

Frequency Bands

Channel Arrangement

GSM World 2001/2002

FREQUENCY BANDS BY COUNTRY

MS Maximum Output Power

Power class	GSM 400 / GSM 900	GSM 1800	GSM 1900	Tolerance (dB)
1	-----	1 W (30 dBm)	1 W (30 dBm)	±2
2	8 W (39 dBm)	0.25 W (24 dBm)	0.25 W (24 dBm)	±2
3	5 W (37 dBm)	4 W (36 dBm)	2 W (33 dBm)	±2
4	2 W (33 dBm)			±2
5	0.8 W (29 dBm)			±2

Power Control Level

Power control level	Nominal output power (dBm)	Tolerance (dB)
0-2	39	±2
3	37	±3
4	35	±3
5	33	±3
6	31	±3
7	29	±3
8	27	±3
9	25	±3
10	23	±3
11	21	±3
12	19	±3
13	17	±3
14	15	±3
15	13	±3
16	11	±5
17	9	±5
18	7	±5
19-31	5	±5

Power control level	Nominal output power (dBm)	Tolerance (dB)
29	36	±2
30	34	±3
31	32	±3
0	30	±3
1	28	±3
2	26	±3
3	24	±3
4	22	±3
5	20	±3
6	18	±3
7	16	±3
8	14	±3
9	12	±4
10	10	±4
11	8	±4
12	6	±4
13	4	±4
14	2	±5
15-28	0	±5

Power control level	Nominal output power (dBm)	Tolerance (dB)
22-29	Reserved	Reserved
30	33	±2
31	32	±2
0	30	±3
1	28	±3
2	26	±3
3	24	±3
4	22	±3
5	20	±3
6	18	±3
7	16	±3
8	14	±3
9	12	±4
10	10	±4
11	8	±4
12	6	±4
13	4	±4
14	2	±5
15	0	±5
16-21	Reserved	Reserved

Legend:  
Countries where operators either have implemented these systems or have committed to do so

- GSM 900
- GSM 900, GSM 1800
- GSM 1800
- GSM 1900

Countries that have shown interest in implementing these systems

- GSM 450\*
- GSM 400\* (GSM 450 or GSM 480)

Countries that have signed the MoU for GSM-R and are planning to implement GSM-R

- GSM-R\*

\*only listed in table

- Albania

Algeria

American Samoa

Andorra

Angola

Antigua & Barbuda

Argentina

Armenia, Republic of

Australia

Austria

Azerbaijan, Republic of

Bahrain

Bangladesh

Belarus, Republic of

Belgium

Benin

Bermuda

Bolivia

Bosnia Herzegovina

Botswana

Brazil

Brunei, Darussalam

Bulgaria

Burkina Faso

Burundi

Cambodia, Kingdom of

Cameroun

Canada

Cape Verde

Central African Republic

Chad

Chile

China, Peoples Republic of

Colombia

Congo

Congo, Democratic Republic of

Croatia

Cuba

Cyprus

Czech Republic

Denmark

Dominican Republic

Egypt

El Salvador

Equatorial Guinea

Estonia

Ethiopia

Faroe Islands

Fiji

Finland

France

French Polynesia

French West Indies

Gabon, Republic of
- Gambia

Georgia

Germany

Ghana

Gibraltar

Greece

Greenland

Guam (USA)

Guernsey

Guinea

Kyrgyz Republic

Hong Kong

Hungary

Iceland

India

Indonesia

Iran

Ireland

Isle of Man
- Israel

Italy

Ivory Coast

Jamaica

Jersey

Jordan

Kazakhstan

Kenya

Mali

Malta

Mauretania

Mauritius

Latvia

Lebanon

Lesotho

Liberia

Libya

Liechtenstein

Lithuania
- Luxembourg

Macao

Macedonia (FYROM)

Madagascar

Malaysia

Maldives, Republic of

Mali

Malta

Mauretania

Mauritius

Mexico

Moldova, Republic of

Monaco

Mongolia

Morocco

Mozambique

Myanmar
- Namibia

Nepal

Netherlands

Netherlands Antilles

New Caledonia

New Zealand

Niger

Nigeria

Norway

Oman, Sultanate of

Pakistan

Palestinian Authority

Papua New Guinea

Paraguay

Peru

Philippines

Poland

Portugal
- Qatar

Reunion (La)

