
	Mode 1	Mode 2	
8PSK	40 W (45.00 dBm)	40 W (45.00 dBm)	60 W (46.78 dBm)

NOTE

- GMSK = Gaussian Minimum Shift Keying
- PSK = Phase Shift Keying

Receive Specifications

Table 14-3 lists the static receive sensitivity of the BTS3012/BTS3012AE.

Table 14-3 Receive sensitivity

Channel Type	Receive Sensitivity
TCH/FS	–112.5 dBm (a typical value in normal temperature)
Others	Better than the requirements specified in the 3GPP TS 05.05 protocols

14.3 Engineering Specifications for the BTS3012

The BTS3012 engineering specifications are concerned with dimensions, weight, power supply, and power consumption of the BTS3012.

Dimensions

Table 14-4 Dimensions (appearance)

Item	Width (mm)	Depth (mm)	Height (mm)
Cabinet	600	450	1600
Cabinet+top subrack	600	450	1680
Cabinet+top subrack+base	600	450	1750

Weight

Table 14-5 Weight of the cabinet

Configuration Type	Weight of the Cabinet (Kg)
Empty cabinet (including the boards in the common subrack)	120

Configuration Type	Weight of the Cabinet (Kg)
Full configuration (S4/4/4)	200
Full configuration (S4/4/4 cell configuration including the transmission modules and the DCOMs)	220

Power Supply

The BTS3012 uses the —48 V DC that complies with the specification ETS 300 132-2. **Table 14-6** lists specifications for the input power.

Table 14-6 Specifications for the input power

Power Type	Rated Value	Specifications
-48 V DC	-48 V DC	-40 V DC to -60 V DC

NOTE

The BTS3012 cabinet supports 110 V AC, 220 V AC, and +24 V DC through an external power subrack.

Power Consumption

Table 14-7 lists the typical power consumption value of the BTS3012 when the DTRU (type A) is used.

Table 14-7 Power consumption

Parameter	Configuration Type	Power Consumption
Mean value	Normal temperature, 900 MHz 40 W TRX, S4/4/4 full configuration, DC power consumption in mean traffic volume (–48 V DC used)	1.6 kW

Table 14-8 lists the typical power consumption value of the BTS3012 when the DTRU (type B) is used.

Table 14-8 Power consumption

Parameter	Configuration Type	Power Consumption
Mean value	Normal temperature, 900 MHz 40 W TRX, S4/4/4 full configuration, DC power consumption in mean traffic volume (–48 V DC used)	0.95 kW

14.4 Lightning Protection Specifications for the BTS3012/ BTS3012AE Ports

The BTS3012/BTS3012AE provides lightning protection mechanism for various ports. The lightning protection specifications for the BTS3012/BTS3012AE ports are concerned with the power supply, E1 links, antenna system, and dry contact point.

NOTE

- The lightning protection specifications for the BTS3012/BTS3012AE ports are concerned with the surge waveform, which is 8/20 us.
- The surge current unspecified with maximum discharge current is called nominal discharge current.

Table 14-9 Lightning protection specifications for the BTS3012/BTS3012AE

Item	Specifications	Remarks
DC power supply	Differential mode: 3 kA; common mode: 5 kA	For the BTS3012 only
	Unspecified	For the BTS3012AE only
AC power supply	Unspecified	For the BTS3012 only
	Nominal value for the differential mode and common mode: 40 kA; maximum value: 60 kA	For the BTS3012AE only
E1 links	Differential mode: 3 kA; common mode: 5 kA	For the BTS3012 only
	Differential mode: 5 kA; common mode: 8 kA	For the BTS3012AE only
Antenna system	Differential mode: 8 kA; common mode: 40 kA	-
Dry contact point	Differential mode/common mode: 250 A	For the BTS3012 only
	Differential mode: 3 kA; common mode: 5 kA	For the BTS3012AE only
RET antenna	Differential mode: 3 kA; common mode: 5 kA	-

14.5 Physical Ports of the BTS3012

The BTS3012 provides a variety of physical ports to connect the external equipment. The BTS3012 physical ports consist of transmission port, clock port, power port, grounding port, monitoring port, and antenna port.

Transmission Ports

Table 14-10 Transmission ports supported by the BTS3012

Type	Quantity	Transmission Rate	Standard
E1	4 pairs	2 Mbit/s	• ETS 300 420 • ITU G.703/G.704
STM-1	2 pairs	155 Mbit/s	• ANSI T1.105-1995 • ITU I.432.2 G.703 • ITU G.957
T1	4 pairs	1.5 Mbit/s	ANSI-G.703/G.704

Other External Ports

Table 14-11 Other external ports of the BTS3012

Port	Type	Quantity	Function
Clock port	External input clocks	1	Take the BITS for instance, the BITS provides high-precision 2.048 MHz clock.
Power port	Power Supply	1	-
Grounding port	Protection grounding port	1	-
	Power grounding port	1	-
Monitoring port	External alarm input port	6+32	The DTMU provides six Boolean value inputs. The DEMU provides 32 Boolean value inputs.
	External control output port	6	The DEMU provides six Boolean value outputs.
	Communication port for environment monitoring	2	Connected with the environment monitor
Antenna feeder port	RF port	12	Input port for the feeder

14.6 Environment Requirements for the BTS3012

The environment requirements for the BTS3012 consists of working environment requirements, transport environment requirements, and storage environment requirements.

14.6.1 Working Environment Requirements for the BTS3012

This part describes the optimal working environment for the BTS3012. It focuses on the climatic, biological, air cleanness, and mechanical stress requirements for the operation of the BTS3012.

14.6.2 Transportation Requirements for the BTS3012
This part describes the optimal transportation environment for the BTS3012. It focuses on the climatic, biological, air cleanness, and mechanical stress requirements for transporting the BTS3012.

14.6.3 Storage Requirements for the BTS3012
This part describes the optimal storage environment for the BTS3012. It focuses on the climatic, waterproof, biological, air cleanness, and mechanical stress requirements for the storage of the BTS3012.

14.6.1 Working Environment Requirements for the BTS3012

This part describes the optimal working environment for the BTS3012. It focuses on the climatic, biological, air cleanness, and mechanical stress requirements for the operation of the BTS3012.

Climatic Requirements

Table 14-12 lists the climatic requirements for the normal operation of the BTS.

Table 14-12 Climatic requirements

Item	Specifications
Temperature	–5°C to +45°C (long-term working environment) –10°C to +55°C (short-term working environment)
Temperature change rate	≤ 3°C/min
Relative humidity	5%–95%
Altitude	≤ 3000 m
Air pressure	70 kPa to 106 kPa
Solar radiation	≤ 1120 W/s^2
Thermal radiation	≤ 600 W/s^2
Wind speed	≤ 50 m/s

NOTE

Long term working environment refers to the conditions in which the BTS works normally for a long time. Short term working environment refers to the conditions refers to the conditions in which the BTS works normally and the hardware is kept undamaged within 15 days.

Biological Environment Requirements

The working environment of the BTS should meet the following biological requirements:

- The environment is not conducive for the growth of fungus or mildew.
- There are no rodents such as rats.

Air Cleanness Requirements

The working environment of the BTS should meet the following air cleanness requirements:

- There is no explosive, conductive, magneto-conductive or corrosive dust in the air.
- The density of chemically active materials complies with the requirements listed in **Table 14-13**.

Table 14-13 Requirements for chemically active materials

Chemically Active Material	Unit	Density
SO_2	(mg/m^3)	≤ 0.30
H_2S	(mg/m^3)	≤ 0.10
NH_3	(mg/m^3)	≤ 1.00
Cl_2	(mg/m^3)	≤ 0.10
HCL	(mg/m^3)	≤ 0.10
HF	(mg/m^3)	≤ 0.01
O_3	(mg/m^3)	≤ 0.05
NO_x	(mg/m^3)	≤ 0.05

Mechanical Stress Requirements

Table 14-12 lists the mechanical stress requirements for the normal operation of the BTS.