Romania

Russia

Rwanda, Republic of

Sao Tome and Principe

Saudi Arabia

Senegal

Seychelles

Sierra Leone

Singapore

Slovak Republic

Slovenia

Somalia

South Africa

Spain

Sri Lanka

Sudan
- Suriname

Swaziland

Sweden

Switzerland

Syria

Taiwan

Tanzania

Thailand

Togo

Tonga

Tunisia

Turkey

Turkmenistan

Uganda

Ukraine

United Arab Emirates

United Kingdom

USA

Uzbekistan

Vanuatu

Venezuela

Vietnam

Virgin Islands (USA)

Yemen

Yugoslavia, Federal Republic of

Zambia

Zimbabwe

4100, 4200, 4300, 4350, 4400



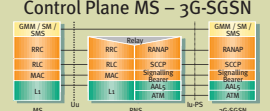
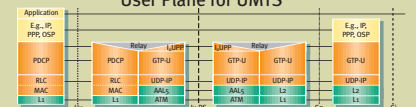
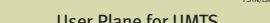
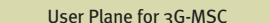
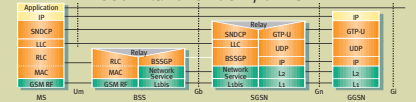
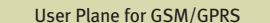
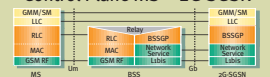
U<sub>m</sub>, BTS

$U_m$ , Network

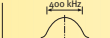





G<sub>c</sub><sup>\*</sup>, G<sub>d</sub>, G<sub>f</sub>, G<sub>i</sub>, G<sub>s</sub>, I<sub>uCS</sub>, I<sub>uPS</sub>, PST  
\*on request

A, A<sub>bis</sub>, C, D, E, F, H, PSTN,  
ISDN/V5.x, G<sub>b</sub>, G<sub>c</sub>, G<sub>d</sub>, G<sub>f</sub>, G<sub>r</sub>,  
G<sub>s</sub>, G<sub>n</sub>, G<sub>i</sub>

A, A<sub>bis</sub>, C, D, E, F, H, PSTN,  
ISDN/V5.x, G<sub>b</sub>, G<sub>c</sub>, G<sub>d</sub>, G<sub>f</sub>,  
G<sub>r</sub>, G<sub>s</sub>



Abbreviations	
AAL2	ATM Adaptation Layer type 2
AAL5	ATM Adaptation Layer type 5
ATM	Asynchronous Transfer Mode
AUC	Authentication Center
BG	Border Gateway
BSC	Base Station Controller
BSS	Base Station System
BSSGP	BSS GPRS Protocol
BTS	Base Transceiver Station
CDMA	Code Division Multiple Access
DNS	Domain Name System
EIR	Equipment Identity Register
FDD	Frequency Division Duplex
GGSN	Gateway GPRS Support Node
GMM	GPRS Mobility Management and Session Management
GMSC	Gateway MSC
GMSK	Gaussian Minimum Shift Keying
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
GTP	GPRS Tunneling Protocol
GTP-C	GTP Control Plane
GTP-U	GTP User Plane
HLR	Home Location Register
HSCSD	High Speed Circuit Switched Data
IP	Internet Protocol
ISP	Integrated Services Digital Network
LLC	Logical Link Control
L1	Layer 1
L2	Layer 2
MAC	Medium Access Control
MMS	Mobile Station
MSC	Mobile Switching Center
OSP	Over Stream Protocol
PCM	Pulse Code Modulation
PCU	Packet Control Unit
PDCP	Packet Data Convergence Protocol
PLMN	Public Land-Mobile Network
PPP	Point-to-Point Protocol
PSDPN	Public Switched Packet Data Network
PSDN	Public Switched Telephone Network
QPSK	Quadrature Phase Shift Keying
RANAP	Radio Access Network Application Protocol
RF	Radio Frequency
RLC	Radio Link Control
RNC	Radio Network Controller
RRC	Radio Resource Control
SCCP	Signaling Connection Control Part
SGSN	Serving GPRS Support Node
SMS	Short Message Service
SM - SC	Short Message - Service Center
SNDCP	Sub Network Dependent Convergence Protocol
TCP	Transmission Control Protocol
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
UDP	User Datagram Protocol
UMTS	Universal Mobile Telecommunications System
UPP	User Plane Protocol
UTRAN	UMTS Terrestrial Radio Access Network
VLR	Visitor Location Register
2G	Second Generation
3G	Third Generation

Technology	Modulation	Access	Communication	Frequency Domain	Time Domain
GSM	GMSK	TDMA	TDD; FDD		
GPRS	GMSK	TDMA	FDD		
UMTS - FDD	QPSK	CDMA	FDD		
UMTS - TDD	QPSK	CDMA	TDD	