Table 14-14 Mechanical stress requirements

Item	Sub Item	Specifications	
Sinusoidal vibration	Offset	≤ 3 mm	-
	Accelerated speed	-	≤ 10.0 m/s^2
	Frequency range	2–9 Hz	9–200 Hz
Unsteady impact	Impact response spectrum II	≤ 250 m/s^2	
	Static payload	0	

NOTE

- Impact response spectrum refers to the maximum acceleration response curve generated by the equipment under specified impact excitation. Impact response spectrum II means that the duration of semi-sine impact response spectrum is 6 ms.
- Static payload refers to the capability of the equipment in package to bear the pressure from the top in normal pile-up method.

14.6.2 Transportation Requirements for the BTS3012

This part describes the optimal transportation environment for the BTS3012. It focuses on the climatic, biological, air cleanness, and mechanical stress requirements for transporting the BTS3012.

Climatic Requirements

Table 14-15 lists the climatic requirements for transporting the BTS.

Table 14-15 Climatic requirements

Item	Specifications
Temperature	-40℃ to +70℃
Temperature change rate	≤ 3℃/min
Relative humidity	5%–95%
Altitude	≤ 3000 m
Air pressure	70–106 kPa
Solar radiation	≤ 1120 W/m^2
Thermal radiation	≤ 600 W/m^2
Wind speed	≤ 50m/s

Waterproof Requirements

The transportation of the BTS should meet the following waterproof requirements:

- The package is intact.
- Waterproof measures should be taken to prevent rainwater from entering the package.
- There is no accumulated water inside transportation vehicle.

Biological Environment Requirements

The transportation of the BTS should meet the following biological requirements:

- The environment is not conducive for the growth of fungus or mildew.
- There are no rodents such as rats.

Air Cleanness Requirements

The transportation of the BTS should meet the following air cleanness requirements:

- There is no explosive, conductive, magneto-conductive or corrosive dust in the air.
- The density of physically active materials complies with the requirements listed in **Table 14-16**.

Table 14-16 Requirements for physically active materials

Physically Active Material	Unit	Density
Suspended dust	mg/m^3	≤ 35
Falling dust	mg/m^2h	≤ 0.2
Sand	mg/m^3	≤ 30
NOTE ● Suspended dust: diameter ≤ 75 μm ● Falling dust: 75 μm ≤ diameter ≤ 150 μm ● Sand: 150 μm ≤ diameter ≤ 1000 μm		

- The density of chemically active materials complies with the requirements listed in **Table 14-17**.

Table 14-17 Requirements for chemically active materials

Chemically Active Material	Unit	Density
SO_2	(mg/m^3)	≤ 0.30
H_2S	(mg/m^3)	≤ 0.10
NO_x	(mg/m^3)	≤ 0.05
NH_3	(mg/m^3)	≤ 1.00
Cl_2	(mg/m^3)	≤ 0.10
HCL	mg/m^3	≤ 0.10
HF	(mg/m^3)	≤ 0.01
O_3	(mg/m^3)	≤ 0.05

Mechanical Stress Requirements

Table 14-18 lists the mechanical stress requirements for transporting the BTS.

Table 14-18 Mechanical stress requirements

Item	Sub Item	Specifications		
Sinusoidal vibration	Offset	≤ 3.5 mm	-	-
	Accelerated speed	-	≤ $10.0m/s^2$	≤ $15.0m/s^2$
	Frequency range	2–9 Hz	9–200 Hz	200–500 Hz

Item	Sub Item	Specifications		
Random vibration	Spectrum density of accelerated speed	30 m^2/s^3	3 m^2/s^3	1 m^2/s^3
	Frequency range	2–10 Hz	10–200 Hz	200–500 Hz
Unsteady impact	Impact response spectrum II	≤ 250m/s^3		
	Static payload	≤ 10 kPa		

NOTE

- Impact response spectrum refers to the maximum acceleration response curve generated by the equipment under specified impact excitation. Impact response spectrum II means that the duration of semi-sine impact response spectrum is 6 ms.
- Static payload refers to the capability of the equipment in package to bear the pressure from the top in normal pile-up method.

14.6.3 Storage Requirements for the BTS3012

This part describes the optimal storage environment for the BTS3012. It focuses on the climatic, waterproof, biological, air cleanness, and mechanical stress requirements for the storage of the BTS3012.

Climatic Requirements

The storage of the BTS should meet the climatic requirements listed in **Table 14-19**.

Table 14-19 Climatic requirements

Item	Specifications
Temperature	-40℃ to +70℃
Temperature change rate	≤ 1℃/min
Relative humidity	5%-95%
Altitude	≤ 3000 m
Air pressure	70–106 kPa
Solar radiation	≤ 1120 W/m^2
Thermal radiation	≤ 600 W/m^2
Wind speed	≤ 50 m/s

Waterproof Requirements

The storage environment of the BTS should be waterproof. The indoor storage environment should meet the following waterproof requirements:

- There is no water on the ground. No water is leaked on the package of the equipment.
- The equipment must be kept away from the auto fire-protection devices and air-conditioner that are prone to leakage.

If you have to place the equipment outdoors, ensure that:

- The package is intact.
- Waterproof measures are taken to prevent rainwater from entering the package.
- There is no water on the ground and water cannot enter the package.
- The package is not exposed to direct sunlight.

Biological Environment Requirements

The storage of the BTS should meet the following biological requirements:

- The environment is not conducive for the growth of fungus or mildew.
- There are no rodents such as rats.

Air Cleanness Requirements

The storage of the BTS should meet the following air cleanness requirements:

- There is no explosive, conductive, magneto-conductive or corrosive dust in the air.
- The density of physically active materials complies with the requirements listed in **Table 14-20**.

Table 14-20 Requirements for physically active materials

Physically Active Material	Unit	Density
Suspended dust	(mg/m^3)	≤ 5.00
Falling dust	(mg/m^2)	≤ 500.00
Sand	(mg/m^3)	≤ 300
NOTE ● Suspended dust: diameter ≤ 75 μm ● Falling dust: 75 μm ≤ diameter ≤ 150 μm ● Sand: 150 μm ≤ diameter ≤ 1000 μm		

- The density of chemically active materials complies with the requirements listed in **Table 14-21**.

Table 14-21 Requirements for chemically active materials

Chemically Active Material	Unit	Density
SO_2	(mg/m^3)	≤ 0.30
H_2S	(mg/m^3)	≤ 0.10
NO_x	(mg/m^3)	≤ 0.50
NH_3	(mg/m^3)	≤ 1.00
Cl_2	(mg/m^3)	≤ 0.10
HCL	(mg/m^3)	≤ 0.10
HF	(mg/m^3)	≤ 0.01
O_3	(mg/m^3)	≤ 0.05

Mechanical Stress Requirements

The storage of the BTS should meet the mechanical stress requirements listed in **Table 14-22**.

Table 14-22 Mechanical stress requirements

Item	Sub Item	Specifications	
Sinusoidal vibration	Offset	≤ 1.5 mm	-
	Accelerated speed	-	≤ 5.0m/s^2
	Frequency range	2–9 Hz	9–200 Hz
Unsteady impact	Impact response spectrum II	≤ 250m/s^2	
	Static payload	≤ 5 kPa	

NOTE

- Impact response spectrum refers to the maximum acceleration response curve generated by the equipment under specified impact excitation. Impact response spectrum II means that the duration of semi-sine impact response spectrum is 6 ms.
- Static payload refers to the capability of the equipment in package to bear the pressure from the top in normal pile-up method.

14.7 Compliant Standards of the BTS3012

The BTS3012 complies with the specifications associated with ITU and ETSI, Abis interface and Um interface, environment adaptability, EMC, lightning protection, safety, physical protection, working environment, transportation environment, storage environment, and acoustic noise environment.

ITU and ETSI Specifications

The BTS3012 complies with the following standards:

- GSM 01.02 (ETR099):*general description of a GSM Public Land Mobile Network (PLMN)*
- GSM 04.04 (ETS 300 553):*European digital cellular Telecommunications System (phase 2); layer 1 general requirements*
- GSM 04.05 (ETS 300 554): *European digital cellular Telecommunications System (phase 2); Data Link (DL) layer general aspects*
- GSM 04.06 (ETS 300 555): *European digital cellular Telecommunications System (phase 2); Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification*
- GSM 04.08 (ETS300557): *digital cellular telecommunications system (phase2); mobile radio interface layer 3 specification*
- GSM 05.01 (ETS300573): *European digital cellular telecommunications system (phase2); physical layer on the radio path general description*
- GSM 05.02 (ETS 300 574):*multiplexing and multiple access on the radio path*
- GSM 05.03 (ETS300575):*digital cellular telecommunications system (phase2); channel coding*
- GSM 05.04 (ETS300576):*European digital cellular telecommunications system (phase2); modulation*
- GSM 05.05 (ETS300577):*digital cellular telecommunications system (phase2); radio transmission and reception*
- GSM 05.08 (ETS300578):*digital cellular telecommunications system (phase2); radio subsystem link control*
- GSM 05.10 (ETS300579):*digital cellular telecommunications system (phase2); radio subsystem synchronization*
- GSM 11.10 (ETS300607):*digital cellular telecommunications system (phase2); Mobile Station (MS) conformity specification*
- GSM 11.11 (ETS300608):*digital cellular telecommunications system (phase2); specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface*
- GSM 08.58 (ETS 300 596):*Base Station Controller-Base Transceiver Station (BSC-BTS) interface layer 3 specification*
- GSM 08.51 (ETS 300 592):*European digital cellular Telecommunications System (phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface general aspects*
- GSM 08.52 (ETS 300 593):*European digital cellular Telecommunications System (phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface principles*
- GSM 08.56 (ETS 300 595):*European digital cellular Telecommunications System (phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface layer 2 specification*

Abis Interface and Um Interface

The BTS3012 complies with the following standards:

- GSM 08.51 (ETS 300 592):*European digital cellular Telecommunications System (phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface general aspects*
- GSM 08.52 (ETS 300 593):*European digital cellular Telecommunications System (phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface principles*
- GSM 08.56 (ETS 300 595):*European digital cellular Telecommunications System (phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface layer 2 specification*
- GSM 04.22 (ETS 300 563): *digital cellular Telecommunication System (phase 2); Radio Link Protocol (RLP) for data and telematic services on the Mobile Station - Base Station System (MS - BSS) interface and the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface*

Environment Adaptability

The BTS3012 complies with the following standards:

- Low temperature specifications: IEC 682-1
- High temperature specifications: IEC 682-2
- Temperature cycling specifications: IEC 682-3
- Moist heat specifications: IEC 68-2-30
- Vibration specifications: ETS 300-019-3
- Anti-seismic specifications: use the anti-seismic test method specified by the Ministry of Posts and Telecommunications
- Anti-mildew specifications: IDT IEC 68-2-10
- Anti-smoke specifications: IDT IEC 68-2-11

EMC

The BTS3012 complies with the following standards:

- R&TTE Directive 99/5/EC
- ETSI EN 301 489-1/8
- The BTS3012 has passed the certificates defined by CE.

Lightning Protection

The BTS3012 complies with the following standards:

- ITU K.27 K.46 ETS 300-253 IEC-1312
- Engineering design specifications for the lightning protection of a telecommunications site (YD5098-2006)
- ITU K.27 K.46 ETS 300-253 IEC-1312

Safety

The BTS3012 complies with the following standards:

GB4943-1995 standard

Physical Protection

The BTS3012 complies with the following standards:

K.11 and K.20 specified by ITU-T

Working Environment

The working environment complies with the following standard:

ETSI EN 300 019-1-4 Class4.1*Non-weatherprotected locations*

Transportation Environment

The transportation environment complies with the following standard:

ETSI EN 300 019-1-2 Class2.3 *Public transportation*

Storage Environment

The storage environment complies with the following standard:

ETSI EN 300 019-1-1 Class1.2 *Weather protected, not temperature controlled storage Locations*

Acoustic Noise

The acoustic noise complies with the following standards:

- GR-63-CORE - 1995
- ETS 300 753 5.2